Examining the Effect of IMF Conditionality on Natural Resource Policy

Iasmin Goes

`iasmin@utexas.edu`

Carlos III University of Madrid

December 2020

Abstract

Can IMF lending improve natural resource governance in borrowing countries? While most IMF agreements mandate policy reforms in exchange for financial support, compliance with these reforms is mixed at best. The natural resource sector should be no exception. After all, resource windfalls enable short-term increases in discretionary spending, and office-seeking politicians are often unwilling to forgo this discretion by reforming the oil, gas, or mining sector. I investigate how and when borrowers go against their political interests and establish natural resource funds – a tool often promoted by the IMF – in the wake of a loan agreement. Using text analysis, statistical models, and qualitative evidence from natural resource policy and IMF conditionality for 74 countries between 1980 and 2019, I show that borrowers under an IMF agreement are more likely to create or regulate a resource fund, particularly if the agreement includes conditions that highlight the salience of fiscal reforms. However, the effectiveness of these conditions is highly dependent on context: reforms are more likely when the IMF can credibly threaten to suspend loan payments. This study contributes to extant research not only by introducing a novel dataset on country-level natural resource policy, but also, more broadly, by identifying under what circumstances international reform efforts can lead to changes in domestic legislation.

Keywords: natural resources, extractive industries, international organizations, IMF programs, conditionality

1 Introduction

Suppose a country discovers oil or copper in its subsoil and decides to sell these resources in international markets. What should it do with its windfalls?[1] It can use some of this money to invest in human capital and public goods. It can pay external debt obligations or set money aside in a rainy day fund. It can redistribute resource revenues at the subnational level to reduce regional disparities. But if history serves as a guide, most political leaders in resource-rich countries will use their newfound wealth for electoral or personal gain.

Between 1972 and 1974, the price of imported crude oil increased almost sixfold, from 1.84 to 10.77 US dollars per barrel. In the subsequent four years, the average oil-exporting country – like Algeria, Iran, or Venezuela – only saved 17.9 percent of its windfall gain; the rest was used for public sector investments that yielded minimal or even negative rates of return (Talvi and Végh, 2005, 164). Non-renewable natural resources, like oil, natural gas, and minerals, can help developing countries meet their financing needs; but more often than not, these resources encourage fiscal profligacy in the short run and erode the quality of domestic institutions over the long run (Ross, 2015).

To address these issues, the International Monetary Fund (IMF) provides technical assistance to resource-rich developing countries, which often "fail to realize the full development potential of their natural resources"[2] due to weak fiscal institutions, ineffective laws, and inexperienced bureaucrats who are ill-equipped to negotiate with oil or mining corporations. Given the Fund's mandate to stabilize the global economy and resolve economic crises, its interest in natural resource governance is unsurprising. When a significant share of public revenue comes from natural resources, institutions that smooth out commodity price volatility and set aside monies for rainy days or direct them to public investment can help countries develop economic fundamentals that avert future crises. But do external efforts to promote natural resource governance work? To what extent can international financial institutions like the IMF help mitigate the resource curse?

As the world's de facto lender of last resort, the IMF provides emergency liquidity to meet a country's financing gap, which is why it often has substantial leverage over the policy decisions of its borrowers. Still, there are three reasons for skepticism about the Fund's ability to positively influence a country's natural resource governance. First, there is a high rate of recidivism in lending: some countries are regular users of IMF credit, suggesting that this credit is not promoting the lasting economic recovery it aims to promote (Bird et al., 2004). Second, compliance with IMF-mandated policy reforms – a condition for loan disbursement – is often mixed at best: between 1973 and 1997, 65 percent of all loans were suspended due to non-compliance (Bird, 2001). Third, domestic leaders are typically unwilling to regulate the natural resource sector, because resource windfalls allow for short-term increases in discretionary spending that can be used for political gain (Ross, 2015). In light of these considerations, I identify the circumstances under which multilateral lending can drive the leaders of resource-rich countries to invest in extractive governance in one

---

[1]In nearly every country, with the exception of the United States (Goldberg et al., 2008), subsoil assets belong to the government, which means that national or subnational authorities have the power to decide what to do with natural resource revenue.

[2]International Monetary Fund. "A Multi-Partner Trust Fund for IMF Capacity Development in Managing Natural Resource Wealth Phase 2 (Program Document)." November 2016.

Figure 1: Cumulative Creation of Natural Resource Funds, 1980-2019
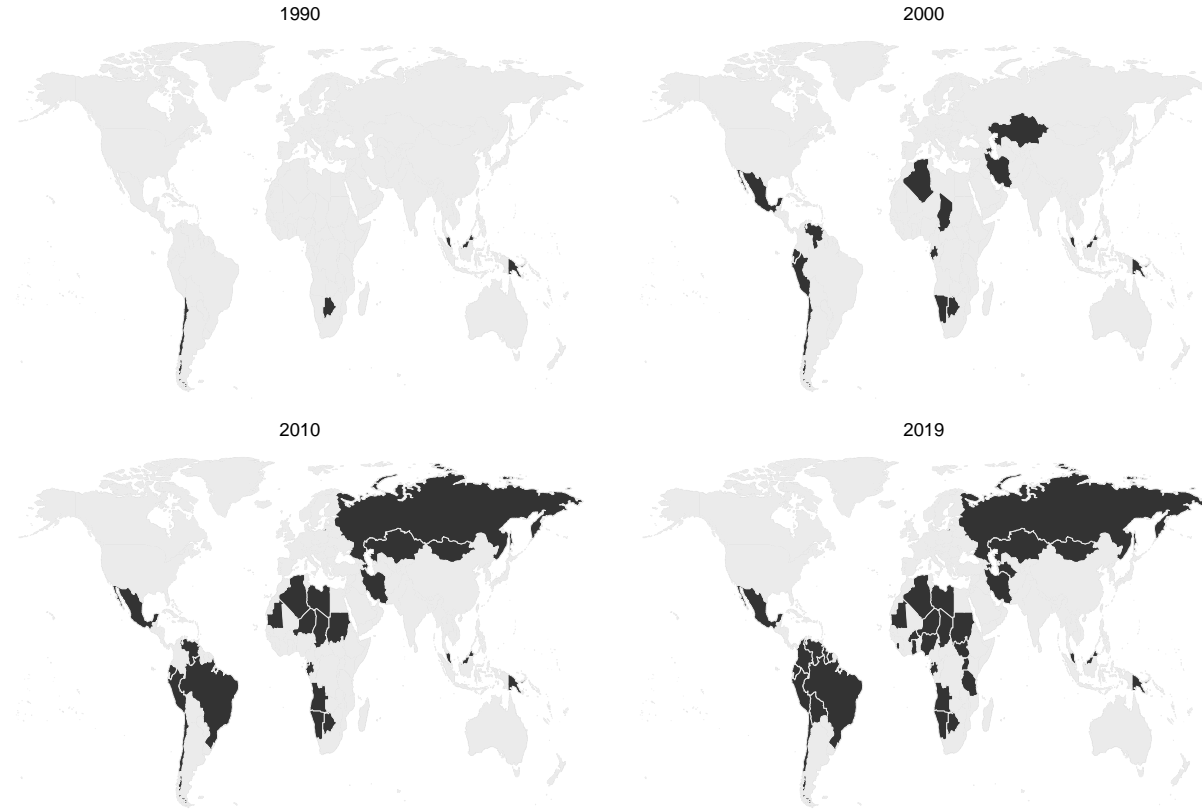
This figure depicts all resource-rich countries in the developing world that have created at least one natural resource fund by the last day of every year. Since the map excludes high income nations, it does not depict the world's largest fund: Norway's Government Pension Fund Global.

specific manner: by creating and regulating a natural resource fund. Though there are other ways to promote extractive governance, natural resource funds are explicitly supported by the IMF as tools to "support the implementation of sound fiscal policies" in contexts of resource wealth (Baunsgaard et al., 2012, 20). Over the past three decades, more and more countries have adhered to this recommendation, as Figure 1 shows.

I argue that IMF agreements can lead resource-rich countries to pass legislation creating and regulating a fund. While most agreements are conditional on policy reforms, these conditions vary on a case-by-case basis. I use text analysis to classify the conditions included in 427 loan agreements signed with 74 resource-rich developing countries between 1980 and 2019, and subsequently examine the effect of conditionality on the emergence of natural resource funds during the same period. My empirical findings confirm the positive association between IMF program participation and natural resource fund legislation, but also highlight the importance of distinguishing between different types of conditionality. Fund legislation tends to be introduced not necessarily when conditions mention the natural resource sector, as one might expect, but rather when they highlight the salience of fiscal reforms. This effect is particularly pronounced when there is a credible threat of loan suspension in case

of non-compliance: borrowers who are closely aligned with the Fund's main principal – the United States – are less concerned about complying with conditions because they do not fear that the Fund will cut off financial support.

A long line of research has examined how international organizations affect domestic politics and law. The European Union, the United Nations, the World Bank, the IMF, and others have played a prominent role setting best practices for human rights (Simmons, 2009), monetary law (Simmons, 2000), money laundering (Findley et al., 2015), anti-corruption efforts (Kaczmarek and Newman, 2011), climate policy (McLean and Stone, 2012), transparency of elections (Hyde, 2007), and the use of military force (Fang et al., 2014).[3] International organizations can also set standards for natural resource revenue management (for example, by endorsing the Extractive Industries Transparency Initiative, or EITI, as the World Bank and the IMF do), but it is unclear whether these standards succeed in promoting economic development and good governance (see Papyrakis et al. 2017 for evidence in favor and Sovacool et al. 2016 for evidence in contrary). This study contributes to extant research by identifying under what circumstances international reform efforts can lead to changes in domestic legislation, even in a sector that incumbents would prefer not to reform. To my knowledge, this is also one of the first studies to use automated text analysis to classify IMF conditions (see also Clark, 2020).

The remainder of this study proceeds as follows. After reviewing the literature on IMF conditionality, I develop a theory of why and when multilateral lending can increase the odds of policy reform. Specifically, I predict that pressure from the IMF will drive impatient politicians to exercise self-restraint in the natural resource sector by creating a natural resource fund. I derive and test my hypotheses, discuss the empirical findings, and conclude with implications for future policy and research.

