Does "Toothless" IO Advice Matter? IMF Surveillance and 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 difference-in-differences, we show that resource-rich developing countries are more likely to adopt legislation reforming the oil, gas, and mining sectors when their corresponding Article IV appraisal recommends natural resource governance reforms. Our results suggest that technocratic consultation — 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

Can international organizations (IOs) help alleviate the resource curse? The potential downsides of natural resource dependence are well known. An abundance of oil, natural gas, and minerals can lead to high economic volatility, weak fiscal capacity, low levels of government accountability, and political unrest (Ross, 2015). Yet natural resource wealth also harbors the potential for economic growth: if properly managed, theses resources can be used to increase public investment in human capital and infrastructure (Venables, 2016). Multilateral economic organizations, such as the World Bank and International Monetary Fund (IMF), routinely provide consultation and non-binding guidance to developing countries seeking to accomplish this. Does this advice improve natural resource governance?

Existing research tends to focus on the IMF's role in crisis lending, including its practice of conditioning loan disbursement on policy reforms (e.g. Vreeland, 2003; Dreher, 2009; Chapman et al., 2017). But a large portion of its time is devoted to routine surveillance, as the staff conducts regular "health checks" (IMF, 2020) of economic and financial practices in its 190 member countries. Despite the amount of time and effort devoted to such health checks (which are formally called Article IV consultations), we know relatively little about what — if anything — they achieve.[1] 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. At the same time, many have argued that IOs can influence government policy through advice and standard setting, including technical assistance from the World Trade Organization (Shaffer, 2005), "positive complementarity" from the the International Criminal Court (Dancy and Montal, 2017), or socialization to human rights norms (Greenhill, 2015). Yet the surveillance function of the IMF remains understudied. If one way IOs matter is through disseminating ideas and best practices, Article IV consultations are an obvious place to look.

Given the "toothlessness" of Article IV consultations, there are many reasons why politically constrained governments might fail to implement well-meaning advice in the face of special interest pressure or public demands for expensive programs and benefits. Even a 2005 report commissioned by the IMF suggests that Article IV surveillance has mixed results, at best (Ostry and Zettelmeyer, 2005). Still, governments may see virtue in shoring up their financial house as a preventive measure, rather than waiting for a costly crisis. This may be especially true in the natural resource sector, where the perils of reliance on primary commodity exports are well documented (Ross, 1999). We argue that expert advice from IMF economists is one source of ideas for developing sound resource governance.

[1] For an important, and comprehensive, exception see Edwards (2018).

Though states often receive conflicting advice from different IOs (Breen et al., 2020), this is unlikely to be the case when it comes to natural resource management, as different IOs largely promote similar practices in this sector. For example, the IMF, World Bank, European Union, G8, G20, and United Nations have all endorsed the Extractive Industries Transparency Initiative, or EITI (Sovacool et al., 2016). Such initiatives are important because oil, gas, and minerals are a crucial source of revenue for many developing countries. Given the large informal sector and the prevalence of small-scale firms, these countries typically have a narrow tax base and collect less revenue (Besley and Persson, 2014). This, coupled with their limited access to capital markets in times of need (Wibbels, 2006), means they often turn to natural resources to fund their expenditures. On the one hand, governments are well aware of the danger of the resource curse and seek out expertise from IOs, especially after new natural resource windfalls. On the other hand, the lure of using resource rents for political purposes and the high cost of institutional development suggest that the natural resource sector might be especially resistant to large scale reform.

IO bureaucracies attain autonomy and legitimacy by developing specialized expertise (Barnett and Finnemore, 2004a; Johnson, 2014). The IMF is no exception. Its staff consists of highly trained economists and development experts who closely scrutinize the structural conditions of countries' economies. During the Article IV process, government officials meet with a team from the IMF to discuss a range of economic policies (a process we describe below). Since 2004, the IMF has consistently published Article IV reports, partly in an effort to pressure countries to adopt their recommendations. We argue that the content of these reports is a good reflection of discussions between host governments and an IMF delegation. If governments take IMF advice to heart, they should be more likely to implement reforms in areas highlighted in public Article IV reports. In particular, when Article IV reports place special emphasis on the natural resource sector, we predict that countries will be more likely to see the adoption of legislation aimed at reforming this sector.

To test this argument, we examine the content of all 700 Article IV consultations conducted in 80 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 a differences-in-differences approach 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, and discuss several cases in which IMF recommendations did, or did not, lead to reform.

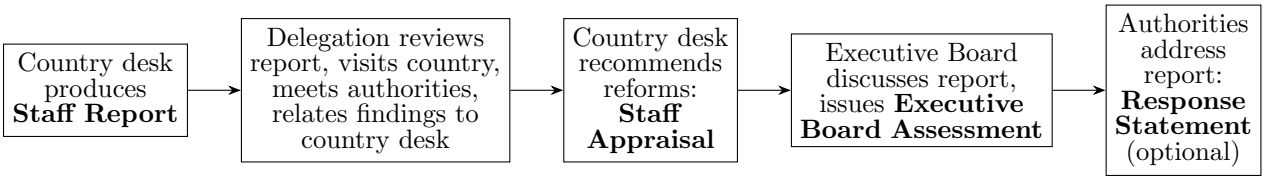
Our analysis speaks not only to a growing body of literature focusing on the linguistic content of IO reports and statements (Busch and Pelc, 2019; Terman and Voeten, 2018), but also to larger debates about

the ability of IOs to influence domestic politics. Scholars have examined the role of IOs in democratization (Pevehouse, 2002), trade policy (Allee and Scalera, 2012), climate policy (McLean and Stone, 2012), human rights practices and legal reform (Simmons, 2009), among other areas. Some of this work focuses on the role of IOs in disseminating knowledge, promoting ideas, and influencing common understandings of best practices (Barnett and Finnemore, 2004b; Park, 2006; Simmons et al., 2006; Park and Vetterlein, 2010; Haas, 2018). Our contribution is, first, to examine whether IOs can influence domestic politics when they have no explicit financial leverage, and second, to assess whether such technical assistance matters in a particularly challenging issue area: natural resource governance.

1 Article IV Consultations

When the IMF was first 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, with member countries providing "the information necessary for such surveillance" (IMF, 2016, 6). This regular surveillance, called an Article IV consultation, is supposed to take place every 12 to 24 months. 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 typically begin with a country desk within the IMF producing a Staff Report that assesses the state of a country's economy. This report is internally reviewed prior to a visit by an IMF delegation. This visit normally lasts one or two weeks and the delegation meets 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 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, which in turn might issue a response statement. In this response statement, authorities are free to disagree with the assessment of the Executive Board, but they tend to agree 75 percent of the time (Fayad et al., 2020).

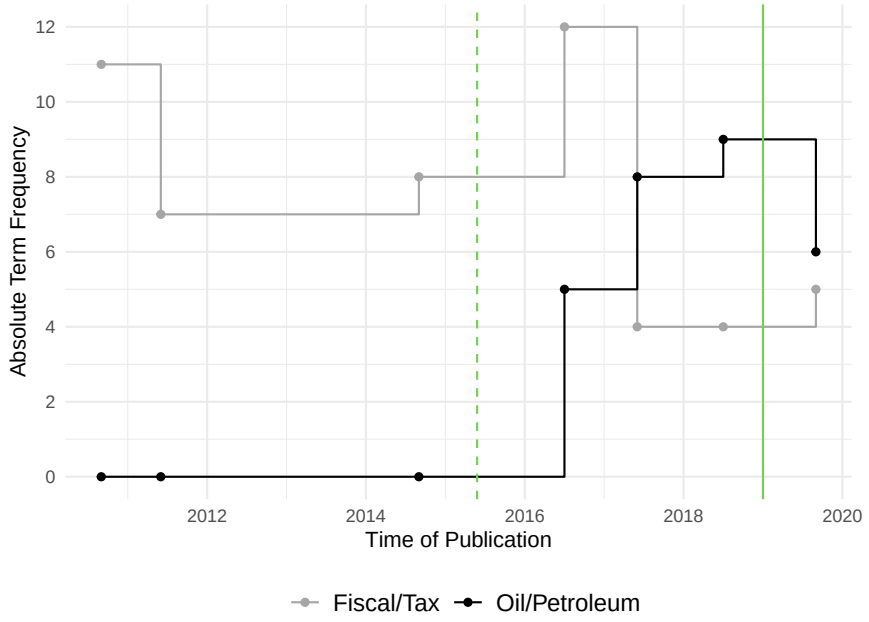
The consultation process has undergone several changes over the history of the Fund. As mentioned above, the process evolved from a form of exchange rate surveillance to a broader assessment of a country's economic fundamentals. Global financial events, like the debt crises of the 1980s, have also prompted rethinking of the surveillance process. Some reforms have been internal and bureaucratic. For instance, the Fund improved its analytical and diagnostic approaches to focus on particular vulnerabilities in the financial sector (Ostry and Zettelmeyer, 2005). Other reforms aimed to alter the incentives of countries to adopt the Fund's recommendations. Various proposals were put forth that would tie crisis borrowing to compliance with past implementation of Article IV recommendations, but these proposals were never adopted: Article IV consultations continue to be only suggestive in nature, and countries are not required to comply with the appraisal of the IMF.[2]

In an attempt to increase transparency, the Executive Board initiated a pilot program for voluntary release of Article IV consultations in March 1999. Since 2004, all consultations are automatically made public, unless the country under surveillance objects. And few countries seem to object: while 47 percent of all reports 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 et al., 2011, 11), and 95 percent for the 2014–2015 period (Mihalyi and Mate, 2018). The idea of transparency in Article IV consultations was not entirely novel. As Rodrik (1995) argues, part of the IMF's role has always been to provide a "seal of approval" for international financial markets. One of the goals of publishing Article IV consultations is to increase transparency for these and other actors (Edwards, 2018).

We do know, at least anecdotally, that the IMF takes Article IV consultations with resource-rich countries very seriously, adjusting recommendations accordingly. For example, prior to the 2015 discovery of oil deposits in Guyana, the IMF limited its recommendations to medium-term fiscal reform. The IMF recognized Guyana as a less developed country and recommended the development of low-carbon, sustainable sectors

[2]In addition to participating in Article IV consultations, 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 prior to asking for a loan. SMP progress is monitored under Article IV consultations, and thus may be considered in future loan decisions, but neither compliance with SMPs nor acceptance of Article IV recommendations is a prerequisite for entering a loan program.

Figure 2: Terms Mentioned in IMF Article IV Consultations with Guyana, 2009–2019



This figure shows the absolute frequency of the terms *fiscal/tax* and *oil/petroleum* (or variations thereof) in all seven available Article IV Consultations with Guyana. Following the discovery of offshore oil in May 2015 (as indicated by the dashed vertical line), IMF recommendations to Guyana shifted from medium-term fiscal reform to specific resource sector reforms, up until January 2019, when the Guyanese government passed the Natural Resource Fund Act (as indicated by the solid vertical line).

and practices. Staff also advised Guyana to focus on debt relief and maintaining tariffs to protect lower income groups.

But after 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 Article IV consultation, published in June of that year, advised authorities to establish a fiscal framework for managing oil wealth, preferably before 2020, when oil production was scheduled to begin: "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."[3] The report was accompanied by an annex titled "Best Practices in Managing Oil Wealth," which noted that a clear resource management framework would "contribute to building confidence in the general public and financial markets."

