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# Is there a fiscal resource curse? Resource rents, fiscal capacity and political institutions in developing economies

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ABSTRACT

While it is recognised that the ability of states to raise revenues (i.e., fiscal capacity) is important for the provision of key public goods in less developed economies, it is less clear what its determinants are and what explains cross-country differences. We focus on the impact of natural resources. Standard arguments suggest that natural resource rents may harm fiscal capacity, as governments tend to substitute tax revenues with revenues from natural resources. We argue, instead, that a fiscal resource curse may materialise or not depending on whether political institutions can limit the power of the executive and on how easy it is to control or appropriate natural resources. We investigate this hypothesis using panel data methods covering the period 1995–2015 for 62 developing countries. The results suggest that: (i) point-source resources are negatively associated with fiscal capacity, while diffuse resources are not; (ii) developing economies with political institutions placing institutionalised constraints on the executive power are able to neutralise the negative effect of point-source resources on fiscal capacity. Our findings imply that it is possible to develop a natural resources sector without necessarily harming fiscal capacity.

## 1. Introduction

The effect of natural resource abundance on less developed economies has been a lively area of research for many years.[1] Traditionally, most research has concentrated on long-term growth effects, initially finding a "resource curse", and more recently arguing that the long-term effect of specialising in natural resources depends on the type of resources (e.g., Isham et al., 2005) and the quality of the institutions governing the economy (e.g., Mehlum et al., 2006).[2] As yet, less analysis has been devoted to other development outcomes. For example, underexplored areas include the effects on inequality, education, health and living standards.[3] This paper contributes to this literature by looking at a further underexplored issue: the effects of natural resource income on state capacity and, in particular, fiscal capacity in less developed economies.

Standard arguments suggest that natural resource rents reduce governments' incentives to invest in the tax system. We argue, instead, that such an effect depends on whether countries have political institutions limiting the power of the executive, hence reducing rulers' discretion over the use of resource revenues, and on how easy it is for rulers to appropriate natural resources rents. We test this hypothesis using panel regressions on a sample of 62 developing countries from 1995 to 2015, using data from the new Wealth Accounting dataset (World Bank, 2018a) and four different measures of fiscal capacity constructed using the recent Government Revenues Dataset, which provides improved country coverage and, crucially, distinguishes

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[1] The literature has referred to resource "abundance" or "rich", "dependence", "intensity", "boom" or "windfall" (see Norman, 2009; Brunnschweiler and Bulte, 2008). The term "dependence" usually refers to the structure of the economy (e.g., captured as resource exports/GDP). "Intensity" refers to the rate at which one exploits natural resources. "Boom" and "Windfall" pertain to shocks, either because new natural resources are discovered or because there is an increase in commodity prices. "Abundance" or "rich" concern the value of the natural resource endowments or the income they generate, measurable as subsoil wealth or resource rents, but they have also been used as terms encompassing all the above aspects. Here we use them in this latter sense.

[2] Vahabi (2018) offers a historical perspective on the evolution of the literature.

[3] See Savoia and Sen (2021), for an assessment.

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between resource and non-resource revenues (ICTD/UNU-WIDER, 2019). After extensive robustness checks, we find evidence that rents coming from *point-source resources* have a negative effect on fiscal capacity, but in countries with political institutions placing institutionalised constraints on the executive power such effect disappears. Hence, a fiscal resource curse does not necessarily materialise.

As well as contributing to the literature on the resource curse, our paper fits into the broader research agenda on state capacity.[4] In particular, we focus on the ability of states to raise revenues from a broad tax base, i.e., fiscal capacity. This is an area that has seen extensive research on the origins of fiscal capacity in nowadays-advanced economies. But there has been so far less analysis on how developing economies learn to tax, especially empirical work.[5] The capacity to collect revenues is at the heart of state formation and is indispensable for the provision of public goods and investments in infrastructure in less developed economies (e.g., Besley and Persson, 2011; Besley and Persson, 2013; Osafo-Kwaako and Robinson, 2013). This is also relevant to the Sustainable Development Goals agenda, as SDG 17.1 focuses on tax revenues mobilisation, but stylised facts suggest that developing economies collect, on average, a significantly smaller share of taxes compared to advanced market economies (Besley and Persson, 2014). Hence, assessing whether a geographical feature shaping the structure of the economy, such as the presence of a significant natural resources sector, comes with the likely price of weaker tax systems may have relevant economic and policy trade-offs. We find that this is not the case, if countries have suitable political institutions.

The paper is structured as follows: Section 2 reviews the literature and sets out our hypotheses; Section 3 describes the empirical strategy and data. In Section 4, we test our hypotheses and present the evidence. Section 5 concludes.