2 IMF Lending and Policy Conditionality

2.1 The Purpose of Policy Conditionality

Since 1952, virtually all IMF programs are conditional: in exchange for financial support, the borrowing government is expected to pass a series of policy reforms on issues like debt management, privatization, fiscal transparency, trade liberalization, and public spending (Gould, 2003; Rickard and Caraway, 2019). The specific conditions vary from country to country, in response to local circumstances (Stone, 2008) and at the discretion of the Fund's staffers (Chwieroth, 2013), but always under the assumption that the Fund's technical knowledge and advice is transferable across circumstances, in what Barnett and Finnemore (2004, 39) call "bureaucratic universalism." As a result, loan conditions align with the Fund's mandate to provide "policy advice and capacity development support to help countries build and maintain strong economies."[4] The purpose of a program is to *build* strong economies

---

[3]However, Chaudoin et al. (2018) show that many of these findings might be a function of false positives, because the unobservable factors driving membership in international organizations coincide with the unobservable factors driving compliance with best practices.

[4]IMF. "The IMF and the World Bank." 25 February 2019. `https://www.imf.org/en/About/Factsheets/Sheets/2016/07/27/15/31/IMF-World-Bank`

by providing immediate liquidity, and *maintain* strong economies by conditioning loan disbursement to the implementation of predetermined structural reforms. Compliance with these predetermined reforms may be rewarded with more loans, while non-compliance may be punished with interruption of payments (Babb and Carruthers, 2008).

The threat of punishment is important because politicians are impatient and value immediate electoral benefits over future policy investments (Jacobs and Matthews, 2012). This impatience mirrors the behavior of voters, who have more confidence in concrete short-term benefits than in longer-term policy promises, and thus have well-established short-term preferences: they want high real income, high growth, low inflation, and low unemployment (Schultz, 1995). IMF programs, which often go against these preferences, are unpopular with the general public (Vreeland, 2003). As a result, incumbents would rather increase current expenditure to improve their re-election prospects than comply with the terms of an IMF agreement, particularly ahead of elections (Dreher, 2003). When the Fund threatens to interrupt payments in case of non-compliance, it attempts to force incumbents to do something they would prefer not to do. Absent such conditions, incumbents would not feel compelled to follow through with the necessary policy reforms (Dreher, 2009). Even incumbents who *want* to implement painful austerity measures would not have the political capital to do so if they could not claim that these reforms are "imposed" by the IMF (Vreeland, 2003). In sum, politicians are more likely to commit to credible policy reforms and timely loan repayment when the threat of punishment prevents them from changing policies in the future.

The logic outlined above assumes that compliance can be attained and enforced. To be fair, compliance with IMF conditions is relatively low. Between 1973 and 1997, only 35 percent of all loans were fully disbursed; the remaining 65 percent were suspended at some point due to non-compliance (Bird, 2001). 93 percent of all countries participating in an IMF program between 1993 and 2003 experienced at least one program suspension (Stone, 2011). Non-compliance may be a function of low state capacity: some governments lack a trained bureaucracy capable of creating and maintaining transparent fiscal institutions. Others might fail to comply due to ethnic divisions, too many parties in the ruling coalition, or the existence of a divided government (Steinwand and Stone, 2008). Yet, non-compliance may also be a deliberate political choice: given that the IMF is less likely to enforce compliance when the borrower has strong political relationships with the US (Dreher and Jensen, 2007; Copelovitch, 2010; Stone, 2011), some incumbents might not want to comply with an agreement and risk losing popular support if punishment is unlikely in first place. Either way, these low compliance rates suggest that IMF conditionality might not have a meaningful or lasting influence on domestic policies.

Still, compliance is "a spectrum, not a binary variable" (Babb and Carruthers, 2008, 21). Borrowers may comply with some conditions, if not with others. Just as full compliance is not equivalent to absolute success, failing to complete an arrangement is not indicative of absolute failure. It is difficult to assess when IMF programs succeed and when they fail, as countries choosing to enter an agreement tend to have worse economic indicators to begin with (Bas and Stone, 2014). Success is hard to quantify, because IMF lending has different effects on different issue areas: it can worsen labor rights (Lee and Woo, 2020), exacerbate poverty and inequality (Nooruddin and Simmons, 2006; Oberdabernig, 2013), reduce public sector spending (Rickard and Caraway, 2019), raise tax revenue (Crivelli and Gupta, 2016),

increase trade openness (Wei and Zhang, 2010), increase capital inflows and reduce the risk of default (Bauer et al., 2012), to name only a few issue areas (see Stubbs et al. 2020 for an overview). One way to quantify success is by observing whether countries pass laws reforming fiscal practices in response to IMF programs. For example, after signing an agreement with the Fund, resource-rich countries might commit to domestic reforms that – at least on paper – ameliorate the negative consequences of the resource curse. Policymakers may still find creative ways to evade these reforms, but passing a law already makes it harder to behave in a completely unfettered manner. Even if the IMF cannot always enforce compliance or set rules of its own, it can propel a deeper institutional change that outlasts one credit line or one term of office.

2.2 Why IMF Lending Matters for Resource-Rich Countries

It is not immediately clear why resource-rich countries enter IMF programs in first place. Why would a country agree to the terms of a loan, revealing unfavorable information about the state of its economy and committing to costly policy reforms, when it can simply sell natural resources in global markets and accumulate international reserves instead? Indeed, there is some evidence that commodity producers borrow less from capital markets than non-producers because they can use resource rents to cover their financing needs (Brooks et al., 2015; Campello, 2015). However, this does not mean that commodity producers can eschew external funding altogether.

Commodity producers still need external funding because the prices of oil, nickel, silver, copper, zinc, aluminum, gold, and other natural resources are volatile. During a price boom, resource exports might be sufficient to cover domestic financing needs, but most countries do not use these windfall gains to save for times of price bust. Rather, most rulers respond to price booms by going on a public sector spending spree associated with low returns (Talvi and Végh, 2005). After all, rulers are impatient and driven by short-term political incentives: they want to maximize their political capital today, instead of waiting for some uncertain tomorrow, when they might no longer be in power, oil prices might go down, and natural resources might be depleted. Resource windfalls enable immediate consumption; these windfalls can be used to lower taxes, increase spending, distribute spoils, and co-opt the opposition, thereby broadening the ruler's basis of support.

In the absence of a far-sighted natural resource policy, resource producers do not tend to save windfalls for difficult times. Since these countries tend to specialize in natural resources at the expense of other sectors, no other segment of the economy is competitive enough to offset the volatility of prices. As a result, they cut public spending and issue sovereign debt during a commodity price bust. Because resource producers have limited access to bond markets in times of economic downturn (Wibbels, 2006), they frequently turn to the IMF, the world's de facto lender of last resort. IMF loans are meant to complement – not replace – extant sources of revenue. Even if these loans are small relative to the financial needs of a country (Steinwand and Stone, 2008), the Fund's "seal of approval" can help secure additional capital flows and improve the investment climate, at least under some circumstances.[5] Given

---

[5]While Rodrik (1995) finds no evidence for such effect, recent scholarship provides a more nuanced picture: IMF lending can catalyze private capital flows in democracies (Bauer et al., 2012), under intermediate

that the resource sector has the potential to help governments overcome fiscal imbalances and meet their financing gap, the IMF is interested in outlining loan conditions that maximize this potential. Thus, resource-rich countries – like resource-poor countries – might still agree to IMF conditions in exchange for financial support.

2.3 The Role of Natural Resource Funds

When the sources of public revenue are predictable, it is easier to set yearly spending goals and reconcile short-term spending with long-term planning. Governments know that they will always have a population to tax and can design the budget accordingly. However, when a significant part of the budget comes from natural resources, planning ahead is much harder, as public revenue is a function of many factors beyond most governments' control. Political actors do not know exactly how much money they will make off natural resources in the next year. They may be surprised by high prices in one given year, only to see these profits dwindle in the following year. To drive this point home, Figure 2 shows the average yearly price for a barrel of crude oil, in 2018 US dollars, from 1861 until 2018. In light of this persistent price volatility, the IMF encourages resource-rich countries to adopt numeric fiscal targets that insulate public spending from public revenue, avoiding stop-go cycles in public investment. These fiscal targets can limit the size of the public debt, impose a limit to public spending, or require that spending equals revenue, for example.

One tool to pursue these fiscal targets is a natural resource fund, which – in the words of IMF staff – can "support the implementation of sound fiscal policies" and "enhance the transparency and credibility of fiscal policy" (Baunsgaard et al., 2012, 20). Resource funds are a type of sovereign wealth fund: they are state-owned investment accounts that use revenue from the extractive sector to purchase international assets like private equity and real estate.[6] These funds serve as a precommitment mechanism that constrains incumbents' discretion over resource revenue by putting this revenue beyond their immediate reach.

The IMF (2008) identifies five types of funds with five non-exclusive mandates. First, stabilization accounts mitigate budget volatility caused by unexpected fluctuations in resource prices. When revenue declines, countries can draw from their stabilization accounts to sustain current expenditures, instead of borrowing from international capital markets. Second, reserve investment corporations increase the return on foreign exchange reserves, which in turn serve to manage exchange rates and reduce the risk of Dutch disease. These "parking funds" (Venables, 2016) work as a temporary storage unit for economies that cannot absorb the unexpected influx of foreign currency all at once. Third, development funds finance socio-economic projects, including durable physical assets like public infrastructure. Fourth, savings accounts benefit future generations. Since oil, natural gas, and minerals are not renewable, saving natural resource revenue can prolong the financial benefits of resource extraction. Finally, contingent pension reserve funds help finance pensions and social welfare liabilities. Since these funds have different time horizons, they pursue different investment strategies: stabilization funds have a short-term, low-risk investment profile, whereas savings

---

financial risk (Saravia and Mody, 2003), and conditional on the amount of financing and conditionality (Chapman et al., 2017).

[6]Botswana, Chile, Ghana, Kazakhstan, Norway, and many others explicitly prohibit their funds from purchasing domestic assets. Iran is one of the few countries allowing for both (Bauer et al., 2014).