Guyanese officials seemed eager to incorporate the Fund's advice, even though they were not obliged to do so; after all, the country was not under a loan agreement mandating reforms in exchange for financial support.[4] Still, authorities developed and adjusted legislation to protect their revenue and retain external

[3]These and other quotes are drawn from the main dataset used in our study, as described in more detail in subsequent sections.

[4]Guyana's last agreement with the IMF ended in 2006.

financing. According to the 2017 consultation, upon the IMF's suggestion to strengthen the fiscal framework,"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 the Act No. 12 – Natural Resource Fund Act in January 2019, incorporating the resource management framework proposed by the IMF. The subsequent Article IV consultation, published in September 2019, covered the natural resource topic in far less detail.

The case of Guyana suggests that Article IV consultations might promote natural resource governance, but we lack systematic evidence about this effect across countries.[5] And 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 many reforms. This is, in part, because countries that are strategically important to key principals — especially the United States — tend to receive favorable treatment from the IMF (Oatley and Yackee, 2004; Stone, 2004, 2008). In these cases, the IMF is less able to credibly threaten to enforce compliance by suspending loans, which means that these borrowers are less likely to comply with conditionality in the first place (Dreher and Jensen, 2007; Stone, 2008; Copelovitch, 2010). But other countries fail to comply with reforms due to domestic politics — for example, compliance often breaks down ahead of elections (Dreher, 2003). And sometimes countries simply lack the technical or bureaucratic capacity to follow through reforms. As a result, only 33% of all IMF programs between 1980 and 2015 were fully completed; the remaining 67% were interrupted due to non-compliance with loan conditions (Reinsberg et al., 2021). If countries struggle to adopt IMF-mandated reforms when money is on the line, why would they adopt these recommendations when they lack "teeth?"

2 Who Reforms?

As a rule, technocratic reforms in the natural resource sector are unpopular. Since citizens have exaggerated expectations of what natural resource revenue can accomplish, 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 also deprive politicians of important funds for political survival (Wiens, 2014). Institutional development is costly for developing countries, which often have weak institutions, fragmented polities, and low administrative capacity (Besley

[5]With the exception of Edwards (2018), to our knowledge there remain no cross-national studies of the effectiveness of Article IV surveillance.

and Persson, 2014). Thus, from the perspective of the incumbent, there are few political incentives to reform the natural resource sector.

At the same time, the idea that natural resources can pose problems for countries is also now well understood amongst economic planners, creating incentives to seek out technical advice from international financial institutions. For instance, upon discovering new sources of rare earth metals, Mongolia's economic advisors sought advice from the World Bank to learn from the experience of other resource rich countries.[6] Guinea similarly requested technical assistance from several sources, including the the IMF, the African Development Bank, and the US-based nonprofit Natural Resource Governance Institute, when it instituted wide scale reforms in its mining sector.[7] These cases are not isolated; the recognition of both the promise and perils of natural resource wealth has increasingly prompted countries to seek out advice on how to best structure their extractive sectors.

Incumbents thus face mixed incentives. On the one hand, natural resource reforms are often unpopular in the short-term, as they tend to require belt-tightening and new restrictions on public spending. This spending could be a useful tool for incumbents seeking to retain office. On the other hand, incumbents need to provide some semblance of economic stability, lest their electoral prospects suffer. Prudent management of natural resource revenues can help achieve that stability, and developing country government officials have incentives to look to sources with the most experience with approaches to natural resource government.

Our ultimate outcome of interest is why and when developing countries adopt advice from the IMF. As a start, we argue that governments are more likely to reform the natural resource sector in response to *expert* advice. A larger goal of Article IV consultation is to provide such advice and technical assistance. Governments might be more open to reform when an expert source — such as the IMF — advises them to. Lombardi and Woods (2008) review theoretical expectations about IMF surveillance, noting that the IMF is positioned to provide perhaps the most comprehensive and highest quality data to its member governments. In direct consultation with governments, the IMF can leverage its expertise to present public officials with policy reforms backed by research across countries, based on years of meticulously-collected data. This may be of particular interest to developing nations that lack the human capital, statistical capacity, and bureaucratic structures to conduct such research on their own.

Framing reforms as recommended by IO experts may also help politicians "sell" reform to their constituents when they would otherwise face stiff opposition to new policies. According to Vreeland (2003), entering an IMF agreement allows politicians to credibly tell opponents and the wider population that their

[6] Michael Forthsythe. "Mongolian Harvard Elites Aim for Wealth without Dutch Disease." *Bloomberg*. 15 February 2010.

[7] 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.

hands are tied: they must implement reforms or forfeit much-needed injections of capital. Although Article IV advice comes with no such penalty if not implemented, the IMF's "seal of approval" may help convince reluctant citizens and officials. IOs like the IMF derive legitimacy from "rational legal authority" and policy expertise (Barnett and Finnemore, 2004a). When citizens see IO advice as legitimate and based in the most up-to-date best practices, they are less likely to oppose change, even if it results in some short-term pain. Organizations like the IMF actively invest in their legitimacy through their hiring, transparency, and consultative practices.

To be sure, the IMF has faced its share of blows to its legitimacy (cf. Seabrooke, 2007), ranging from criticisms of the Washington Consensus to perceived failures during the Asian financial crisis and beyond. But one response adopted by the IMF is to foster more domestic ownership from governments (Best, 2007), where ownership is defined as "a situation in which 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). Article IV consultations explicitly do this through collaborative meetings that involve back and forth with country representatives. This involvement in the consultative process may produce a sense of procedural legitimacy, in addition to the legitimacy afforded the IMF because of the expertise of its bureaucrats.

More generally, Article IV consultations are an understudied example of the power and influence of IO bureaucracies. Many recent studies draw on principal-agent theory to assess when important principals are likely to influence the Fund's lending decisions (e.g. Stone, 2002, 2011). While powerful principals no doubt matter due to the Fund's quota-based voting system, the Fund staff exerts more influence in less salient cases or when important principals are split on a lending decision (Copelovitch, 2010). Like actors in any bureaucracy, IO bureaucrats develop organizational procedures and practices in order to increase their legitimacy and power (Barnett and Finnemore, 2004a). And bureaucrats have played important roles in IO design and reform (Johnson, 2014). Since Article IV consultations involve lower stakes than loan programs, they are an obvious channel through which IMF staff may influence policy and leave their mark in developing countries, without the need to take geopolitical dynamics into consideration. The anecdotal evidence and the resources invested by the Fund in country surveillance suggest that such surveillance matters for real policy. If the IMF is perceived — on average — as an authority on macroeconomic and fiscal policy, we should observe more movement toward reform after Article IV consultations. Even if reform-minded governments seek out technical advice, the process of receiving such advice can tip countries over the edge to adopting real reform.

Still, consultations focus on a variety of topics. We argue that the *content* of an Article IV report matters: when consultations emphasize reform of the natural resource sector or make specific recommendations for reform, countries are more likely to adopt reforms. Since these reports are efforts to persuade government

officials to devote attention to meaningful policy reform, there is reason to focus on how much a report dwells on particular issue areas. Moreover, in the absence of direct transcripts of meetings during Article IV consultations, the published reports are the next best evidence of what topics were discussed. When a consultation occurs with a country like Guyana, one that seeks advice about natural resource sector management and that — in the absence of reform — is a good candidate for developing the resource curse, much of the discussion focuses on natural resource reforms. The published Staff Appraisal will reflect the tenor of that discussion.

If these reports are meant to influence authorities' behavior through peer pressure or through providing transparency to market actors, substantive content should matter. 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 are expert assessments of a country's economy. They rarely dwell on non-issues, or elements of economic performance that do not need attention, instead highlighting areas of under performance or that need structural reform. Highlighting and emphasizing a specific issue often is an indicator of the urgency the IMF delegation places on the issue. Moreover, as noted above, special emphasis on topics may also be driven by government officials who want to reform, but need technical advice. Article IV consultations can therefore catalyze nascent or stalled reform efforts. For these reasons, we expect governments to be more likely to adopt legislation addressing the natural resource sector if Article IV reports discuss this sector more frequently.

> ***Hypothesis 1:*** *Governments are more likely to adopt natural resource reforms when an Article IV consultation directly recommends the creation of a natural resource fund or a similar fiscal rule, and as the Article IV report places greater emphasis on the natural resource sector.*

2.1 Possible Mechanisms

Admittedly, officials' views of the usefulness of IMF advice is bound to vary. Neoliberal beliefs might facilitate not only the request for technical advice, as we predicted in the previous section, but also the receptiveness to it. For example, 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. Building on these findings, it is possible that technocratic policymakers, who share the training and the economic beliefs of IMF staffers, are more responsive to their peers' advice: when Article IV consultations discuss the natural resource sector more frequently, these individuals should be more likely to respond to such discussions with natural resource reforms.

It is also possible that publication of Article IV reports puts market actors on alert, thereby creating

pressure for countries that rely heavily on inward capital flows to adopt recommended reforms. This increased pressure may come from diffuse market actors, who see the IMF's "stamp of approval" as an important determinant of the quality of an investment environment. Multinational corporations, for instance, may be reluctant to invest in a country that has discovered new oil fields if they expect government graft or inefficiency in managing windfalls. While new discoveries improve a country's balance of payments and macroeconomic health in the medium to long run (Arezki et al., 2017), international actors, wary of the resource curse, may view these discoveries with skepticism at first. If international actors gain access to information about a country's economic woes, they are likely to pay closer attention to issues that are raised more frequently in Article IV reports. Therefore, policymakers should face a greater incentive to address heavily emphasized issues in order to assuage market actors, preventing a decline in future inflows. One way to forestall such decline is to announce reforms that address the IMF's criticisms.

Still, a survey of IMF staff investigating the perceived audience of Article IV consultations concluded that "market participants find little new market-related information in the report" — in part because these reports are "too complicated and difficult to interpret" (Lombardi and Woods, 2008, 721). Relatedly, in a survey of 1,784 government officials, Masaki and Parks (2020, 393) found that "credibility signaling to investors and donors appears to be, at best, a secondary consideration" when governments implement policies in response to external performance assessments.[8] Moreover, extant research suggests that market actors tend to use a few macroeconomic indicators as cognitive "shortcuts" (Mosley, 2000), and Article IV reports may not contain much information that is not already available through other sources, such as the ratings of sovereign risk agencies. If anything, these reports are confirmatory: they strengthen market actors' pre-existing beliefs about the economic circumstances of a country. In one of the few empirical investigations into IMF surveillance, Edwards (2018) finds little evidence that surveillance affects developing country financial markets. Thus, there is reason for skepticism that Article IV reports substantially move the priors of multinational corporations or international creditors.

The last alternative explanation suggests that recidivist borrowers may be especially eager to adopt recommended reforms because they wish to stay in the "good graces" of the Fund. Although Article IV consultations lack the "teeth" of conditions attached to loan tranches, the IMF may take into consideration compliance with these recommendations when negotiating future loan programs. Since there is a high rate of recidivism in IMF borrowing (Bird, 1996, 2001; Bird et al., 2004), countries that borrowed regularly in the past and expect to do so in the future may be more likely to comply with Article IV consultations in order to remain in the IMF's "good graces." Even if implementation of Article IV advice is not formally linked to

[8]The main consideration is whether these performance assessments provide "practical solutions to help address critical issues facing the country" (Masaki and Parks, 2020, 393).

access to crisis borrowing, negotiations over IMF bailout packages involve bargaining between governments and the Fund (Stone, 2002). The IMF may be more willing to lend, and with less stringent terms, if a country has previously shown to be both able and willing to address macroeconomic and fiscal policy issues prior to a crisis. This may be especially true for governments that have adopted policies directly recommended by the IMF itself.