Figure 2: Crude Oil Prices, in 2018 US Dollars per Barrel
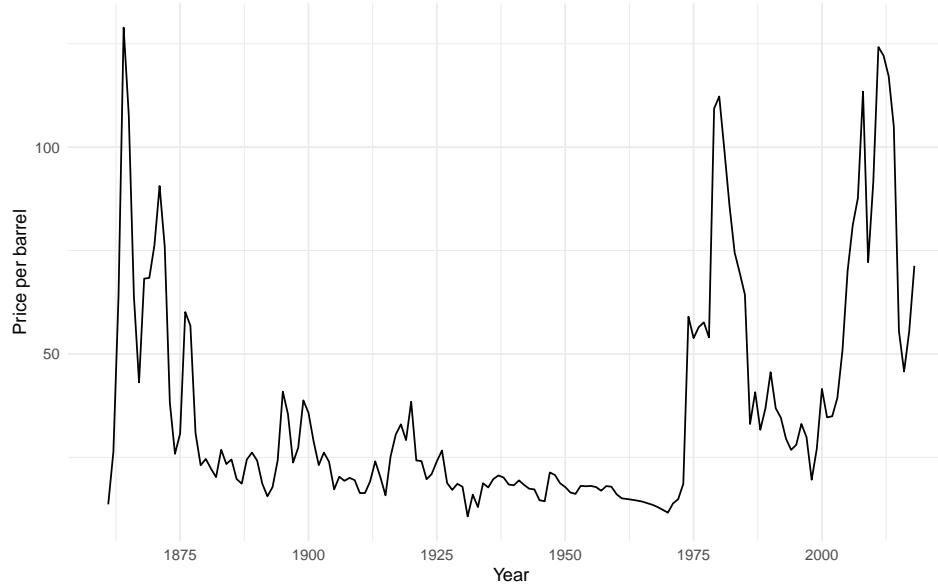
This figure shows the average yearly price for a barrel of crude oil, in 2018 US dollars (deflated using the Consumer Price Index for the US), from 1861 until 2018, using data from (BP, 2019). From 1861 to 1944, BP reports the US average price; from 1945 to 1983, it reports the posted price for Saudi Arabian light oil; and from 1983 onwards, it reports the price for Dated Brent.

or pension accounts have a long-term, high-risk investment profile due to their low liquidity needs.

Though nearly all extant natural resource funds are enshrined in legislation, they are institutionalized to different degrees: some are subject to public scrutiny, regular audits, and legislative oversight, while others are not. (Wang and Li, 2016). The IMF has taken an active role in promoting and endorsing this institutionalization process. Timor-Leste's Petroleum Fund Law, passed on 3 August 2005, was drafted with the support of a resident advisor from the IMF Fiscal Affairs Department; according to an IMF staff report, "the creation of a Norwegian-style petroleum fund and the adoption of a cautious saving policy are major steps in the right direction" (IMF, 2005). Similarly, a 2007 staff report urged Angola to consider the creation of "an oil fund that is based on well-defined flexible rules and fully integrated into the budget process, and buttressed by stringent procedures to ensure transparency" (IMF, 2007). Unsurprisingly, the number of developing countries with at least one natural resource fund has soared over the past three decades, as Figure 1 shows.

When policymakers in Timor-Leste or Angola craft natural resource legislation, they face an intertemporal trade-off: they must balance short-term pain with long-term gain, enacting policies that impose political costs in the short term, but ensure that future generations will benefit from resource wealth – long after oil, gas, or mining reserves are depleted. Many incumbents would prefer to not pass any such policy, instead maintaining full discretion over who benefits from resource windfalls, and when, to maximize their political capital.

3 A Theory of Policy Conditionality in Resource-Rich Countries

3.1 Main Hypotheses

There is a tension between domestic interests and international commitments; ruling parties need to respond to voters in order to win elections and stay in power, but they also need to meet the demands of international creditors (Ezrow and Hellwig, 2014). Therefore, incumbents who enter an IMF program face a dilemma: though they want to retain full control over the allocation of resource windfalls, they also need to comply with the terms of the program to ensure that the funds are disbursed. First, I seek to establish whether or not participation in a program matters; after all, there is reason to suspect that program participation does not always result in reform. Hypothesis 1 predicts incumbents will be more likely to pass legislation related to a natural resource fund when they have an outstanding IMF program – even if doing so goes against their political interests.

> **Hypothesis 1 (IMF program):** *All else equal, governments are more likely to pass natural resource policy when they are under an IMF program.*

Going beyond program participation, I propose two competing hypotheses to test for the effect of specific program conditions. Several IMF programs include a targeted condition related to natural resources. For instance, a 2009–2012 loan agreement with Angola mandated the "submission to the cabinet of the approval documents of the Angola Sovereign Wealth Fund." In line with this condition, president Jose Eduardo dos Santos signed a decree creating an oil fund in March 2011. More recently, following a 2013–2016 arrangement mandating the "establish[ment of] a Natural Resource Revenue Fund with legal and procedural characteristics," the government of Sierra Leone created the Transformational Development Stabilization Fund in 2016. Angola and Sierra Leone were each explicitly instructed to create a natural resource fund, and these instructions were written in a way that made non-compliance easily observable – and punishable. Having agreed to enter IMF programs, these countries did not have the leeway to develop alternative policies and would not have been able to deviate from their respective loan conditions without jeopardizing the disbursement of additional funds. The cases of Angola and Sierra Leone suggest that borrowers might be more likely to pass natural resource policy in response to targeted natural resource conditions, which highlight the salience of natural resources and the need to reform the extractive sector. This is what Hypothesis 2 predicts.

> **Hypothesis 2 (IMF resource conditionality):** *All else equal, governments are more likely to pass natural resource policy when they are under an IMF program that includes conditions related to natural resources.*

Though not all IMF programs are equal, nearly every program includes fiscal conditions setting fiscal targets (Rickard and Caraway, 2019). These conditions mandate borrowers to cut back on aggregate spending, balance the budget, or reduce the size of the public deficit, without necessarily specifying where cuts should come from (Nooruddin and Simmons, 2006).

For example, a 1995–1998 agreement with Gabon stipulated the "issuance and strict implementation of a circular by the Minister of Finance to all government departments providing instructions for the proper procedures for budget preparation, expenditure control, and public accounting, in line with the existing legal framework." Ecuador's 2000–2001 agreement conditioned loan disbursement to "submission to congress of fiscal reform legislation that will eliminate all revenue earmarking not mandated by the constitution and reduce the fiscal impact of volatility in oil prices," while Suriname's 2016–2018 agreement mandated the Council of Ministers to issue a "decision announcing that the 2016 supplementary budget will be based on the Fund-supported program's macroeconomic assumptions and measures."[7] These terms highlight the importance of fiscal policy while giving Gabon, Ecuador, and Suriname some leeway to determine where to raise revenue, what sectors to cut from, or how to meet the agreed-upon fiscal deficit target.

Though Gabon, Ecuador, and Suriname are not explicitly instructed to create a natural resource fund, they might choose to do so in order to accomplish these fiscal targets. There is anecdotal evidence in support of such prediction: Gabon's Fund for Future Generations was created in 1998; Ecuador's Fund for Stabilization, Social and Productive Investment, and Reduction of Public Debt was created in 2000 (see Lledó et al. 2019 for a history of Ecuador's oil funds); and Suriname's Savings and Stabilization Fund was created in 2017. It could be the case, then, that borrowers reform the extractive sector not when this sector is singled out, as Hypothesis 2 posits, but rather when made aware of the need to promote budget reforms across all sectors of the economy. This is what Hypothesis 3 predicts.

> **Hypothesis 3 (IMF fiscal conditionality):** *All else equal, governments are more likely to pass natural resource policy when they are under an IMF program that includes conditions related to fiscal policy.*

3.2   Moderating Hypothesis

Program participation and conditionality might not provide sufficient motivation to create and regulate a natural resource fund. Borrowers might not reform the natural resource sector simply because the IMF tells them to; after all, full compliance with conditions is relatively rare, and domestic politics also constrain policymakers' ability to implement reforms mandated by the IMF. The effect of Hypotheses 2 and 3 on natural resource policy may be moderated by additional factors.

According to extant research, compliance with conditionality depends on whether borrowers expect to be punished for non-compliance (Stone, 2004). The credibility of such a threat is contingent upon the political interests of the Fund's largest shareholders (Stone, 2008; Copelovitch, 2010). It might be unfair to describe the Fund as an agent fully beholden to the political interests of its principals, but it is true that US allies, in particular, tend to receive larger loans with fewer conditions that are enforced less rigorously (Stone, 2011). Likewise, countries tend to receive larger loans when government officials and IMF staff share similar professional training (Chwieroth, 2013); and the more a country's voting pattern in

---

[7]The source for all these citations is Kentikelenis et al. (2016), whose dataset reproduces the text of each condition for each Letter of Intent signed between 1980 and 2014, and the IMF MONA Database, which does the same for agreements signed between 2003 and 2020.

the UN General Assembly aligns with the voting pattern of the US, the better the terms of this country's loan agreements (Dreher and Jensen, 2007). Borrowers that are strategically important to the US might fail to comply with IMF conditionality because they anticipate lax enforcement. If so, these countries will be less likely to pass natural resource policy in response to a loan condition, as they do not anticipate to be punished for their lack of compliance. This is what Hypothesis 4 predicts.

> **Hypothesis 4 (IMF conditionality and US allies):** *All else equal, governments are less likely to pass natural resource policy in response to IMF conditionality of any kind when they are closely allied with the United States.*

4 Data and Descriptive Analysis

4.1 Dependent Variable: Natural Resource Policy

I introduce original data on natural resource policy for 74 developing countries between 1980 and 2019 (see appendix for full country list). This corresponds to all developing countries classified as resource rich by the IMF (Venables, 2016), the Natural Resource Governance Institute (2017), or both. The dependent variable is a binary indicator of whether each country-year pair passed a legal document (that is, a law, statute, act, code, or executive decree) creating or regulating a natural resource fund. To collect these data, I first use the Natural Resource Governance Institute (2017) and the IMF Fiscal Rules at a Glance Dataset (Lledó et al., 2017) to identify the precise country-year in which a legal document was passed. I then locate each legal document in its country's Official Gazette, available in the Foreign Official Gazette Database and the Global Legal Information Network (two initiatives sponsored by the US Library of Congress). During the period under study, 37 of the 74 countries in the analysis passed a total of 80 legal documents pertaining to 60 distinct natural resource funds. The remaining 37 countries have not passed any natural resource policy during the period under study. Figure 3 shows the number of legal documents passed at the national level between 1980 and 2019, indicating that the vast majority was passed after 1995.

To illustrate the content of such legal documents, consider Angola, where president Jose Eduardo dos Santos signed the Executive Decree Number 48 creating the Sovereign Wealth Fund of Angola on 9 March 2011. The purpose of the fund is to "encourage and support, in the Republic of Angola and abroad, investment in the development of projects in the energy and water sectors and in other sectors considered strategic, including, in particular, infrastructure projects."[8] Under the Santos administration, the 2011 Budget Law[9] (passed on 28 December 2010) also earmarked oil revenue for regional development and infrastructure, with budget projections based on an oil price of 68 USD per barrel; all revenue exceeding this projection should enter the treasury reserve. Both the Executive Decree Number 48 and the 2011 Budget Law count as natural resource policy.

Recall the IMF (2008) taxonomy of natural resource funds. At one extreme, stabilization funds have low-risk, fixed-income portfolios meant to provide immediate liquidity that

---

[8]Decreto Presidencial No. 48/11, 9 March 2011. Article 1, Paragraph 3.
[9]Lei do Orçamento Geral do Estado – Lei 26/10, 28 December 2010.

Figure 3: Number of Legal Documents Passed Every Year, 1980-2019
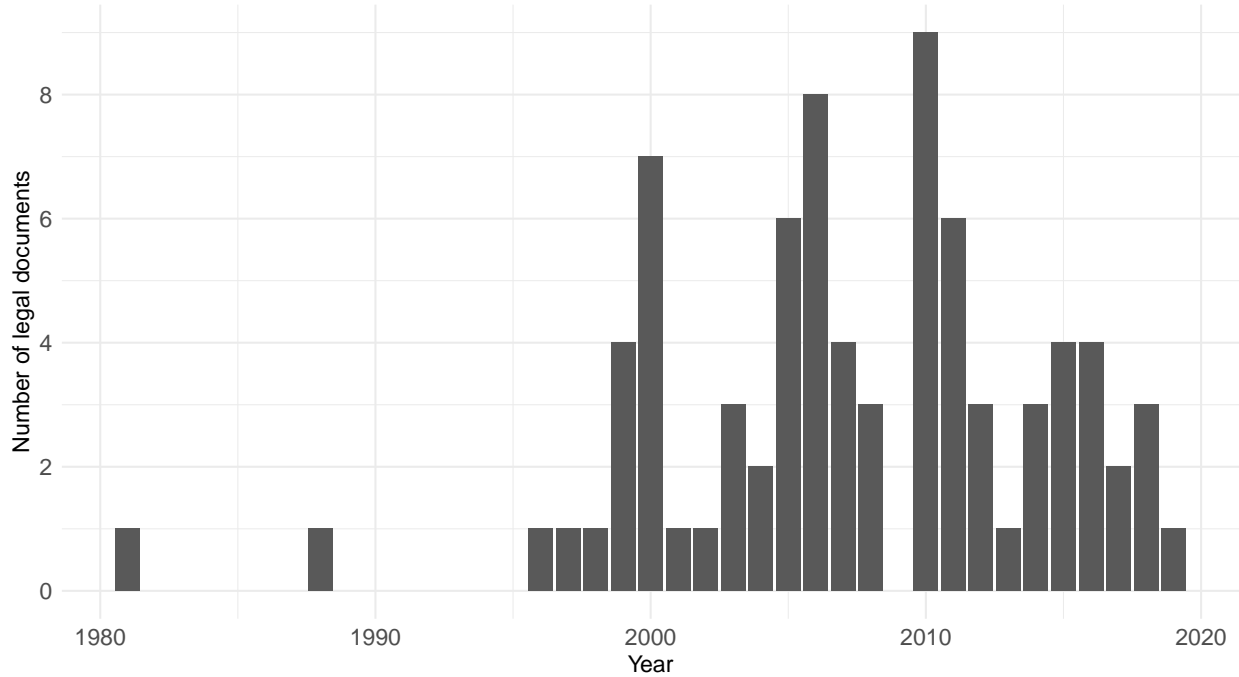
This figure depicts the temporal distribution of 80 legal documents creating and regulating natural resource funds in 37 countries during the period covered in the analysis.

offsets the losses caused by unexpected fluctuation in commodity prices. Reserve investment corporations and development funds have similarly short horizons, serving as temporary storage units until the domestic economy can absorb resource rents and use them to invest in socio-economic projects. At the other extreme, savings and pension funds have diversified portfolios and can finance riskier investments due to their long time horizons and low liquidity needs. As a consequence of these different time horizons, incumbents have more discretion over stabilization, investment, and development funds than over savings or pension funds. Chile has two funds, both created in 2006; the Economic and Social Stabilization Fund was made immediately available to cover current expenditures,[10] while the Pension Reserve Fund – earmarked for old-age and disability benefits – was off-limits to public officials for the first ten years after its creation.[11] Both funds represent precommitment mechanisms, but the degree of precommitment is different. I generate two binary variables to account for this distinction: *Short-term policy* measures the passage of legal documents related to stabilization, investment, or development funds, whereas *Long-term policy* indicates the passage of documents related to savings or pension funds.

Table 1 shows the number of funds, legal documents, and countries by type of policy. The numbers in this table do not add up to the totals (60 funds, 80 legal documents, 37 countries) because one fund can fulfill multiple purposes. For example, in a Letter of Intent (LOI)

---

[10]Decreto con Fuerza de Ley 1, 11 December 2006.
[11]Ley 20128 Sobre Responsabilidad Fiscal, 22 September 2006.

Table 1: Natural Resource Funds and Corresponding Legal Documents, by Type

	Short-Term Policy			Long-Term Policy	
	Stabilization	Investment	Development	Savings	Pension
# of funds	33	10	15	19	1
# of legal documents	50	14	18	22	1
# of countries	26	8	14	18	1

submitted to the IMF in November 2009,[12] the government of Angola states: "we would welcome technical assistance from the IMF on the setting up [of] the Sovereign Wealth Fund *which will be both a stabilization and a savings fund*" (emphasis added). Thus, the Executive Decree Number 48 and the 2011 Budget Law, which create and regulate the Sovereign Wealth Fund of Angola, are coded as both *Short-term policy* and *Long-term policy.* The same applies to legal documents pertaining to Colombia's Savings and Stabilization Fund or Trinidad and Tobago's Heritage and Stabilization Fund, among others.

I focus on written legal documents because they are easier to enforce and harder to revoke than unwritten norms. Admittedly, these documents are often aspirational, rather than normatively binding; in Latin America, for example, governments often bend or evade formal rules (Weyland, 2002), which could suggest that natural resource policy is not a credible precommitment mechanism. Still, it is useful to understand when and why de jure policy is enacted because this is a necessary first step toward explaining the effects of law on behavior. Even where formal rules are bent or evaded, they still approximate political behavior. For example, Amick et al. (2020) find that both constitutional and statutory rules mandating a balanced budget are associated with higher fiscal discipline, even in Latin American countries where formal rules are frequently disregarded. There is value in examining what states aspire to do and what they are willing to commit to on paper, regardless of their ability to actually comply with such aspirations.

Table 2 reports the average of selected variables for countries with and without natural resource funds in place in 2019, using World Bank data from the same year (or from the most recent year available). In that year, countries with natural resource funds tended to have a higher GDP per capita and a higher GDP share of natural resource rents than countries without such funds. In the previous four decades, states with funds also tended to be under an IMF agreement for fewer years: 13.5, as opposed to a mean of 15.5 years for countries without funds. This suggests that there is something qualitatively different about states that are able and willing to adopt precommitment mechanisms in the extractive sector.

4.2 Independent Variables: IMF Program Participation and Conditionality

Using data from Kentikelenis et al. (2016) (available for 1980–2014) and the IMF MONA Database (available for 1993–2019), I examine the content of 427 IMF programs signed with

---

[12]The full LOI is available under `https://www.imf.org/external/np/loi/2009/ago/110309.pdf`

Table 2: Characteristics of Countries With and Without Natural Resource Funds, 2019

	Natural Resource Fund	
Attribute	Yes	No
# of years under IMF program, 1980-2019	13.5	15.5
GDP per capita (in current US$)	5,807.19	2,605.80
Resource rents (% GDP)	16.05	11.30
N	37	37

64 of the 74 developing countries identified as resource rich. The remaining ten countries,[13] while included in the analysis, signed no agreement in the period under study. The terms of each agreement, including the conditions for loan disbursement, are stipulated in its Letter of Intent (LOI). On average, each agreement lasts for two years and includes 31 conditions, with a standard deviation of 29, totaling over 13,000 conditions.[14]

Extant research on the relationship between IMF conditionality and public policy tends to focus on the *number* of conditions pertaining to a specific issue area (e.g. Dreher and Jensen, 2007; Woo, 2013; Stubbs et al., 2020). However, the number of conditions is an imperfect proxy for the stringency of an agreement, as it does not tell us anything about the denominator. The relative importance of one single condition covering one specific issue area is conditional on the total number of conditions covering all issue areas. Other researchers use a binary variable to indicate the presence or absence of a specific kind of condition – for example, a trade condition (Wei and Zhang, 2010) or a labor condition (Rickard and Caraway, 2019) –, but one single condition can address multiple issue areas, and a binary indicator might not capture this nuance. Given the limitations of extant approaches, I use automated text analysis to classify the 13,000 available conditions into different categories of interest.

Though there is no single best method for automated text analysis (Grimmer and Stewart, 2013), probabilistic topic models are helpful in uncovering similarities between semantically comparable documents, by identifying the proportion of each document (in this case, an IMF condition) that addresses a specific topic. A topic is a distribution over a fixed vocabulary (Blei, 2012); for example, the topic *natural resources* has a fixed vocabulary that includes words like *oil*, *mining*, and *hydrocarbon*. Like other methods of unsupervised learning, topic models do not require training sets and are suitable for new discoveries: they can parse the data to identify hidden patterns that are not immediately evident to the human eye (like the unobservable influence of IMF conditionality on domestic legislation). Researchers can use these models to make inferences about unobserved latent topics, with few a priori assumptions about the documents being analyzed.

One weakness of traditional topic models is their instability. Despite its name, automated text analysis is not entirely automated; researchers must specify the number of topics in

---

[13]Botswana, Eritrea, Iran, Libya, Malaysia, Namibia, South Sudan, Syria, Timor-Leste, and Turkmenistan.

[14]The LOI for each agreement is several pages long and includes an extensive discussion of the borrowing country's economic perils. In the following statistical analysis, I focus exclusively on the conditions for loan disbursement and disregard any additional content.

Table 3: Ten Most Common Words Per Topic

| Topic 1: Natural Resources	Topic 2: Fiscal Issues
prices	**tax**
petroleum	**budget**
price	law
oil	government
percent	public
products	**fiscal**
gas	**revenue**
electricity	**expenditure**
increase	submit
fuel	parliament

advance, label each topic, and interpret the results, all of which are subjective decisions (Wilkerson and Casas, 2017). Topic models tend to generate multiple topics with similar content, and the results are sensitive to the starting values of the estimation algorithm. To circumvent these issues, I use the dynamic keyword assisted topic model developed by Eshima et al. (2020), which allows me to specify a small number of keywords to label each topic ahead of estimation. The chosen keywords incorporate knowledge from previous research on IMF conditionality (e.g. Kentikelenis et al., 2016), from interviews I conducted with IMF officials in the Fiscal Affairs Department, and from non-binding recommendations that these officials issue to governments on a yearly basis (in the form of Article IV Consultations). This specification yields more interpretable topics and increases the stability of topic proportions across different specifications, enabling me to investigate how topic proportions change over time.

Using a dynamic keyword assisted topic model, I identify the share of each condition that addresses two topics: targeted natural resource policy and general fiscal issues. Table 3 displays the ten most frequent terms for each of these two topics; the pre-specified keywords appear in bold. The model identifies six additional topics (related to labor issues, state-owned enterprises, foreign debt, financial regulations, redistributive policies, and trade, plus a residual category), presented in more detail in the appendix.