Indeed, Article IV consultations frequently reference progress made since previous consultations. For instance, in its 2014 report on Mexico, the Fund wrote: "with the political environment highly unsettled, there was no progress on most of the critical issues discussed in the 2004 Article IV consultation. The elimination of the oil stabilization fund and changes to the fiscal responsibility law and pension system have weakened the macroeconomic policy framework." Despite identifying political instability as an obstacle to reform, there is a notable reference to the lack of progress made by the Mexican government in implementing sound fiscal policy as well as the backward slide of eliminating the oil stabilization fund. But given that progress on Article IV recommendations is not formally tied to access to future loan tranches, the IMF is unlikely to deny funding to an economy in crisis solely because it did not implement suggestions from a non-binding consultation. Recidivist borrowers may be the ones least able to act upon the advice of Article IV consultations, since they tend to suffer from deeper structural and political challenges — like weaker governance, lower investment rates, and higher debt — that make it difficult to adopt sweeping reforms (Bird et al., 2004).

3 Data

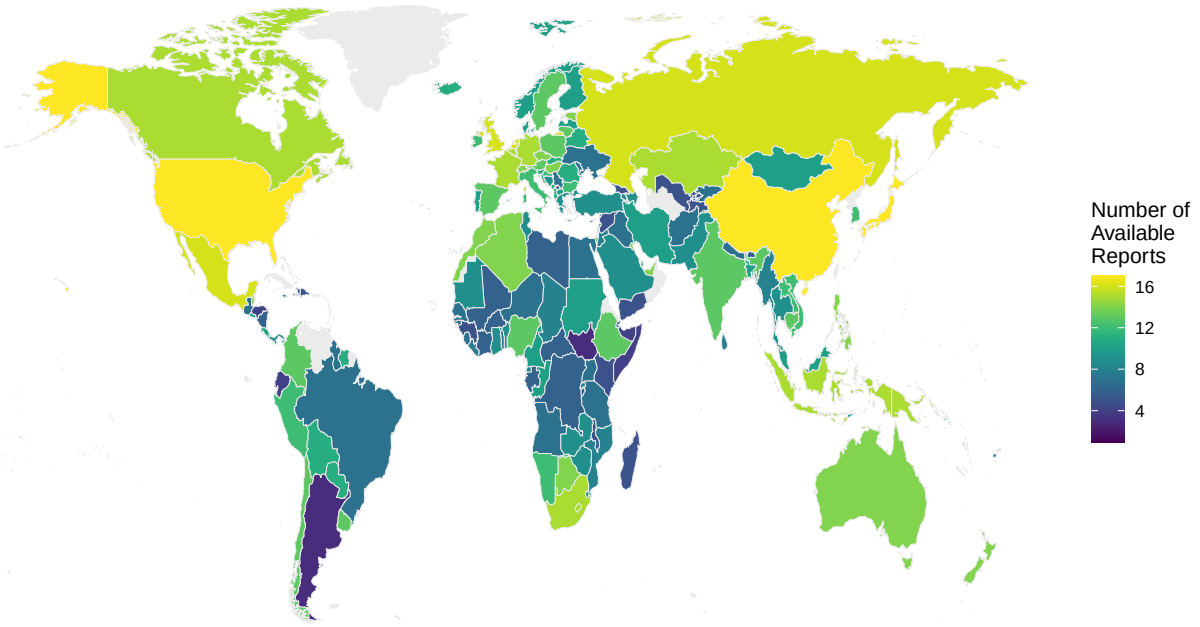
3.1 Article IV Consultations

We examine all Article IV consultations conducted and published between 1 January 2004 and 31 December 2019. This dataset was compiled by Mihalyi and Mate (2018) for 2004–2018; we extend it until 2019.[9] There is substantial variation in data availability across countries and regions, as confirmed by Figure 3, in particular during the early years (2004–2005), when only four out of five countries tended to agree with the full publication of reports. At the time, democracies were more likely to agree with publication, while Latin American governments were less likely to do so (Edwards et al., 2011). By 2014–16, this figure had improved considerably, as 95% of all reports were made public (Mihalyi and Mate, 2018). Given our interest in natural resource governance, we focus on all consultations for 80 resource-rich developing nations. Figure

[9]Our dataset also includes some consultations for the 2004–2018 period that had not been published at the time of Mihalyi and Mate's data collection. Though some information is available for 2020, most Article IV consultations that year were suspended due to the COVID-19 pandemic, which is why our analysis ends in December 2019.

4 summarizes the types of observations included in our sample.[10]

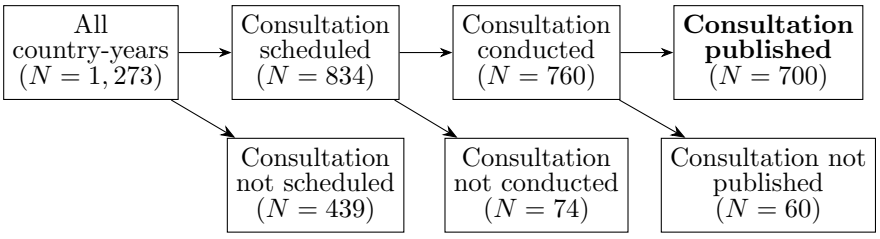
Figure 3: Number of Publicly Available Reports, by Country, 2004–2019



This figure shows the number of Article IV consultations that were conducted and made publicly available for each country between 2004 and 2019. No reports are available for Eritrea, Oman, Turkmenistan, or Venezuela.

We identify 834 country-years for which consultations were scheduled and 439 country-years for which consultations were not. Some countries are monitored in more detail and more frequently than others, depending on their regional importance, size of outstanding loans, and perceived macroeconomic risk,[11] but for most countries, Article IV consultations take place every 12 to 24 months.

Figure 4: 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

[10] We examine 80 countries over 16 years, but only eight years are available for South Sudan, which became independent in 2011; hence, $N = 1,273$.

[11] For instance, during the period under study, a report was produced for China, Japan, and the US every single year.

2012, the IMF publishes a yearly list of such consultation delays (e.g. IMF, 2017). While this list likely underestimates the number of delayed reports before 2012, it allows us to make general inferences about 74 consultations that *should have happened and did not* (see appendix for full list). 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.[12] Thus, Venezuela is "behind" on 15 consultations that would otherwise have happened after 2004. Argentina, Libya, Syria, and others similarly missed scheduled consultations.

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. This is the case for a total of 56 country-year pairs, like Argentina in 2006 and Angola in 2008.

Lastly, there are 700 country-years for which consultations were scheduled, conducted, and published. These are the observations that interest us most. At least one report was published for each of the 80 countries, with the exception of Eritrea, Turkmenistan, and Venezuela. The number of available reports by country ranges from two (Nauru) to 16 (Russia), with an average of 9.09.

As shown in Figure 1, every published Article IV consultation consists of at least three parts: a press release that condenses the views of the IMF Executive Board; a Staff Report that provides key information about the country in question; and an Informational Annex that summarizes the country's history with the IMF, in addition to identifying potential statistical issues with the data provided by the local authorities. We focus on the Staff Report, specifically the subsection *Staff Appraisal*. This section is arguably formal and technocratic, whereas the assessment of the Executive Board is more susceptible to informal governance.[13] On average, these appraisals are 956 words long, ranging from 385 (Senegal 2010) to 2,789 (China 2010).

3.2 The Emergence of Natural Resource Funds

In its appraisal, the IMF staff frequently recommends the adoption of one policy tool: a natural resource fund. 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). Correspondingly, we examine whether variation in the content of Staff Appraisals increases the odds that a country will pass any legal document (that is, a law, statute, act, code, or executive decree) related to a natural resource

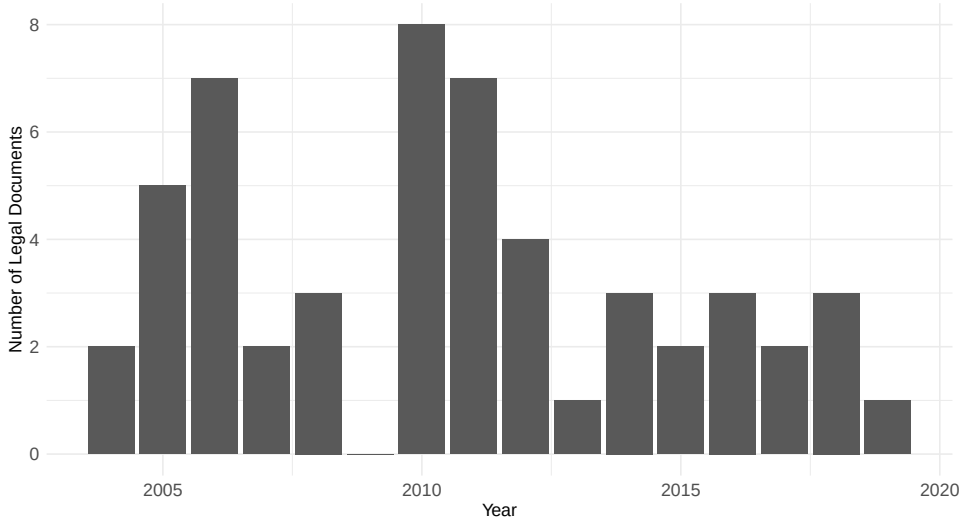
[12] Saul Hudson. "Venezuela to quit IMF, World Bank." *Reuters*. 1 May 2007.

[13] 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" — and, given that the management is controlled by the largest shareholders, the assessment of the Executive Board is likely influenced by their political preferences.

fund in the subsequent year. Goes (2022) collected these legal documents from Official Gazettes, based on information provided by the Natural Resource Governance Institute (2017). We opt for this dependent variable, rather than more general fiscal rules, in order to maximize comparability across countries in policies adopted.

During the period under study, 33 of the 80 governments passed a total of 53 such legal documents (which we call "natural resource policy" in brief).[14] Ecuador leads the list, with four organic laws (passed 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 5 showcases the distribution of such documents over time, from 2004 until 2019.

Figure 5: 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, with the exception of 2009.

Though these legal documents vary in length, their content is typically 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 (that is, 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 aforementioned 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." Then, it assigns overall management duties to the Minister of Finance, but also creates the Public Accountability and Oversight Committee to monitor and evaluate "whether the Fund has

[14]This includes Venezuela (2005) and Turkmenistan (2014 and 2018), though we are unable to observe the effect of IMF surveillance on these two countries; as previously mentioned, Venezuela refused to participate in Article IV consultations and Turkmenistan opposed publication of its reports.

been managed in accordance with the principles of transparency, good governance and international best practices." The Fund must be invested 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. According to the Act No. 12, 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, the Act determines that 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).