As the ten most common words for topic 1 suggest, natural resource conditionality frequently mandates an increase in the price of oil products and electricity tariffs. For example, a condition issued to Burkina Faso in 1999 stipulated the "introduction of an automatic domestic price setting mechanism of petroleum products reflecting movements in international prices." This condition reflects the broader IMF stance against energy subsidies, with Fund staffers (e.g. Coady et al., 2019) finding that fossil fuels tend to be substantially underpriced in developing and developed nations alike.

Figure 4 presents the time trend for these two topics, based on the year in which an IMF program was initiated. For each year in the x-axis, the y-axis represents the average proportion of words associated with a given topic. In 1990, for instance, the IMF initiated six loan arrangements with a total of 183 conditions; on average, 6.5 percent of the words

**Figure 4:** Topic Prevalence Over Time, 1980-2019
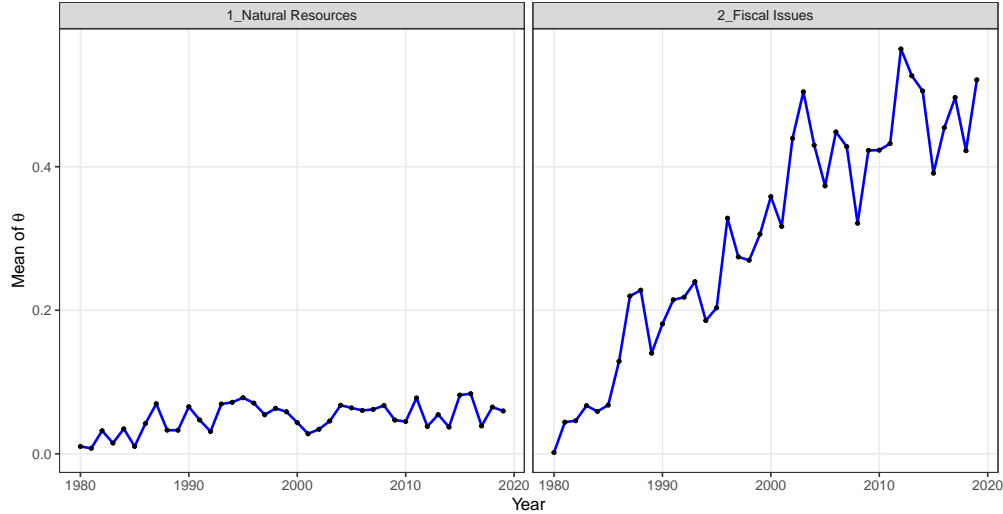
These plots display the prevalence of each topic over time, based on the year of program initiation (as indicated by the x-axis). The y-axis represents the relative proportion θ of each topic in each condition, averaged for all conditions over a year.

included in these conditions were related to natural resource policy, compared to 18.1 percent related to fiscal issues. The prevalence of fiscal issues increased linearly since 1980, peaking at 56.4 percent in 2012. The takeaway point is that since 1983, IMF programs in resource-rich countries have consistently spent more words on overall fiscal policy than on specific natural resource policy.

This does not mean that all IMF agreements signed with resource-rich countries cover these topics to the same extent. Topic proportions vary not only over time, but also across countries; for example, the prevalence of topic 1 in each agreement is significantly correlated with the magnitude of the borrowing country's resource rents.[15] To illustrate this variation, Figure 5 depicts each of the 427 agreements under study, according to the proportion of words associated with each topic. As this figure shows, 92.3 percent of the words included in Tanzania's 2012 agreement and 88.6 percent of the words included in Burkina Faso's 2003 arrangement pertain to fiscal issues; in both cases, less than 5 percent relates to natural resources. In contrast, 37 percent of the vocabulary in Russia's 1995 arrangement relates to natural resources and 12.5 percent to fiscal issues. These differences are more than just semantics. They suggest that the IMF does not pursue an undifferentiated "one-size-fits-all" approach to reform in resource-rich countries, instead tailoring the conditions of each agreement to the different political and economic realities of countries like Tanzania or Russia. Some countries receive a diverse set of conditions related to other categories identified by the topic model (for example, monetary or trade policy), while others are instructed to raise revenue, cut expenditure, and balance the budget. Borrowers exposed to different kinds of conditionality are likely to respond differently, which is why the effect of IMF programs

---

[15]The correlation between topic 1 prevalence in each agreement and the size of resource rents in the same year (as a percentage of GDP, using World Bank data) equals $\rho = 0.13094$ ($p = 0.00982$).

Figure 5: Topic Prevalence, by Agreement
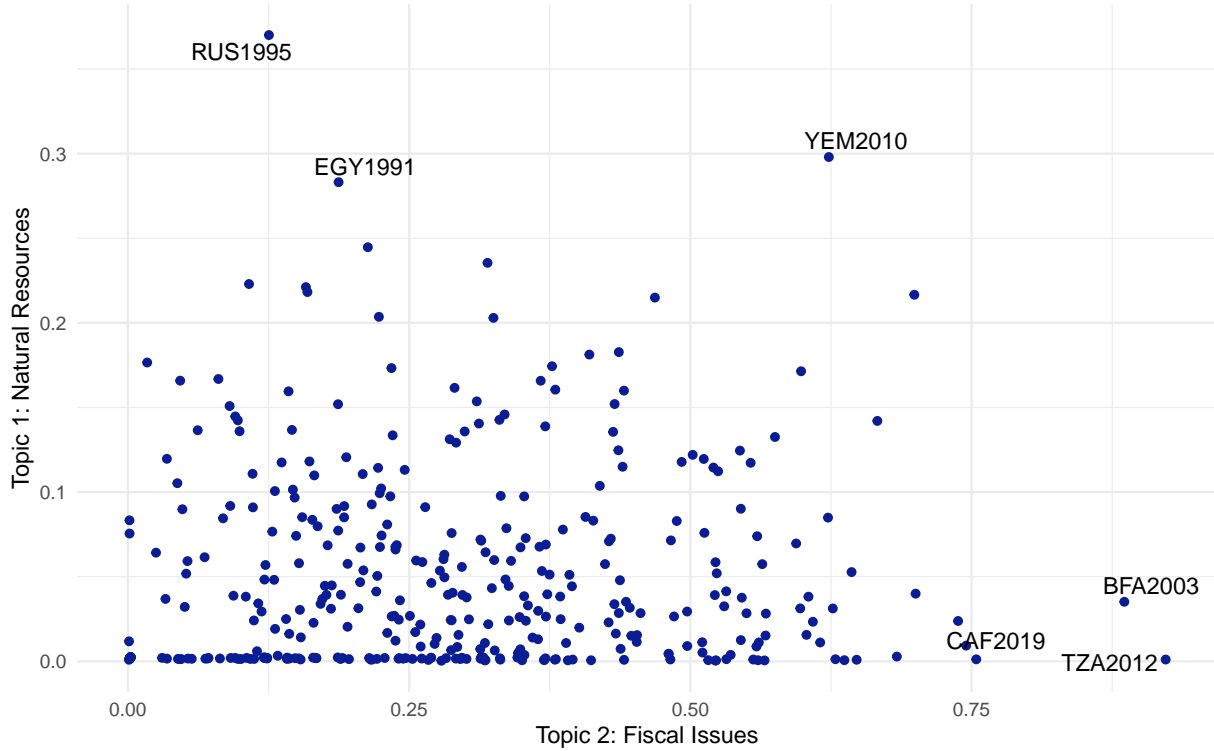
For each IMF agreement signed between 1980 and 2019, the y-axis represents the relative proportion of topic 1 (natural resources) among all conditions of this agreement, while the x-axis represents the relative proportion of topic 2 (fiscal issues).

on natural resource policy should differ across countries.

I use this information to generate three independent variables. For every country and year, the binary variable *Program participation* (used to test Hypothesis 1) indicates whether a loan agreement was in place. After all, program participation has effects of its own: it increases technical assistance and policy advice, catalyzes foreign aid, and can undermine or improve perceived creditworthiness, depending on the context (Stubbs et al., 2016; Chapman et al., 2017; Lee and Woo, 2020; Stubbs et al., 2020). If *Program participation* equals one, I generate two additional independent variables, *Topic 1: natural resources* and *Topic 2: fiscal issues*, which indicate the prevalence of each topic among the program's conditions. These two variables are used to test Hypotheses 2 and 3, respectively, and take the value of zero for country-years without program participation.

4.3 Moderating and Control Variables

Hypothesis 4 predicts that borrowers are less likely to pass natural resource policy in response to IMF programs when they are closely aligned with the US. As the largest IMF shareholder, the US tends to push for less rigorous conditionality enforcement among its allies; thus, US allies should be less likely to pass natural resource policy in response to conditionality of

any kind. To test this hypothesis, I employ an ideal point score computed by Bailey et al. (2017), who use voting patterns in the United Nations General Assembly to calculate the absolute distance between the ideal points of two states. Several extant studies (e.g. Stone, 2004; Dreher and Jensen, 2007; Chapman et al., 2017) use equivalent measures to examine how each country relates to the ideal point of the US. Like Bailey et al. (2017), I multiply the ideal point distance by –1 for ease of interpretation, such that larger values of the resulting variable *Voting with US* represent closer positions. This variable is lagged by one year to avoid simultaneity bias.[16]

Models include a measure of whether countries have passed short-term or long-term policy in the past (*Previous short-term policy* and *Previous long-term policy*) and additional economic variables that are correlated with the timing of natural resource policy. *GDP per capita* (in current US dollars, logged), *GDP growth* (in percent), and *Resource rents* (as a percentage of the GDP) are reported by the World Bank. *Field discovery* indicates the discovery of a giant, supergiant, or megagiant oil and gas field (that is, a field with over 500 million recoverable barrels of oil or over 3 trillion cubic feet of gas) in a given country and year (Horn, 2014). *Oil price* is the cost of a barrel of West Texas Intermediate crude oil, in current US dollars, on December 31 of every year. *Crisis* is coded one in years of banking, debt, or currency crisis and zero otherwise (Laeven and Valencia, 2020). These economic variables are lagged by one year, corresponding to the budget cycle. Finally, I consider the effect of regime type using the Polity 2 index, which ranges from –10 to +10, from hereditary monarchy to consolidated democracy.

5 The Origins of Natural Resource Policy

5.1 Testing the Main Hypotheses

I begin by estimating logistic regressions with country fixed effects and cubic polynomials. Passing natural resource policy is a rare event that did not occur every single year between 1980 and 2019, and in fact never occurred in 37 of the 74 countries under study. These 37 countries are what Beck (2020) calls "homogeneous groups:" they are perfect predictors of event non-occurrence, because they show no variation in the dependent variable (which consists of all zeros). Since models estimated with maximum likelihood would drop these groups altogether, I adopt the penalized maximum likelihood approach proposed by Cook et al. (2020) to retain the complete sample.

Table 4 tests Hypothesis 1. As Model 1 shows, participation in an IMF agreement almost triples the odds of passing *Short-term policy* ($e^{1.040} = 2.83$), that is, of creating and regulating stabilization, investment, and development funds, which are suited for short- to medium-term crisis mitigation. Model 2 indicates that program participation has a similar effect on *Long-term policy*, which entails the creation and regulation of savings or pension funds. These results can be framed in terms of the Fund's two self-declared mandates: first, provide immediate liquidity to *build* strong economies; second, impose loan conditionality to *maintain* strong economies. Put together, Models 1 and 2 suggest that IMF agreements signed with resource-rich countries have the potential to serve both mandates: they promote short- to

---

[16]I also tested for effects of US foreign aid, but these effects are not significant and are not reported below.

Table 4: The Effect of IMF Program Participation on Natural Resource Policy, 1980–2019 (Penalized Logit)

	Dependent variable:	
	Short-term policy	Long-term policy
	(1)	(2)
Program participation = 1	1.040***	1.054**
	(0.334)	(0.440)
Voting with US	1.047**	−0.351
	(0.425)	(0.538)
Previous short-term policy = 1	−1.496***	0.190
	(0.434)	(0.654)
Previous long-term policy = 1	−0.590	−3.172***
	(0.567)	(0.710)
Resource rents (% GDP)	0.014	0.043**
	(0.015)	(0.021)
GDP per capita (log)	0.768*	2.476***
	(0.398)	(0.578)
GDP growth (%)	0.013	0.025
	(0.013)	(0.015)
Field discovery = 1	0.714*	0.687
	(0.383)	(0.549)
Oil price (USD)	−0.019***	−0.029***
	(0.007)	(0.010)
Crisis = 1	−0.002	0.515
	(0.485)	(0.625)
Democracy (Polity)	−0.030	0.040
	(0.055)	(0.070)
Constant	−1.596	3.098
	(2.877)	(3.378)
Observations	2,420	2,420
Log Likelihood	−215.611	−89.583

This table reports the results of penalized likelihood models with third-order polynomials and country fixed effects. Coefficients represent log odds.
*p<0.1; **p<0.05; ***p<0.01.

medium-term fiscal anchors in addition to long-term fiscal sustainability. In addition, these first results indicate that *Voting with US* has different effects on different kinds of funds: as proximity to the ideal point of the US increases, resource-rich countries are significantly more likely to embrace short-term policies, but there is no significant effect on long-term policy.

All else equal, governments that have already passed short-term or long-term policy are at least four times less likely to pass any additional policy of the same kind ($e^{1.496} = 4.46$). Furthermore, increases in *Resource rents*, *GDP per capita*, and *GDP growth* are significantly associated with increases in *Long-term policy*, suggesting that wealthier or fast-growing economies can afford to save for the future in a way that poorer or slow-growing

economies cannot. This effect is absent for policies related to stabilization, investment, or development funds.

How, concretely, does the content of IMF agreements influence policy passage in resource-rich countries? To test Hypotheses 2 and 3, Table 5 isolates the potential consequences of program participation (including technical assistance, policy advice, and foreign aid catalysis) from the effects of conditionality. The two variables for conditionality – *Topic 1: natural resources* and *Topic 2: fiscal policy* – represent the relative prevalence of each topic among all conditions for all active IMF programs in a given country-year. As a reminder, these two

Table 5: The Effect of IMF Conditionality on Natural Resource Policy, 1980–2019 (Penalized Logit)

	Dependent variable:	
	Short-term policy	Long-term policy
	(1)	(2)
Topic 1: natural resources	1.962	−1.575
	(3.498)	(4.733)
Topic 2: fiscal issues	2.503***	2.377**
	(0.836)	(1.032)
Voting with US	1.080**	−0.298
	(0.424)	(0.531)
Previous short-term policy = 1	−1.504***	0.077
	(0.435)	(0.652)
Previous long-term policy = 1	−0.547	−3.125***
	(0.575)	(0.712)
Resource rents (% GDP)	0.013	0.039*
	(0.015)	(0.021)
GDP per capita (log)	0.873**	2.531***
	(0.398)	(0.569)
GDP growth (%)	0.014	0.025*
	(0.013)	(0.015)
Field discovery = 1	0.706*	0.640
	(0.382)	(0.545)
Oil price (USD)	−0.020***	−0.031***
	(0.007)	(0.009)
Crisis = 1	−0.088	0.468
	(0.496)	(0.641)
Democracy (Polity)	−0.044	0.035
	(0.055)	(0.070)
Constant	−0.803	3.605
	(2.828)	(3.336)
Observations	2,420	2,420
Log Likelihood	−214.847	−89.855

This table reports the results of penalized likelihood models with third-order polynomials and country fixed effects. Coefficients represent log odds.
*p<0.1; **p<0.05; ***p<0.01.

variables take the value of zero for country-years without an IMF program, as they can only be observed when *Program participation* equals one. Results suggest that increased coverage of natural resources has no significant effect on either *Short-term policy* or *Long-term policy*, providing no evidence to support Hypothesis 2. In contrast, increased coverage of fiscal issues is associated with a significant increase in the odds of passing short-term policies *and* long-term policies, which provides support for Hypothesis 3. These results indicate that general fiscal concerns supersede concerns that are specific to the natural resource sector: governments are more inclined to enact policy reforms in response to fiscal conditions than in response to natural resource conditions.

One might be concerned that fiscal conditions are more likely to be binding than natural resource conditions. Binding conditions are hard conditions, meaning that loan disbursement can be interrupted in case of non-compliance. If this is the case, borrowers could simply be responding to binding fiscal conditionality, as opposed to non-binding natural resource conditionality. However, models that include only binding conditions return equivalent results (see appendix), suggesting that the distinction between fiscal issues and natural resources is not just a matter of binding versus non-binding. Rather, it is a matter of highlighting the salience of the public budget and the importance of fiscal reforms, as opposed to simply addressing the natural resource sector.

5.2 Testing the Moderating Hypothesis

Stone (2004), Dreher and Jensen (2007), and others show that the threat to interrupt loan disbursement is less credible when the borrowing nation is closely aligned with the Fund's largest shareholders. Specifically, borrowers whose voting pattern in the United Nations General Assembly is similar to that of the US should expect less rigorous enforcement of conditionality, thus being less likely to adopt policies that might work against their political self-interest. Building on these findings, Hypothesis 4 posits that borrowing countries are less likely to pass natural resource policy in response to IMF conditionality of any kind the closer they are to the US (that is, the higher their value of *Voting with US*).

Table 6 provides qualified support for this hypothesis, showing that incumbents are significantly less likely to pass long-term policies in response to general fiscal conditions the closer they are allied with the US. This effect is absent for short-term policies, that is, for stabilization, investment, or development funds, which are associated with lower political costs because they are more discretionary in nature. When the IMF cannot credibly threaten to interrupt a loan program, borrowers do not anticipate to be punished for lack of compliance, so there is no need to create rigid, long-term natural resource institutions in response to fiscal conditionality, as would otherwise be the case. This indicates that resource-rich governments take advantage of their proximity to the US in order to evade policies with longer time horizons, but not policies with shorter time horizons. The interaction between *Voting with US* and *Topic 1* is not significant, suggesting again that borrowers do not respond to targeted natural resource conditions.

Natural resources generate well-known perverse incentives when it comes to fiscal governance, and IMF agreements might attempt to remediate this by making specific demands related to natural resources and fiscal issues. But given that the credibility of enforcement varies depending on a country's importance to major principals, Table 6 provides a discour-

Table 6: The Effect of IMF Conditionality and Voting with US on Natural Resource Policy, 1980–2019 (Penalized Logit)

	Dependent variable:	
	Short-term policy	Long-term policy
	(1)	(2)
Topic 1: natural resources	5.764	26.820
	(14.574)	(16.849)
Topic 2: fiscal issues	1.340***	0.582
	(0.461)	(0.584)
Voting with US	−5.396	−17.605**
	(4.827)	(7.195)
Voting with US × Topic 1	1.062	9.178
	(4.782)	(5.663)
Voting with US × Topic 2	−2.542	−6.205***
	(1.547)	(2.217)
Previous short-term policy = 1	−1.496***	−0.040
	(0.433)	(0.646)
Previous long-term policy = 1	−0.610	−3.151***
	(0.575)	(0.710)
Resource rents (% GDP)	0.012	0.033
	(0.015)	(0.021)
GDP per capita (log)	0.827**	2.406***
	(0.396)	(0.563)
GDP growth (%)	0.013	0.023
	(0.013)	(0.015)
Field discovery = 1	0.721*	0.669
	(0.384)	(0.548)
Oil price (USD)	−0.020***	−0.030***
	(0.007)	(0.009)
Crisis = 1	−0.069	0.483
	(0.495)	(0.632)
Democracy (Polity)	−0.048	0.032
	(0.054)	(0.069)
Constant	−0.420	4.851
	(2.828)	(3.344)
Observations	2,420	2,420
Log Likelihood	−214.565	−88.375

This table reports the results of penalized likelihood models with third-order polynomials and country fixed effects. Coefficients represent log odds.
*p<0.1; **p<0.05; ***p<0.01.

aging implication: the interests of top IMF shareholders might undermine the Fund's ability to influence extractive reforms with long time horizons.

5.3 Examining the Inaugural Policy

The IMF might influence not just the passage of *any* legal document, but specifically the decision to pass the *first* legal document creating a natural resource fund. As a robustness check, I address this possibility by estimating Cox proportional hazards models that capture a series of binary outcomes, each representing whether or not an event occurred in a given month and year. 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 2019 are included and considered right-censored; their contribution to the dataset is a vector of zeroes (Box-Steffensmeier and Jones, 2004). This modeling strategy is admittedly imperfect, as governments are constantly at risk of passing new policy; they can, and do, create several different natural resource funds over time. Ecuador, for example, created five different funds between 2000 and 2018; a survival model only captures the creation of the first. But it is useful to examine whether the factors driving the adoption of the *first* legal document are similar to the factors driving the adoption of the *n*th legal document.

Results of Cox proportional hazards models (reported in the appendix) indicate that IMF conditionality affects the passage of the *first* policy much like it affects the passage of all other policies. The prevalence of *Topic 2* increases the odds of policy passage and the prevalence of *Topic 1* does not. The conditional effects of *Voting with US* are also consistent. One important difference is that program participation alone has no meaningful impact on the passage of the inaugural policy: the choice of words and the substance of IMF conditions are crucial in compelling countries to pass natural resource policy in first place.