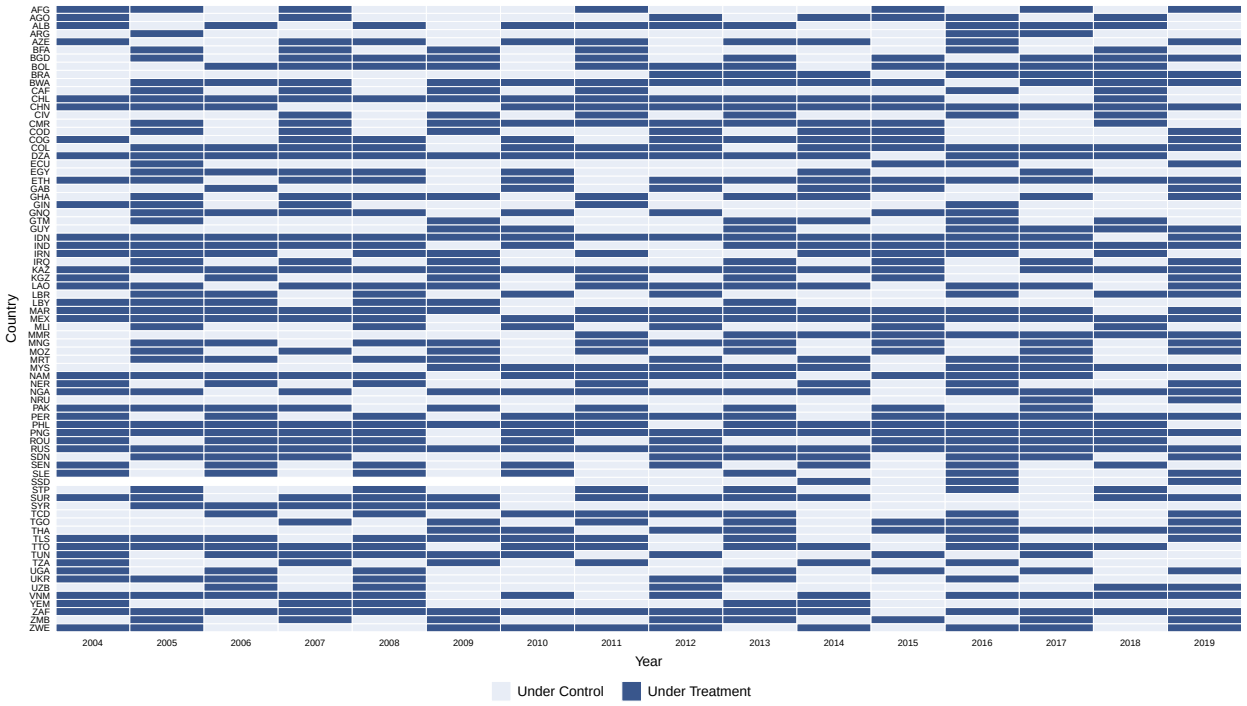
For every country-year, our outcome of interest is a dichotomous indicator of *Policy Passage*. Of course, this variable says little about policy outcomes — we do not know if Guyana's Natural Resource Fund is actually managed according to international best practices or if all withdrawals are truly approved by parliament. But passing a legal document like Guyana's Act No. 12 is a good indicator that countries follow IMF advice. Even if governments are not always institutionally equipped to implement this advice, their willingness to promote *de jure* reforms is a necessary condition to promote *de facto* reforms (Amick et al., 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 et al., 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 Quantifying IMF Advice

Article IV consultations might increase the odds of *Policy Passage* in three main ways; we generate three independent variables, or treatments, to account for these three scenarios. First, countries might be more likely to pass natural resource policy simply by virtue of participating in a consultation and publishing the corresponding report. Given that participation with publication is the norm, we do not expect this treatment to have a significant effect on the outcome of interest, but we test for it nonetheless. Therefore, our first independent variable, *Published Consultation*, takes the value of one if a country-year pair is associated with a published Article IV consultation, and zero otherwise. This is the case for 700 country-year pairs, as Figure 6 shows.

Second, countries might be more likely to pass such policy if they participate in a consultation that mentions natural resources *at least once*. Thus, our second independent variable, *Consultation Promotes Natural Resource Governance*, takes the value of one if a country-year pair is associated with an Article IV

Figure 6: Treatment 1 — Published Article IV Consultation

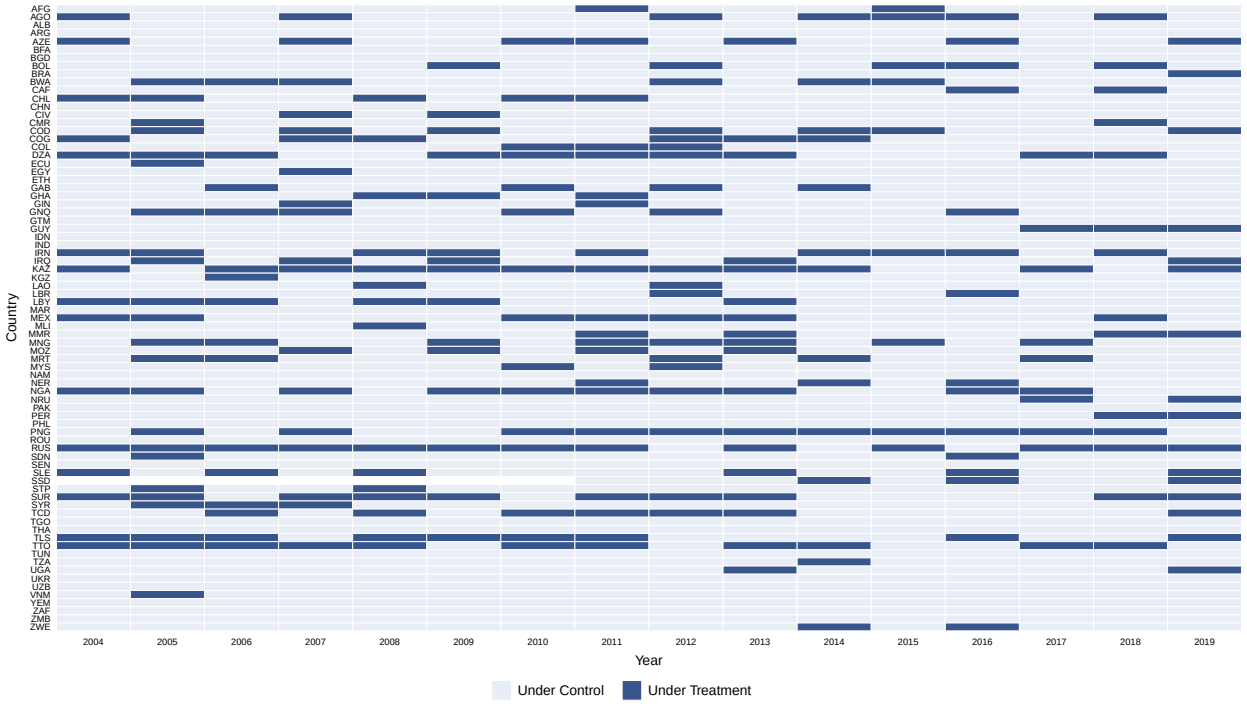


This figure indicates how the variable *Published Consultation* is coded for each country (y-axis) and year (x-axis). A country-year pair is part of the treatment group if it is associated with a published Article IV consultation, and is part of the control group otherwise. Note that seven years are missing for South Sudan, a country that only became independent in 2011.

consultation that promotes natural resource governance, and zero otherwise — a strategy that is similar to what several researchers already adopt when studying the effects of IMF conditionality (e.g. Kentikelenis et al., 2016; Rickard and Caraway, 2019). In our manual coding, we consider that a consultation promotes natural resource governance if it includes general language advising countries to "establish a comprehensive framework for managing oil wealth" (Guyana, 2017), but also if it includes 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). A mere mention of natural resources is not enough and nor is a mention of resource prices or subsidies; a country is only coded as receiving the treatment if the IMF actively encourages it to promote policy changes in the resource sector. Figure 7 shows that 253 country-year pairs receive this treatment.

Third, countries might be more likely to pass such policy if they participate in a consultation that mentions natural resources *frequently*. Although there are no direct transcripts of meetings during Article IV consultations, the content of the Staff Appraisal likely reflects how extensively each topic was discussed during the actual meetings. This, in turn, might signal how necessary the IMF considers natural resource reform to be for the country in question. We generate a dictionary of resource-related terms (like *natural*

Figure 7: Treatment 2 — Article IV Consultation Promotes Natural Resource Governance



This figure indicates how the variable *Consultation Promotes Natural Resource Governance* is coded for each country (y-axis) and year (x-axis). A country-year pair is part of the treatment group if it is associated with a published Article IV consultation that promotes natural resource governance, and is part of the control group otherwise. Note that seven years are missing for South Sudan, a country that only became independent in 2011.

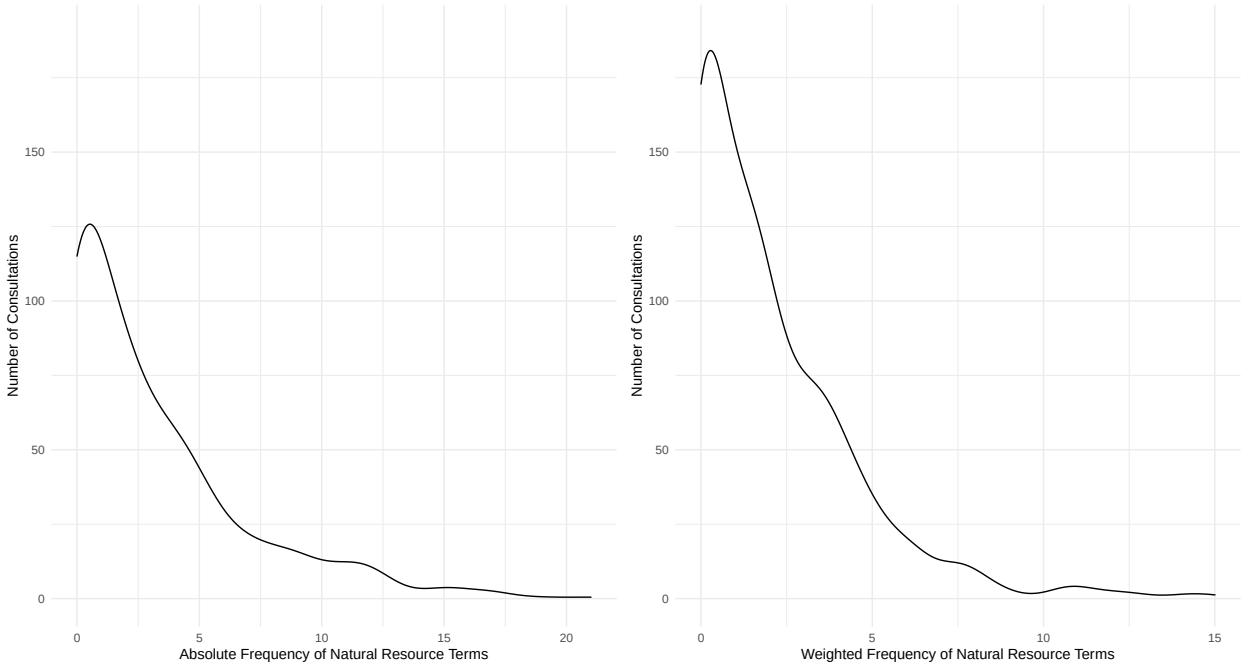
resource, *oil*, *hydrocarbon*, or *EITI* — see appendix for full list) and count how frequently such words are mentioned. This frequency count, which ranges from zero (Afghanistan 2004) to 21 (Timor-Leste 2004), is used to generate our third and last independent variable, *Natural Resource Term Frequency*. As Figure 8 shows, there are more Afghanistans than Timor-Lestes in the sample: 192 consultations do not mention a single natural resource term, and 111 consultations mention just one. Since Staff Appraisals can vary considerably in length, our robustness checks (reported in the appendix) replace *Natural Resource Term Frequency* with the term frequency–inverse document frequency (TF–IDF) statistic, a common weighting scheme that gives more weight to less frequent words.