5.4 Modeling Endogenous Policy Adoption

Participation in an IMF program is not randomly distributed: it is a function of unobservable factors that might also predict a government's willingness to reform its economy. Many countries entering IMF programs already need economic reforms and would likely pursue such reforms even in the absence of a loan. Furthermore, loan agreements are the product of month-long negotiations between government officials and the IMF staff. The negotiating government might select (or be selected) into greater degrees of conditionality, or specific kinds of conditionality, depending on domestic constraints and political willingness to reform. For example, some governments might be able to negotiate more favorable conditions ahead of a democratic election (Rickard and Caraway, 2014). Democracies tend to receive fewer conditions, suggesting that the IMF is aware that democratic institutions constrain a borrower's ability to reform (Stone, 2008). Policymakers might *want* to include certain kinds of conditions in the agreement, so as to have a credible excuse to push through unpopular economic reforms that they were already planning to implement anyway (Vreeland, 2003). Finally, borrowers might withhold information about their future intentions, instead pushing for conditions that they know in advance they will be able to meet, securing the future disbursement of funds.

My theory and data suggest that there is limited danger of reverse causation: natural resource reforms are unlikely to be the driving force behind program participation or

conditionality. This is because few conditions explicitly mention the resource sector, suggesting that few – if any – governments are actively selecting into this kind of conditionality. Furthermore, if policymakers were pushing to include natural resource conditions in their agreement, then compliance with these conditions would not be conditioned or moderated by *Voting with US*: governments would pass natural resource policy regardless of their affinity with the IMF's largest shareholder. Still, I address these concerns in robustness checks using instrumental variables, reporting the results in the appendix.

To study the consequences of IMF programs, Stubbs et al. (2020) propose to use two compound instruments, one for program participation and another for conditionality. These instruments rely on a measure developed by Lang (2016): the natural logarithm of the IMF liquidity ratio, that is, the amount of liquid resources divided by liquid liabilities, reflecting the budget constraints faced by the Fund. In any given year, these constraints affect the probability that the IMF will lend to a given country. To instrument for program participation, Stubbs et al. (2020) interact the liquidity ratio with a country-specific proportion of years under IMF agreement; to instrument for conditionality, they interact the liquidity ratio with a country-specific average of conditions covering the issue area of interest. The Fund tends to have a regular clientele: many countries are recidivist borrowers (Bird et al., 2004). Therefore, prior program participation is a good predictor of present participation, and prior conditions are a good predictor of present conditions.

Instrumental variables generate consistent estimates under two conditions. First, the instrument must satisfy the exclusion restriction: it must affect the outcome (in my case, natural resource policy) exclusively through the treatment (program participation or conditionality), without being correlated with the error term. The validity of the exclusion restriction cannot be justified empirically (Sovey and Green, 2011), but on theoretical grounds, the compound instruments described above arguably fulfill the exclusion restriction for several country-specific outcomes, like income inequality (Forster et al., 2019), labor rights (Lee and Woo, 2020), education spending (Stubbs et al., 2020), and natural resource policy. Second, the instrument must be strongly correlated with the treatment variable in the first-stage equation, conditional on other covariates. As a rule of thumb, the first-stage for each instrument should have an F statistic of at least 10 (though this is contingent on sample size, as Sovey and Green 2011 show). This condition does not hold unequivocally for my models, reported in the appendix. Thus, while these models substantiate some of the main findings of this study (in particular, the interactive effect between IMF conditionality and the ideal point distance to the US), they should not be viewed as confirmatory due to the potential weakness of instruments, which might lead to inconsistent estimates.

6 Conclusion

This study identifies under what circumstances the IMF can improve natural resource governance among developing nations, leveraging its influence as the world's lender of last resort to set standards for natural resource revenue management. To reiterate, IMF loans pursue two complementary goals: they provide immediate liquidity that reduces the short-term risk of default (what Chapman et al. 2017 call the *liquidity effect*) and promote fiscal reforms that improve long-term solvency (the *conditionality effect*). Among resource-rich borrow-

ers, I identify both a liquidity effect and a conditionality effect. Borrowers are more likely to set short-term fiscal anchors or adopt long-term fiscal sustainability mechanisms when they enter a loan agreement with the IMF. Put differently, a loan agreement increases the odds that a borrowing country will create stabilization, investment, or development funds, but also savings or pensions funds. Under these circumstances, governments have incentives to model "good behavior" by adopting policy reforms that the IMF generally approves of, thereby securing loan disbursement. This is particularly the case when loan disbursement is conditional on fiscal reforms (*Topic 2*), though not when disbursement explicitly mentions natural resources (*Topic 1*). In sum, borrowers are most likely to reshape the allocation of natural resource revenue (by creating institutions that smooth out commodity price volatility or setting aside monies for rainy days) when made aware of this revenue's potential to overcome fiscal setbacks.

My results suggest that governments do not reform the natural resource sector just because the IMF tells them to; rather, governments tend to pass legislation associated with natural resource funds when loan agreements highlight the importance of fiscal reforms that these funds can contribute to, that is, when these funds are framed as tools that serve a broader fiscal strategy. Borrowers are not equally responsive to IMF advice, either: in response to conditionality of any kind, they are less likely to adopt long-term natural resource institutions when they do not expect to be punished for "bad behavior" because they are closely aligned with the Fund's top shareholder, the US.

To be clear, this study does not seek to normatively distinguish between "good" or "bad" advice, or between what is "right" and "wrong" for the natural resource sector. IMF conditionality is contentious and international bureaucrats are frequently accused of promoting capital market liberalization at the expense of institutional regulations (Stiglitz, 2002). My assumption is not that natural resource funds are objectively appropriate for every single borrowing country, only that they fit a global understanding of what good governance in the natural resource sector should entail. At the same time, given the widespread evidence that oil, gas, and minerals are associated with corruption and generate perverse incentives to engage in fiscal profligacy, international institutions like the IMF can motivate domestic actors to adopt mechanisms that increase short-term control over fiscal policy and prolong the benefits of natural resource wealth. Ultimately, there is substantial variation in the conditions associated with an agreement, suggesting that the IMF tailors its advice to what it considers most appropriate for each resource-rich country.

Future work can examine how the Fund's influence over natural resource governance extends to resource-rich countries that are *not* under an agreement. After all, the IMF provides advice to each of its 189 member countries, in the form of yearly Article IV consultations. Admittedly the IMF has less leverage over non-borrowers; since these countries cannot be punished through loan interruption, they face fewer incentives to behave in line with IMF advice. In this sense, Article IV consultations are not hard conditions as much as soft suggestions. Still, a study of non-borrowers might reveal a country's true motivation to pass natural resource policy, by elucidating what drives policymakers to regulate the natural resource sector when they are not in need of immediate liquidity and are not urged by international organizations to do so.

References

Amick J, Chapman T, Elkins Z (2020) On Constitutionalizing a Balanced Budget. Journal of Politics 82(3):1078–1096, DOI 10.1086/707618

Babb SL, Carruthers BG (2008) Conditionality: Forms, Function, and History. Annual Review of Law and Social Science 4(1):13–29, DOI 10.1146/annurev.lawsocsci.4.110707.172254

Bailey MA, Strezhnev A, Voeten E (2017) Estimating Dynamic State Preferences from United Nations Voting Data. Journal of Conflict Resolution 61(2):430–456, DOI 10.1177/0022002715595700

Barnett M, Finnemore M (2004) Rules for the World: International Organizations in Global Politics. Cornell University Press, Ithaca and London

Bas MA, Stone RW (2014) Adverse Selection and Growth under IMF Programs. Review of International Organizations 9(1):1–28, DOI 10.1007/s11558-013-9173-1

Bauer A, Rietveld M, Toledano P (2014) Managing the Public Trust: How to Make Natural Resource Funds Work for Citizens. Accessed December 2018, URL https://resourcegovernance.org/sites/default/files/documents/fiscal-rules-commodity-crash.pdf

Bauer ME, Cruz C, Graham BA (2012) Democracies Only: When do IMF Agreements Serve as a Seal of Approval? Review of International Organizations 7(1):33–58, DOI 10.1007/s11558-011-9122-9

Baunsgaard T, Villafuerte M, Poplawski-Ribeiro M, Richmond C (2012) Fiscal Frameworks for Resource Rich Developing Countries. IMF Staff Discussion Notes 12(4), DOI 10.5089/9781475510065.006

Beck N (2020) Estimating Grouped Data Models with a Binary-Dependent Variable and Fixed Effects via a Logit versus a Linear Probability Model: The Impact of Dropped Units. Political Analysis 28:139–145, DOI 10.1017/pan.2019.20

Bird G (2001) IMF Programs: Do They Work? Can They be Made to Work Better? World Development 29(11):1849–1865, DOI 10.1016/S0305-750X(01)00077-8

Bird G, Hussain M, Joyce JP (2004) Many Happy Returns? Recidivism and the IMF. Journal of International Money and Finance 23(2):231–251, DOI 10.1016/j.jimonfin.2003.12.002

Blei DM (2012) Probabilistic Topic Models. Communications of the ACM 55(4):77–84, DOI 10.1145/2133806.2133826

Box-Steffensmeier JM, Jones BS (2004) Event History Modeling: A Guide for Social Scientists. Cambridge University Press, Cambridge, DOI 10.1016/j.bandc.2014.04.006

BP (2019) Statistical Review of World Energy 2019. URL https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Brooks SM, Cunha R, Mosley L (2015) Categories, Creditworthiness, and Contagion: How Investors' Shortcuts Affect Sovereign Debt Markets. International Studies Quarterly 59(3):587–601, DOI 10.1111/isqu.12173

Campello D (2015) The Politics of Market Discipline in Latin America: Globalization and Democracy. Cambridge University Press, New York

Chapman T, Fang S, Li X, Stone RW (2017) Mixed Signals: IMF Lending and Capital Markets. British Journal of Political Science 47(2):329–349, DOI 10.1017/S0007123415000216

Chaudoin S, Hays J, Hicks R (2018) Do We Really Know the WTO Cures Cancer? British Journal of Political Science 48(4):903–928, DOI 10.1017/S000712341600034X

Chwieroth JM (2013) 'The Silent Revolution:' How the Staff Exercise Informal Governance over IMF Lending. Review of International Organizations 8(2):265–290, DOI 10.1007/s11558-012-9154-9

Clark R (2020) Bargain Down or Shop Around? Outside Options and IMF Conditionality. Working Paper

Coady D, Parry I, Le NP, Shang B (2019) Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. IMF Working Papers 19(89), DOI 10.5089/9781484393178.001