4 Research Design and Results

4.1 Identification Strategy: Difference-in-Differences

Nearly all extant studies examine the role of IMF advice in the context of loan conditionality, which means that they must grapple with the issue of endogeneity (Stubbs et al., 2020). Given that countries self-select

Figure 8: Treatment 3 — Frequency Count of Natural Resource Terms



This figure indicates the absolute (left) and weighted (right) distribution of natural resource terms across the 700 Article IV consultations examined here. The distribution on the left corresponds to the variable *Natural Resource Term Frequency*, used in our main analysis, whereas the distribution on the right corresponds to the variable *Natural Resource TF–IDF*, used in robustness checks.

into loan agreements, borrowers tend to be intrinsically different from non-borrowers. This is less of a concern in a study of Article IV consultations. It is true that Venezuela has consistently refused to participate, and other governments, like Turkmenistan or Eritrea, have sometimes opposed the publication of reports. But participation is the norm, as Figure 4 shows: consultations are scheduled ahead of time, and most countries agree to surveillance on a regular basis. Therefore, unlike entrance into a loan agreement (which commits them on paper to specific reforms), governments do not seem to strategically select into (or out of) Article IV consultations, except in rare circumstances.

Still, we are interested in mitigating the effects of any potential selection bias, which is why we estimate difference-in-differences models (DiD) to quantify the effect of IMF advice on natural resource policy passage, as measured by the binary variables *Published Consultation* and *Consultation Promotes Natural Resource Governance*. This approach is helpful to establish whether Article IV consultations make *any* difference, above and beyond what countries would ordinarily do in the absence of such advice.

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

$$y_{it} = \alpha_i + \lambda_t + \delta D_{it} + \epsilon_{it}, \tag{1}$$

where y_{it} is the outcome of interest, α_i and λ_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).

Our setting differs from the canonical setup in three ways. First, the parallel trends assumption is unlikely to hold unless we condition it on time-varying covariates. After all, not all countries are equally likely to receive advice pertaining to natural resource funds; countries with *more* natural resources (that is, with a larger GDP share of resource rents) are conceivably more likely to receive such advice than countries with a comparatively small natural resource sector. We thus estimate models with five covariates. In addition to the GDP share of resource rents and logged GDP per capita (both reported by the World Bank), we control for the discovery of a giant, supergiant, or megagiant oil and gas field (with over 500 million recoverable barrels of oil or over 3 trillion cubic feet of gas, using data from Horn 2014).[15] Between 2004 and 2019, seven of the 80 countries included in our analysis discovered oil or gas for the first time (Ghana, Mozambique, Sierra Leone, Ethiopia, Tanzania, Senegal, and Guyana), and many already established producers discovered additional fields; these discoveries likely increased the odds of passing natural resource policy as well as the odds of receiving IMF advice pertaining to this sector. We further control for current participation in an IMF program (Kentikelenis et al., 2016) and for the professional training of the Finance Minister. The latter is important because individuals with graduate training from US economics departments might be more attuned to the resource curse, placing a higher value both on resource sector reform and on technocratic recommendations pertaining to this sector. Following Chwieroth (2013) and Nelson (2017), we use the CIA Chiefs of State and Cabinet Members of Foreign Governments directory to identify all finance ministers and 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. In the appendix, we provide evidence that the parallel trends assumption holds when controlling for these five factors.

Our setting further differs from the canonical DiD in that our treatment is not simultaneous, but stag-

[15] Horn's coverage ends in 2014. We thank James Cust and Alexis Rivera Ballesteros from the World Bank for sharing data extending this coverage until 2019.

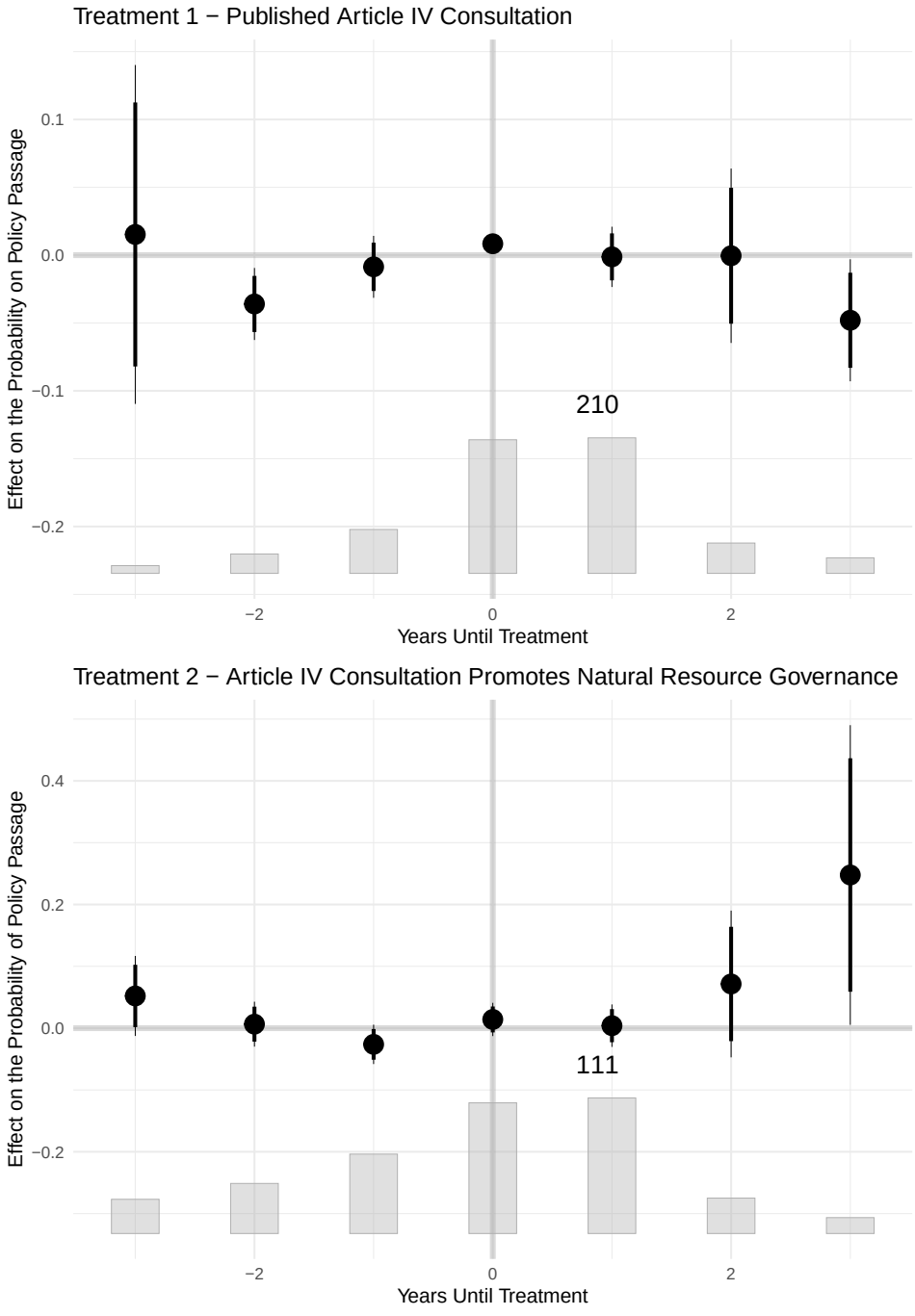
gered. Countries are not all treated at once; they can receive natural resource advice at any point in time between 2004 to 2019. Indeed, the treatment is reversible, not absorbing, which means that it switches on and off: countries might receive natural resource advice from the IMF in one year, but not in the subsequent year. Lastly, our setting includes heterogeneous and dynamic treatment effects: 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 2013, when oil prices peaked at 222 USD per barrel, is likely different from its effect in 2004, when a barrel of oil cost 82.10 USD.

Recent research has shown that the standard TWFE specification is biased in the presence of staggered treatment timing with dynamic and heterogeneous treatment effects (Baker et al., 2022; Roth et al., 2022). To overcome these limitations, we use the counterfactual estimators developed by Liu et al. (2020) that allow 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 potential outcomes), this estimation framework assumes that such missing observations can be imputed using untreated observations with similar values. Specifically, we use the matrix completion method (Athey et al., 2021), which provides more reliable causal estimates. The downside of this approach is that it automatically discards treated units (in our case, countries) that have too few pre-treatment periods, since there is not enough information available from the control group to impute counterfactuals for the treatment group. This is a particular concern for Treatment 1 (published Article IV consultation), since countries like China were "treated" for 13 out of the 16 years between 2004 and 2019, therefore dropping out of the analysis; it is less of a concern for our main treatment of interest, Treatment 2 (Article IV consultation promotes natural resource governance), which is less frequent. Despite these limitations, we present the results of the counterfactual estimators in the main text and report alternative models in the appendix.

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 would be to use non-linear difference-in-difference estimators (e.g. Athey and Imbens, 2006), but they are far less common and much harder to implement or interpret. Linear probability models tend to have two downsides: they generate fitted values outside of the $[0, 1]$ boundaries and their error terms tend to be heteroskedastic. The first issue is less of a concern — we are not interested in the fitted values themselves as much as in the average *difference* between fitted values of the treatment and control groups. As to heteroskedasticity, we address it by clustering standard errors by country, as most DiD implementations do (Cunningham, 2021).

4.2 First Results

Figure 9: Period-Wise ATT



This figure shows the estimates of the average treatment effect on the treated (ATT) for *Published Consultation* (top) and *Consultation Promotes Natural Resource Governance* (bottom) on *Policy Passage*, calculated using the matrix completion method, with 90 and 95 percent confidence intervals, conditioning on the five time-varying covariates discussed previously. Standard errors are clustered at the county level.

Figure 9 shows the period-wise average treatment effect on the treated (ATT), with 90 and 95 percent

confidence intervals, allowing us to visualize the effect of receiving the treatment relative to the control group. As a reminder, we control for resource rents (as a percentage of GDP), GDP per capita (logged), oil and gas field discovery, participation in an IMF program, and the educational background of top-level economic officials, as measured by the variable *Technocratic Finance Minister*. These variables allow us to control for a government's ex ante "eagerness" to reform the natural resource sector, ensuring that any effect observed after the treatment is only a function of IMF advice.

As discussed above, some units receive the treatment every period; in other words, some countries publish a consultation every year. There no alternative world in which these observations are not treated, so they are automatically discarded by the model (and thus not included in Figure 9). For the remaining units, according to Figure 9, Treatment 1 — participating in and publishing an Article IV consultation — at $t = 0$ has no significant effect on passing natural resource policy in subsequent periods. This is not surprising: consultations are routine events that cover a myriad of topics, so even if countries are intent on promoting domestic reform in response to IMF advice, there is no reason to expect reform in one particular sector unless the IMF staff draws attention to it. This is what Treatment 2 measures: it indicates whether the Staff Appraisal in question offered any targeted advice related to the natural resource sector. We find that targeted advice has a positive effect on the outcome of interest, even if this effect is not immediate. When the IMF encourages a country to promote policy changes in the natural resource sector at time $t = 0$, the probability that said country will pass natural resource policy — relative to the control group — increases gradually and is highest at time $t = 3$, that is, three years after the original consultation. Conversely, when discussions between public authorities and IMF staff do not cover this topic, authorities are less likely to prioritize natural resource sector reform, at least in the short run. These results suggest that countries pay attention to the tenor of IMF advice, which is what we turn to in the next section.

4.3 Additional Tests: The Language of IMF Surveillance

We provided evidence that participating in an Article IV Consultation and publishing the corresponding report is not in itself a significant driver of natural resource reform. We did, however, find evidence that the *content* of Article IV Consultations matters: countries are more likely to pass natural resource policy in the wake of a consultation that mentions the natural resource sector (directly or indirectly) at least once. Beyond that, we are interested in the extent to which the *frequency* of mentions matters, as captured by the 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 focus on the 700 country-year pairs with a consultation.