Cook SJ, Hays JC, Franzese RJ (2020) Fixed Effects in Rare Events Data: A Penalized Maximum Likelihood Solution. Political Science Research and Methods 8(1):92–105, DOI 10.1017/psrm.2018.40

Copelovitch MS (2010) The International Monetary Fund in the Global Economy: Banks, Bonds, and Bailouts. Cambridge University Press, Cambridge, DOI 10.1111/j.1477-7053.1992.tb00411.x

Crivelli E, Gupta S (2016) Does Conditionality in IMF-Supported Programs Promote Revenue Reform? International Tax and Public Finance 23(3):550–579, DOI 10.1007/s10797-015-9379-7

Dreher A (2003) The Influence of Elections on IMF Programme Interruptions. Journal of Development Studies 39(6):101–120, DOI 10.1080/00220380312331293597

Dreher A (2009) IMF Conditionality: Theory and Evidence. Public Choice 141(1-2):233–267, DOI 10.1007/s11127-009-9486-z

Dreher A, Jensen NM (2007) Independent Actor or Agent? An Empirical Analysis of the Impact of U.S. Interests on International Monetary Fund Conditions. Journal of Law and Economics 50(1):105–124, DOI 10.1086/508311

Eshima S, Imai K, Sasaki T (2020) Keyword Assisted Topic Models. Working Paper URL http://arxiv.org/abs/2004.05964

Ezrow L, Hellwig TT (2014) Responding to Voters or Responding to Markets? Political Parties and Public Opinion in an Era of Globalization. International Studies Quarterly 58(4):816–827, DOI 10.1111/isqu.12129

Fang S, Johnson JC, Leeds BA (2014) To Concede or to Resist? The Restraining Effect of Military Alliances. International Organization 68(4):775–809, DOI 10.1017/S0020818314000137

Findley MG, Nielson DL, Sharman JC, Griffith JS (2015) Causes of Noncompliance with International Law: A Field Experiment on Anonymous Incorporation. American Journal of Political Science 59(1):146–161, DOI 10.1111/ajps.12141

Forster T, Kentikelenis AE, Reinsberg B, Stubbs TH, King LP (2019) How Structural Adjustment Programs Affect Inequality: A Disaggregated Analysis of IMF Conditionality, 1980-2014. Social Science Research 80:83–113, DOI 10.1016/j.ssresearch.2019.01.001

Goldberg E, Wibbels E, Mvukiyehe E (2008) Lessons from Strange Cases: Democracy, Development, and the Resource Curse in the US States. Comparative Political Studies 41(4/5):477–514, DOI 10.1177/0010414007313123

Gould ER (2003) Money Talks: Supplementary Financiers and International Monetary Fund Conditionality. International Organization 57(3):551–586, DOI 10.1017/S0020818303573039

Grimmer J, Stewart BM (2013) Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts. Political Analysis 21(3):267–297, DOI 10.1093/pan/mps028

Horn MK (2014) Giant Oil and Gas Fields of the World. URL https://edx.netl.doe.gov/dataset/aapg-datapages-giant-oil-and-gas-fields-of-the-world

Hyde SD (2007) The Observer Effect in International Politics: Evidence from a Natural Experiment. World Politics 60(1):37–63, DOI 10.1353/wp.0.0001

IMF (2005) Democratic Republic of Timor-Leste: Staff Report for the 2005 Article IV Consultation. IMF Country Report 5(245)

IMF (2007) Angola: Staff Report for the 2007 Article IV Consultation. IMF Country Report 7(354)

IMF (2008) Sovereign Wealth Funds – A Work Agenda. IMF Policy Paper pp 1–38

Jacobs AM, Matthews JS (2012) Why Do Citizens Discount the Future? Public Opinion and the Timing of Policy Consequences. British Journal of Political Science 42(4):903–935, DOI 10.1017/S0007123412000117

Kaczmarek SC, Newman AL (2011) The Long Arm of the Law: Extraterritoriality and the National Implementation of Foreign Bribery Legislation. International Organization 65(4):745–770, DOI 10.1017/S0020818311000270

Kentikelenis AE, Stubbs TH, King LP, Kentikelenis AE, Stubbs TH, King LP (2016) IMF Conditionality and Development Policy Space, 1985-2014. Review of International Political Economy 23(4):543–582, DOI 10.1080/09692290.2016.1174953

Laeven L, Valencia F (2020) Systemic Banking Crises Database II. IMF Economic Review 68:307–361

Lang VF (2016) The Economics of the Democratic Deficit: The Effect of IMF Programs on Inequality. Heidelberg Discussion Paper No 617 DOI 10.2139/ssrn.2883120

Lee SHH, Woo B (2020) IMF = I'M Fired! IMF Program Participation and Workers' Rights Motivation. Political Studies pp 11–24, DOI 10.1177/0032321720905318

Lledó V, Yoon S, Fang X, Mbaye S, Kim Y (2017) Fiscal Rules at a Glance. International Monetary Fund, Washington DC

Lledó V, Sasson M, Acevedo S (2019) Enhancing Ecuador's Fiscal Framework: Lessons from Second-Generation Rule-Based Systems. IMF Working Paper 19

McLean EV, Stone RW (2012) The Kyoto Protocol: Two-Level Bargaining and European Integration. International Studies Quarterly 56(1):99–113, DOI 10.1111/j.1468-2478.2011.00706.x

Natural Resource Governance Institute (2017) Resource Governance Index. URL http://www.resourcegovernanceindex.org/

Nooruddin I, Simmons JW (2006) The Politics of Hard Choices: IMF Programs and Government Spending. International Organization 60(4):1001–1033, DOI 10.1017/S0020818306060334

Oberdabernig DA (2013) Revisiting the Effects of IMF Programs on Poverty and Inequality. World Development 46:113–142, DOI 10.1016/j.worlddev.2013.01.033

Papyrakis E, Rieger M, Gilberthorpe E (2017) Corruption and the Extractive Industries Transparency Initiative. Journal of Development Studies 53(2):295–309, DOI 10.1080/00220388.2016.1160065

Rickard SJ, Caraway TL (2014) International Negotiations in the Shadow of National Elections. International Organization 68(3):701–720, DOI 10.1017/S0020818314000058

Rickard SJ, Caraway TL (2019) International Demands for Austerity: Examining the Impact of the IMF on the Public Sector. Review of International Organizations 14:35–57, DOI 10.1007/s11558-017-9295-y

Rodrik D (1995) Why Is There Multilateral Lending? NBER Working Paper 5160:167–205, DOI 10.3386/w5160

Ross ML (2015) What Have We Learned about the Resource Curse? Annual Review of Political Science 18(1):239–259, DOI 10.1146/annurev-polisci-052213-040359

Saravia D, Mody A (2003) Catalyzing Capital Flows: Do IMF-Supported Programs Work As Commitment Devices? IMF Working Papers 3(100), DOI 10.5089/9781451852424.001

Schultz KA (1995) The Politics of the Political Business Cycle. British Journal of Political Science 25(1):79–99, DOI 10.1017/S0007123400007079

Simmons BA (2000) International Law and State Behavior: Commitment and Compliance in International Monetary Affairs. American Political Science Review 94(4):819–835, DOI 10.2307/2586210

Simmons BA (2009) Mobilizing for Human Rights: International Law in Domestic Politics. Cambridge University Press, New York

Sovacool BK, Walter G, Van de Graaf T, Andrews N (2016) Energy Governance, Transnational Rules, and the Resource Curse: Exploring the Effectiveness of the Extractive Industries Transparency Initiative (EITI). World Development 83:179–192, DOI 10.1016/j.worlddev.2016.01.021

Sovey AJ, Green DP (2011) Instrumental Variables Estimation in Political Science: A Readers' Guide. American Journal of Political Science 55(1):188–200, DOI 10.1111/j.1540-5907.2010.00477.x

Steinwand MC, Stone RW (2008) The International Monetary Fund: A Review of the Recent Evidence. Review of International Organizations 3(2):123–149, DOI 10.1007/s11558-007-9026-x

Stiglitz JE (2002) Globalization and Its Discontents. W.W. Norton & Company, New York

Stone RW (2004) The Political Economy of IMF Lending in Africa. American Political Science Review 98(4):577–591, DOI 10.1017/S000305540404136X

Stone RW (2008) The Scope of IMF Conditionality. International Organization 62(4):589–620, DOI 10.1017/S0020818308080211

Stone RW (2011) Controlling Institutions: International Organizations and the Global Economy. Cambridge University Press, Cambridge, DOI 10.1017/CBO9780511793943

Stubbs T, King L, Reinsberg B, Kentikelenis A, King L (2020) How to Evaluate the Effects of IMF Conditionality: An Extension of Quantitative Approaches and an Empirical Application to Public Education Spending. Review of International Organizations 15(1):29–73, DOI 10.1007/s11558-018-9332-5

Stubbs TH, Kentikelenis AE, King LP (2016) Catalyzing Aid? The IMF and Donor Behavior in Aid Allocation. World Development 78:511–528, DOI 10.1016/j.worlddev.2015.10.010

Talvi E, Végh CA (2005) Tax Base Variability and Procyclical Fiscal Policy in Developing Countries. Journal of Development Economics 78(1):156–190, DOI 10.1016/j.jdeveco.2004.07.002

Venables AJ (2016) Using Natural Resources for Development: Why Has It Proven So Difficult? Journal of Economic Perspectives 30(1):161–184, DOI 10.1257/jep.30.1.161

Vreeland JR (2003) The IMF and Economic Development. Cambridge University Press, New York

Wang D, Li Q (2016) Democracy, Veto Player, and Institutionalization of Sovereign Wealth Funds. International Interactions 42(3):377–400, DOI 10.1080/03050629.2016.1130313

Wei SJ, Zhang Z (2010) Do External Interventions Work? The Case of Trade Reform Conditions in IMF Supported Programs. Journal of Development Economics 92(1):71–81, DOI 10.1016/j.jdeveco.2008.11.008

Weyland K (2002) Limitations of Rational-Choice Institutionalism for the Study of Latin American Politics. Studies in Comparative International Development 37(1):57–85, DOI 10.1007/BF02686338

Wibbels E (2006) Dependency Revisited: International Markets, Business Cycles, and Social Spending in the Developing World. International Organization 60(2):433–468, DOI 10.1017/S0020818306060139

Wilkerson J, Casas A (2017) Large-Scale Computerized Text Analysis in Political Science: Opportunities and Challenges. Annual Review of Political Science 20(1):529–544, DOI 10.1146/annurev-polisci-052615-025542

Woo B (2013) Conditional on Conditionality: IMF Program Design and Foreign Direct Investment. International Interactions 39(3):292–315, DOI 10.1080/03050629.2013.782303