Our models incorporate several economic and political variables that might explain variation in *Policy Passage*. This includes five variables used in the previous DiD model: resource rents (as a share of GDP), GDP per capita, oil and gas field discoveries, participation in IMF programs, and technocratic Finance Ministers. In addition, we include a dichotomous indicator of whether or not the country in question has passed natural resource policy in the past and control for regime type, measured by Marshall and Gurr's (2020) Polity 2 index (ranging from –10 to +10, from hereditary monarchy to consolidated democracy), as well as the number of protests recorded by the Mass Mobilization Project every year, which serves 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. The inclusion of these control variables reduces our sample size from 700 to 535 observations.

We estimate a linear probability model with country as well as year fixed effects; standard errors are clustered by country, and all independent variables (including *Natural Resource Term Frequency*) are lagged by one year. As a robustness check, we also estimate a logistic regression. Policy passage is a rare event that did not occur every year, as indicated by Figure 5. Since our models include fixed effects, a traditional logistic regression would drop these years, which are "homogeneous units:" they are perfect predictors of the dependent variable because they did not experience the event under study (Beck, 2020). To prevent the loss of these "homogeneous units," we follow Cook et al. (2020) and estimate these logistic regressions with penalized maximum likelihood.

Table 1 shows that governments tend to follow IMF advice pertaining to the natural resource sector, even when this advice lacks "teeth." According to Model 1, every additional use of a natural resource term is significantly associated with a 1.1 percent increase in the odds of passing natural resource policy. Put differently, when the IMF staff talks about natural resources, countries listen; the more the IMF staff talks about natural resources, the more likely countries are to respond by creating or regulating a natural resource fund. This finding is not contingent on modeling choice: Model 2 (a logistic regression) returns similar results, though the effect size is far more generous ($e^{0.116} = 1.123$, that is, a 12 percent increase). Both models further concur that countries with a higher GDP share of resource rents are significantly less likely to pass natural resource policy. The remaining variables have no significant effect on the outcome of interest, except for IMF program participation, which is associated with a significant 89 percent increase in the odds of policy passage according to the logistic regression (but not according to the linear probability model).

In sum, our results confirm the expectation that the norm is to participate in an Article IV consultation and publish the corresponding report (Treatment 1), so this in itself is not enough of a motivation to reform the natural resource sector. But when the published report includes at least one reference to the natural resource sector (Treatment 2), states are significantly more likely to reform this sector, an effect that increases

Table 1: The Effect of Natural Resource Terms on Policy Passage

	Dependent variable:	
	Policy Passage	
	OLS	*Logit*
	(1)	(2)
Natural Resource Term Frequency	0.014^{***}	0.116^{***}
	(0.005)	(0.041)
Previous Policy	0.030	0.406
	(0.074)	(0.603)
Resource Rents (% GDP)	-0.004^{*}	-0.063^{**}
	(0.002)	(0.025)
GDP per Capita (Log)	0.111	1.471
	(0.079)	(1.160)
Field Discovery	0.053	0.558
	(0.051)	(0.391)
IMF Program	0.040	0.638^{**}
	(0.027)	(0.311)
Technocratic Finance Minister	−0.012	−0.406
	(0.027)	(0.321)
Oil Price	−0.001	−0.028
	(0.001)	(0.020)
GDP Growth (%)	0.0002	−0.0003
	(0.002)	(0.028)
Polity 2	0.003	0.022
	(0.005)	(0.068)
Protest	0.003	0.010
	(0.003)	(0.019)
Constant	−0.583	−7.544
	(0.454)	(6.943)
Observations	535	535
R^2	0.225	
Log Likelihood		−87.783
Akaike Inf. Crit.		359.567

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

the more resource-related words are featured in the report (Treatment 3).

4.4 Robustness Checks: Endogenous Advice?

Our previous difference-in-difference models addressed endogeneity in Article IV *participation*, but endogeneity in the *content* of Staff Appraisals could also be a problem. Loan agreements, for instance, are the product of a negotiation between government officials and the IMF, so borrowing governments might negotiate specific conditions that are politically convenient or that they know in advance they will be able to meet (Vreeland, 2003; Rickard and Caraway, 2014). A similar issue might exist with Article IV consultations: policymakers that already *want* to create natural resource funds might be more likely to bring up the oil, gas, and mining sector during conversations with the IMF staff. Ultimately, each government has at least 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), it is true that 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 statements about the effect of IMF advice on natural resource policy.

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

Since the advice given in Article IV Consultations is not tied to lending, the liquidity ratio is unlikely to play a role in our context. But given the paucity of research on IMF surveillance, there is no widely accepted instrument for the content of Staff Appraisals, which is why we follow Lang (2020) 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 of *Natural Resource Term Frequency* for each country with the average of *Natural Resource Term Frequency* for each year. This interaction term plausibly meets the exclusion restriction, in that it is likely to have a strong effect on *Natural Resource Term Frequency* without independently affecting *Policy Passage*. We then perform a two-stage least squares (2SLS) estimation using this instrument, presenting the full results in the appendix and summarizing them here. The model's F-statistic indicates the strength of the instrument, that is, how strongly said 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 21.809 passes the test. However, the Wu-Hausman test fails to reject the null hypothesis that 2SLS and OLS are equally consistent — and, since 2SLS and OLS are equally consistent, OLS is better because it is more efficient.

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. Put differently, how strong would unobserved confounders need to be for our main results to be disproved? The results, presented in the appendix, indicate that even an omitted variable that is three times as strong as *Resource Rents* or *Technocratic Finance Minister* would not overturn our key finding — namely, that *Natural Resource Term Frequency* increases the probability of passing natural resource policy. Taken together, these robustness checks reassure us that the potential issue of endogeneity is not driving the results presented in Table 1.

Lastly, 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 or not an event occurred at a given point in time. It includes all country-years from 2004 until event occurrence; once a country experiences the event in question (that is, once 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 considered 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 (Ecuador, for instance, passed four resource-related organic laws during the period under study). In addition, our analysis begins in 2004 for reasons of data availability (after all, Article IV consultations were not published in a systematic manner until then), but 16 countries[16] suffer from "unobserved histories"

[16]The 16 countries and corresponding years of first law passage 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), Russia (2003), and Venezuela (1999).

(Box-Steffensmeier and Jones, 1997, 1422): they experienced the event before the 2004. Since we cannot observe the effect of Article IV consultations on initial policy passage for these countries, we omit them from this analysis. Even 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 the appendix, support our expectation that IMF advice can meaningfully influence natural resource policy passage.

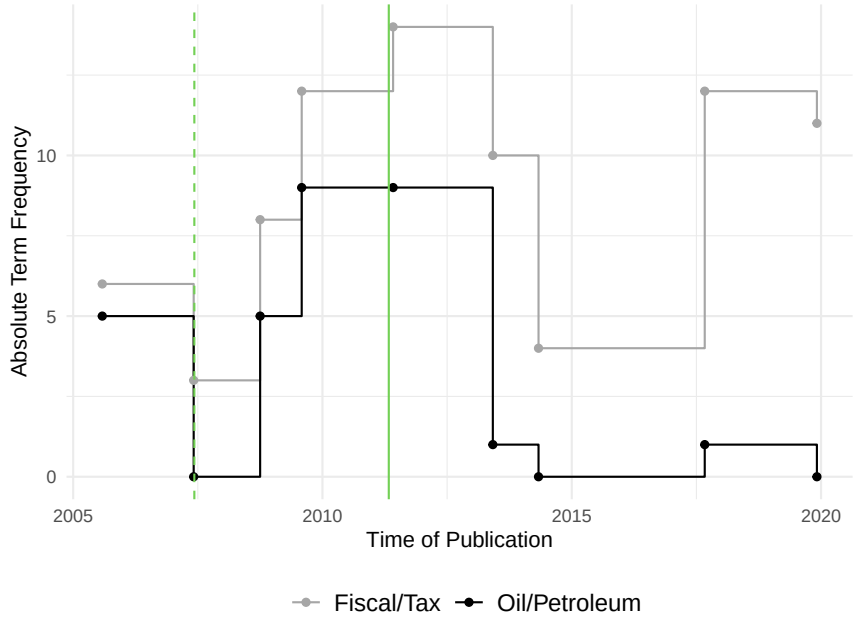
4.5 An Illustration: Natural Resource Policy in Ghana

Before 2007, Ghana was predominantly an exporter of gold and — to a lesser extent — diamonds and manganese. The Staff Appraisal for the 2005 Article IV consultation identified the country'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." This assessment did not change in the subsequent consultation. Following a series of 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 in the following year, 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 subsequent consultations — for example, 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." Following a staff visit to Accra in February and March 2011, the Staff Appraisal in the 2011 consultation (published in June of the same year) again 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 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 this law was passed, the IMF staff shifted the focus of its advice, and the 2013 consultation only addressed natural resources in one sentence: "Ghana's strong democratic credentials and favorable prospects for oil and gas production

Figure 10: Terms Mentioned in IMF Article IV Consultations with Ghana, 2005–2019



This figure shows the absolute frequency of the terms *fiscal/tax* and *oil/petroleum* (or variations thereof) in all nine available Article IV Consultations with Ghana. Following the discovery of offshore oil in June 2007 (as indicated by the dashed vertical line), IMF recommendations to Ghana shifted from medium-term fiscal reform to specific resource sector reforms, up until April 2011, when the Ghanaian government passed the Petroleum Revenue Management Act (as indicated by the solid vertical line).

continue to attract significant FDI." In the following consultations, the IMF continued to praise Ghana's commitment to fiscal discipline, but the focus of its advice shifted away from the natural resource sector and towards broader improvements in financial management and banking supervision, issues that the staff considered more pressing.

Conclusion

Since implementation of recommendations made during Article IV surveillance is not tied to loans, one might expect these consultations to amount to "much ado about nothing." Yet more recent literature has noted the ways in which IO 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, along with Edwards (2018), is one of the first ones to examine not only the *content* of public Article IV reports, but also the extent to which such reports influence legal reform.

We argue that Article IV surveillance is an opportunity for IO bureaucrats — in this case, IMF staff — 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 aimed at improving fiscal and monetary governance. As such, the emphasis reports place on different topics should matter. When reports are crafted to call attention to the natural resource sector and suggest specific reforms, governments are more likely to take heed and act. Of course, these reforms are often difficult and politically costly. We do not claim that Article IV reports are the largest or most important determinant of the creation of natural resource funds and related resource management rules. Still, our analysis indicates that such reforms are more likely when Article IV consultations make the case for them, even after controlling for other common determinants of reform.

Our results further suggest that reform may be more likely when natural resource wealth is particularly salient (as indicated by oil prices and resource rents) or when technocratic ministers are involved in Article IV consultations. But the impact of Article IV topic proportions cannot be attributed entirely to these other factors, nor is it primarily a function of a country's ability to attract private capital or multilateral loans. Instead, Article IV advice seems to have an independent effect on adoption of new rules for managing resource revenue.

Incumbents are often loathe to forfeit control of resource rents, despite knowing the likely consequences of the resource curse. Their time horizons are too often incompatible with reform. But we show that technical or purely advisory consultations from IOs can make a difference, especially under the right circumstances. The IMF has come under criticism, on the one hand, for the high rate of recidivism among borrowers and low compliance with conditionality, and on the other hand, for imposing harsh austerity measures on struggling economies. But 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 but 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

A 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, Eritrea, 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, Turkmenistan, Uganda, Ukraine, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

B Availability of Data by Country

Table B.1 indicates the country-years that are truly missing: they did not participate in Article IV consultations. Table B.2 indicates the country-years that participated, but opposed publication, whereas Table B.3 lists the country-years that participated *and* consented to the publication of results.

Table B.1: Article IV Consultations, 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

Table B.2: Article IV Consultations, Not Published

Country	No. Consultations
Turkmenistan	9
Brazil	6
Myanmar	6
Guyana	5
Thailand	4
Uzbekistan	4
Ecuador	3
Eritrea	3
Malaysia	3
Azerbaijan	2
Guatemala	2
Angola	1
Argentina	1
Egypt	1
Gabon	1
Kyrgyzstan	1
Libya	1
Mauritania	1
Suriname	1
Tanzania	1
Timor-Leste	1
Venezuela	1
Yemen	1
Zimbabwe	1

Table B.3: Article IV Consultations, Published

Country	No. Consultations
Russia	16
Indonesia	15
Kazakhstan	15
Mexico	15
Papua New Guinea	15
South Africa	15
Algeria	14
Morocco	14
Philippines	14
Botswana	13
Chile	13
China	13
Colombia	13
Ethiopia	13
India	13
Nigeria	13
Laos	12
Namibia	12
Peru	12
Trinidad and Tobago	12
Vietnam	12
Bolivia	11
Suriname	11
Albania	10
Bangladesh	10
Cameroon	10
Iran	10
Malaysia	10

Mongolia	10
Timor-Leste	10
Zimbabwe	10
Azerbaijan	9
Congo	9
Ghana	9
Pakistan	9
Sudan	9
Thailand	9
Tunisia	9
Chad	8
Equatorial Guinea	8
Liberia	8
Mauritania	8
Mozambique	8
Myanmar	8
Senegal	8
Zambia	8
Afghanistan	7
Angola	7
Brazil	7
Democratic Republic of the Congo	7
Egypt	7
Guyana	7
Iraq	7
Kyrgyzstan	7
Niger	7
Sierra Leone	7
Togo	7
Uganda	7
Ukraine	7
Burkina Faso	6

Central African Republic	6
Côte d'Ivoire	6
Gabon	6
Guatemala	6
Libya	6
Mali	6
São Tomé e Príncipe	6
Tanzania	6
Guinea	5
Syria	5
Uzbekistan	5
Yemen	5
Ecuador	4
Argentina	3
South Sudan	3
Nauru	2
Eritrea	0
Turkmenistan	0
Venezuela	0

C Difference-in-Differences

C.1 Results

Table C.1: Average Treatment Effects

	Dependent variable:	
	Policy Passage	
	Treatment 1	*Treatment 2*
	(1)	(2)
ATT, Treated Obs. Equally Weighted	0.029	0.067^{***}
	(0.032)	(0.028)
ATT, Treated Units Equally Weighted	0.030	0.078^{***}
	(0.032)	(0.029)
IMF Program	−0.007	0.009
	(0.042)	(0.020)
Field Discovery	0.019	−0.001
	(0.050)	(0.029)
Resource Rents (% GDP)	0.005^{**}	0.004^{**}
	(0.002)	(0.002)
GDP per Capita (Log)	0.084	0.046
	(0.086)	(0.035)
Technocratic Finance Minister	−0.002	−0.011
	(0.020)	(0.010)
Number of Units	46	68
Number of Time Periods	16	16

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

C.2 Tests

Figure C.1: Pre-Trend Tests

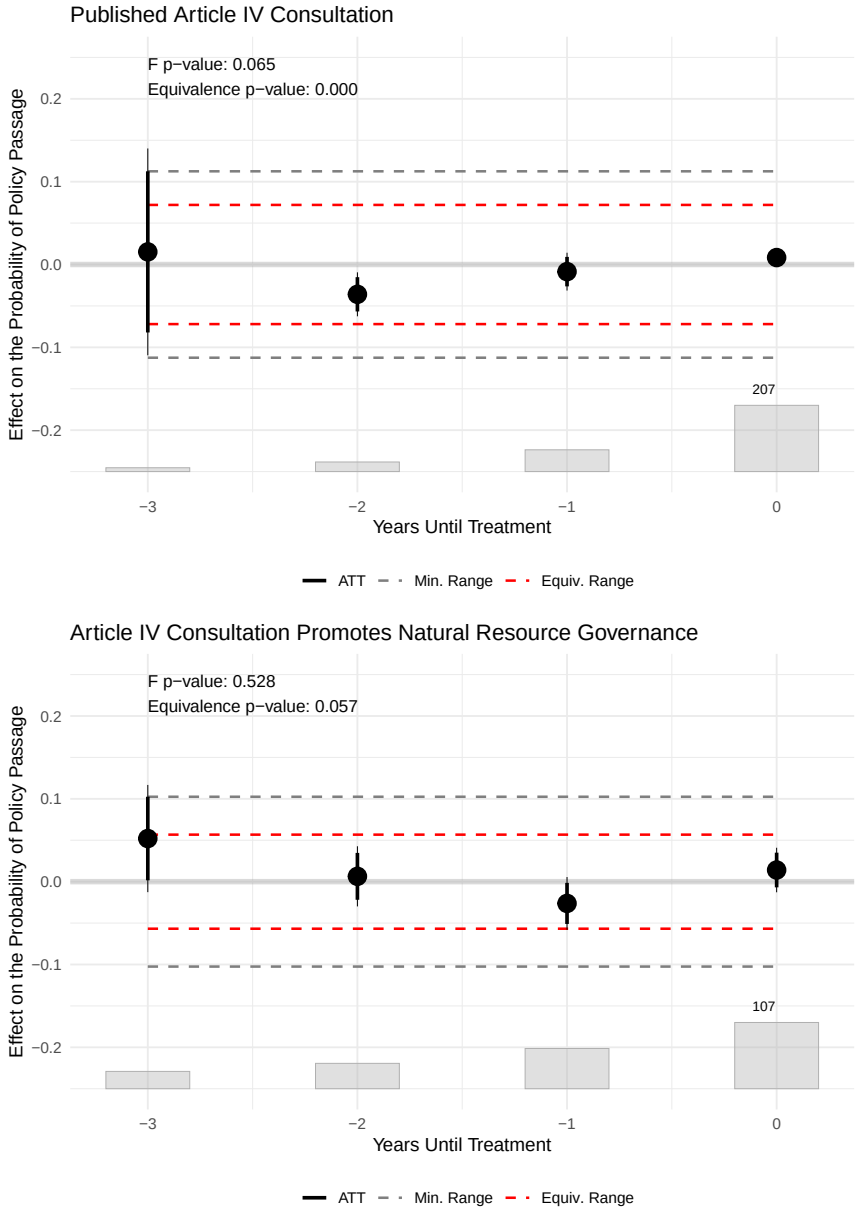
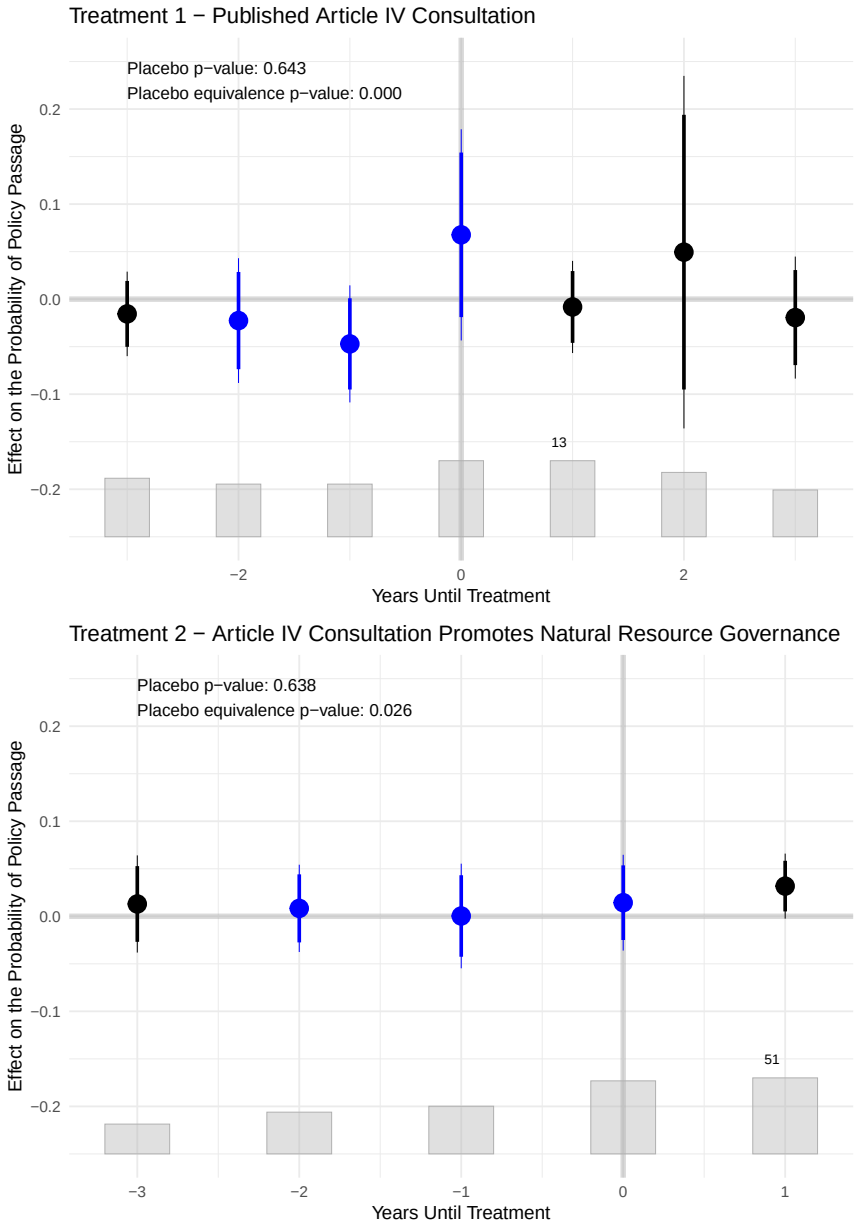


Figure C.2: Placebo Tests



D 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*, *oil*, *petroleum*, *crude*, *gas*, *gasoline*, *diesel*, *electricity*, *LNG*, *natural gas*, *fuel*, *fuels*, *energy*, *refinery*, *hydrocarbon*, *mineral*, *mining*, *mine*, *mines*, *copper*, *gold*, *diamond*, *iron*, *steel*, *phosphate*, *EITI*.

E Robustness

E.1 Using Weighted Natural Resource Term Frequency

Table E.1: The Effect of Natural Resource Terms on Policy Passage, Using Natural Resource TF–IDF

	Dependent variable:	
	Policy Passage	
	OLS	*Logit*
	(1)	(2)
Natural Resource TF–IDF	0.011^{**}	0.111^{**}
	(0.006)	(0.056)
Previous Policy	0.036	0.501
	(0.076)	(0.612)
Resource Rents (% GDP)	-0.004^{*}	-0.065^{**}
	(0.002)	(0.026)
GDP per Capita (Log)	0.123	2.202^{*}
	(0.080)	(1.182)
Field Discovery	0.055	0.655
	(0.053)	(0.402)
IMF Program	0.036	0.571^{*}
	(0.027)	(0.315)
Technocratic Finance Minister	−0.014	−0.442
	(0.027)	(0.318)
Oil Price	−0.001	−0.024
	(0.002)	(0.022)
GDP Growth (%)	0.001	0.003
	(0.002)	(0.028)
Polity 2	0.004	0.036
	(0.005)	(0.070)
Protest	0.003	0.011
	(0.003)	(0.019)
Constant	−0.682	-12.657^{*}
	(0.466)	(7.216)
Observations	535	535
R^2	0.213	
Log Likelihood		−88.863
Akaike Inf. Crit.		361.727

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

E.2 Instrumental Variables Estimation

Table E.2: The Effect of Natural Resource Terms on Policy Passage: Instrumental Variables Estimation

	Dependent variable:	
	Policy Passage	
	(1)	(2)
Natural Resource Terms	0.025	
	(0.021)	
Natural Resource TF–IDF		0.015
		(0.029)
Previous Policy	0.033	0.039
	(0.077)	(0.088)
Resource Rents (% GDP)	−0.005*	−0.004
	(0.002)	(0.003)
GDP per Capita (Log)	0.102	0.123
	(0.080)	(0.081)
Field Discovery	0.053	0.056
	(0.049)	(0.053)
IMF Program	0.046	0.038
	(0.029)	(0.028)
Technocratic Finance Minister	−0.009	−0.013
	(0.028)	(0.027)
Oil Price	−0.002	−0.001
	(0.002)	(0.002)
GDP Growth (%)	−0.0001	0.001
	(0.002)	(0.002)
Polity 2	0.001	0.003
	(0.006)	(0.006)
Protest	0.003	0.003
	(0.003)	(0.003)
Constant	−0.448	−0.660
	(0.486)	(0.478)
Observations	535	535
R^2	0.213	0.213
F-Statistic for Instrument	21.809***	7.599***
Wu-Hausman	0.341	0.007

Note: *p<0.1; **p<0.05; ***p<0.01

Table E.3: The Effect of Natural Resource Terms on Policy Passage: First Stages of Instrumental Variables Estimation

	Dependent variable:	
	Natural Resource Terms	Natural Resource TF–IDF
	(1)	(2)
Instrument: Natural Resource Terms	0.331^{***}	
	(0.082)	
Instrument: Natural Resource TF–IDF		0.380^{***}
		(0.130)
Previous Policy	0.354	−0.579
	(0.569)	(0.453)
Resource Rents (% GDP)	0.012	0.042^{*}
	(0.031)	(0.025)
GDP per Capita (Log)	−0.190	−0.560
	(0.918)	(0.665)
Field Discovery	−0.100	−0.174
	(0.558)	(0.298)
IMF Program	−0.437	−0.340
	(0.364)	(0.235)
Technocratic Finance Minister	−0.171	−0.066
	(0.282)	(0.224)
Oil Price	−0.001	0.018
	(0.021)	(0.017)
GDP Growth (%)	0.018	−0.002
	(0.032)	(0.027)
Polity 2	0.145^{**}	0.111^{**}
	(0.069)	(0.055)
Protest	0.018	0.011
	(0.031)	(0.021)
Constant	1.104	1.132
	(5.898)	(4.603)
Observations	535	535
R^2	0.628	0.498

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

E.3 Survival Analysis

Table E.4: The Effect of Natural Resource Terms on Policy Passage: Cox Proportional Hazards Model

	Dependent variable:
	Time to Policy Passage
Natural Resource Terms	0.214^{***}
	(0.077)
Resource Rents (% GDP)	0.036
	(0.023)
GDP per Capita (Log)	0.414
	(0.328)
Field Discovery	1.371
	(0.853)
IMF Program	1.049^{*}
	(0.605)
Technocratic Finance Minister	0.303
	(0.560)
GDP Growth (%)	0.157^{**}
	(0.073)
Polity 2	0.078
	(0.066)
Protest	−0.135
	(0.114)
Observations	584
R^2	0.046
Log Likelihood	−44.873
Wald Test	25.200^{***} (df = 9)
LR Test	27.442^{***} (df = 9)
Score (Logrank) Test	33.991^{***} (df = 9)
Note:	*p<0.1; **p<0.05; ***p<0.01

E.4 Sensitivity Analysis

The variable *Natural Resource Term Frequency* might not have a direct effect on our outcome of interest; rather, governments might be more likely to talk about the natural resource sector *and* more likely to pass natural resource policy in years of oil field discovery, or when the incumbent Finance Minister is someone who received a graduate degree from a US economics department. 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, as we do here.

We use the `R` package `sensemakr`, developed by Cinelli and Hazlett (2020), to investigate how our estimate of the treatment variable *Natural Resource Term Frequency* is sensitive to unobserved confounders. Table E.5 reports the estimated coefficient (0.014) for *Natural Resource Term Frequency* as well as its standard error (0.004) and t-value (3.302). The table then presents three sensitivity statistics.

The first sensitivity statistic is the partial R^2 of the treatment with the outcome (2.4%). In an extreme scenario, an unobserved confounder that explains 100% of the residual variance in the outcome would need to explain at least 2.4% 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. In order to explain away all the observed effect of the treatment *Natural Resource Topic* on the outcome *Policy Passage*, we would need unobserved confounders that explain at least 14.5% 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 Topic* is zero ($RV_{q=1,\alpha=0.05}$). If the unobserved confounder explains more than 6.1% of the residual variance of both the treatment and the outcome, it is strong enough to bring the estimate of *Natural Resource Topic* 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 now in order to safely rule out confounders that could be problematic. We now contrast these values to the effect of the observed benchmark covariates *Resource Rents* and *Technocratic Finance Minister*. In other words, we investigate the maximum strength of an unobserved confounder that is once, twice, or three times as strong as *Resource Rents* or *Technocratic Finance Minister* in explaining outcome variation ($R^2_{Y\sim Z|\mathbf{X},D}$) and treatment variation ($R^2_{D\sim Z|\mathbf{X}}$). All these values are below the RV, suggesting that even a very strong confounder would not be able to overturn our findings.

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

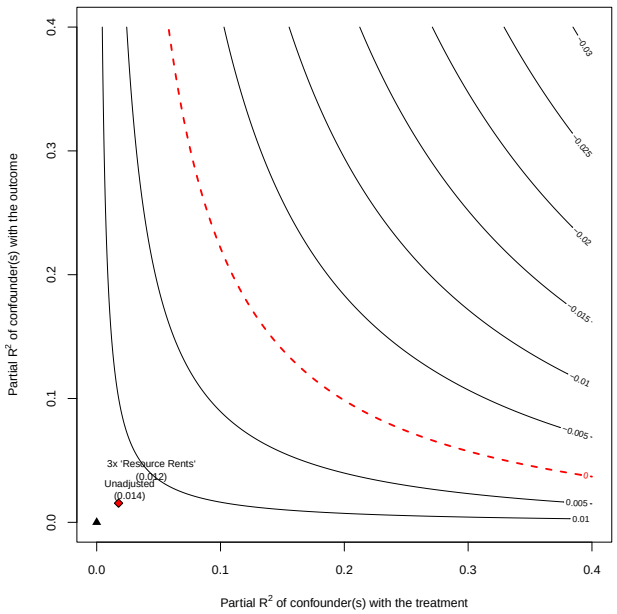
Outcome: *Policy Passage*

Treatment	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
Natural Resource Term Frequency	0.014	0.004	3.302	2.4%	14.5%	6.1%

df = 436; *Bound (1x Resource Rents)*: $R^2_{Y\sim Z|\mathbf{X},D} = 0.5\%$, $R^2_{D\sim Z|\mathbf{X}} = 0.6\%$
df = 436; *Bound (2x Resource Rents)*: $R^2_{Y\sim Z|\mathbf{X},D} = 1\%$, $R^2_{D\sim Z|\mathbf{X}} = 1.2\%$
df = 436; *Bound (3x Resource Rents)*: $R^2_{Y\sim Z|\mathbf{X},D} = 1.5\%$, $R^2_{D\sim Z|\mathbf{X}} = 1.8\%$
df = 443; *Bound (1x Technocratic Finance Minister)*: $R^2_{Y\sim Z|\mathbf{X},D} = 0\%$, $R^2_{D\sim Z|\mathbf{X}} = 0.1\%$
df = 443; *Bound (2x Technocratic Finance Minister)*: $R^2_{Y\sim Z|\mathbf{X},D} = 0.1\%$, $R^2_{D\sim Z|\mathbf{X}} = 0.2\%$
df = 443; *Bound (3x Technocratic Finance Minister)*: $R^2_{Y\sim Z|\mathbf{X},D} = 0.1\%$, $R^2_{D\sim Z|\mathbf{X}} = 0.3\%$

Figure E.1, also generated using `R` Cinelli and Hazlett's package, helps us grasp the meaning of these

Figure E.1: Sensitivity Contour Plots in the Partial R^2 Scale, Benchmark: Resource Rents

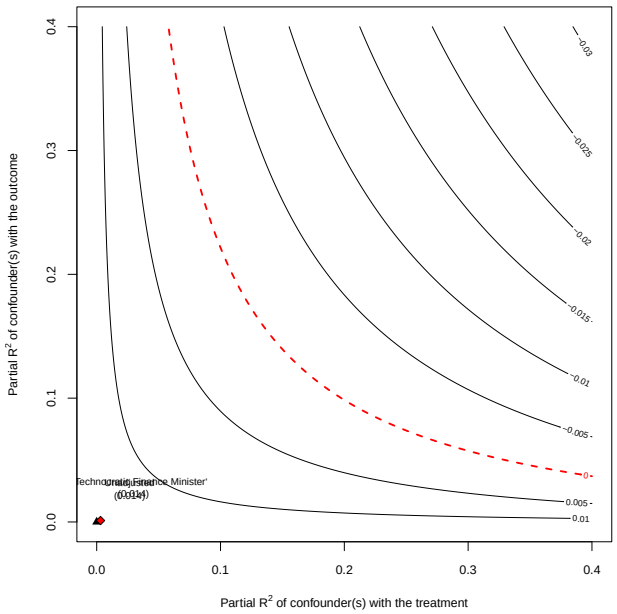


This figure shows the sensitivity contour plot of the point estimate for *Natural Resource Term Frequency*, including unobserved confounders with the hypothetical strength of three times the value of *Resource Rents*. Note that the hypothetical estimate (in red) is very close to the unadjusted estimate (in black).

results. The x-axis shows the hypothetical residual share of variation of the treatment explained by unobserved confounding ($R^2_{D\sim Z|\mathbf{X}}$), whereas the y-axis does the same for the residual share of variation of the outcome explained by unobserved confounding ($R^2_{Y\sim Z|\mathbf{X},D}$). 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 *Resource Rents*. The dashed red line indicates combinations of values that would shrink the estimated effect of *Natural Resource Term Frequency* to zero. Figure E.1 shows that the unadjusted effect of topic proportions is robust to the inclusion of unobserved confounders that are once, twice, or three times as strong *Resource Rents*, giving us more confidence that our findings are not a function of omitted variables.

In Table Figure E.2, we repeat this analysis using *Technocratic Finance Minister* (rather than *Resource Rents*) as a benchmark covariate, finding again that our results are robust to the inclusion of unobserved variables with effects that are one, two, or three times as strong as the effect of *Technocratic Minister*.

Figure E.2: Sensitivity Contour Plots in the Partial R^2 Scale, Benchmark: Technocratic Finance Minister



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 *Technocratic Finance Minister*. Note that the hypothetical estimate (in red) practically overlaps with the unadjusted estimate (in black).