## 2. Resource rents, fiscal capacity and political institutions

The "Fiscal Resource Curse" hypothesis suggests that governments tend to substitute tax revenues with revenues from natural resources: the greater the expected amount of income from natural resources, the greater the incentive to substitute tax revenues with resource revenues, the lower fiscal capacity. Part of the literature has studied this hypothesis with respect to the short-term macroeconomic consequences for taxation, in terms of amount and composition of tax revenues, and public finance management.[6] Another part of the literature has, instead, looked at the long-term consequences, i.e., the effect of natural resources rents on tax systems. The political science literature had long characterised *rentier states*, whose main features are their dependence on revenues from natural resources, and the weakness and lack of accountability of state institutions (e.g., see Karl, 2007).[7] Building on this line of research, McGuirk (2013) offers theory and micro level evidence that political elites will respond to increased resource rents by reducing tax enforcement among in order to alleviate pressure for government accountability from the citizenry. Focussing on fiscal capacity, Besley and Persson (2011) formally show that governments discovering natural resources today with anticipated revenues in future years see a reduced incentive to invest in the revenue administration, because the availability of natural resources endowments provide a new and easy-to-obtain source of revenues (where taxation relies on royalty payments), compared to value-added tax and income taxes. Knack (2009) presents initial cross-section evidence, partly consistent with this hypothesis. Jensen (2011) provides further evidence from a panel of thirty hydrocarbon-rich economies, finding that a 1 % increase in hydrocarbon revenues is associated with a 1.5 % decrease in non-resource tax effort, used as a proxy for fiscal capacity. An earlier panel study by Bornhorst et al. (2009), on a similar sample of countries and variables, finds a smaller effect: an additional percentage point of revenue from hydrocarbons reduces revenues from other domestic sources by 0.19 percentage points of GDP.

Although the literature hypothesises a negative effect of natural resources rents on fiscal capacity, the actual empirical evidence is fairly limited, often fraught with methodological challenges (e.g., measurement of fiscal capacity, endogeneity, sample size), and so in need of systematic investigation if one wants to probe into the generality of the fiscal resource curse hypothesis. But how general is this hypothesis? We argue that its validity depends on: (i) the type of political institutions countries develop and (ii) on the type of natural resources.

Let us first consider the role of institutions.[8] The foundations of the fiscal resource curse are political. In the presence of a resource windfall, all political leaders face the same incentive: to use natural resource revenues, rather than taxation, for public expenditure that will facilitate keeping them in power. By increasing the value of incumbency, resource rents will incentivise an "autocratic" executive, whether it is the *stationary* or *roving bandit* type (Olson, 1993), to engage in private patronage to buy support from groups that may keep him or her in power (Caselli and Cunningham, 2009; Collier and Hoeffler, 2009). By relaxing budget constraints, a "democratic" executive has an incentive to engage in patronage spending by supplying the public goods and services that increase the likelihood of re-election (Robinson et al., 2006; Brollo et al., 2013). The result is an adverse effect on taxation, as governments tend to move away from taxes as one of their key sources to

[4] There is an emerging consensus that state capacity, together with political institutions and economic institutions, matters for long-term development (e.g., Acemoglu and Robinson, 2019).

[5] Important recent work includes Martin (2023), Bowles (2023), Bodea and LeBas (2014), Carillo, Pomeranz and Singhal (2017), and Weigel (2020).

[6] James (2015) provides US-state level evidence that, in response to higher resource revenues, governments decrease non-resource tax rates and increase spending and savings: a $1 increase in resource revenues results in a $0.25 decrease in non-resource revenues, a $0.43 increase in government spending and a $0.32 increase in public savings. Arezki and Brückner (2012) show that resource revenue windfalls have a heterogeneous effect on sovereign bond spreads: reducing the spread in democracies, but increasing it in autocracies. Focussing on the consequences for tax composition in resource-rich economies, Crivelli and Gupta (2014) find a large negative impact of resource revenues on the taxation of goods and services, and a more modest impact on corporate income tax and trade taxes. Looking at tax performance, Morrissey et al. (2016) find that a reliance on natural resources amplifies the negative effects of macroeconomic shocks (terms of trade, exchange rates and natural disasters) on total revenues. However, democracies tend to outperform non-democracies in revenue resilience to shocks in lower income countries.

[7] Herbst et al. (2020) and Sigman et al. (2022) take this argument further, looking at the role of the bureaucracy and the conditions under which the civil service may support or oppose the political use of resource rents.

[8] A number of papers argues, and empirically demonstrates, that institutions can mitigate or even reverse the negative effects of natural resources on economic growth (e.g., Melhum et al., 2006; Brunnschweiler, 2008; Boschini et al., 2007; Bhattacharyya and Hodler, 2010; Omgba, 2015; Masi and Ricciuti, 2019). The explanations emphasize *rent-seeking* mechanisms (Tornell and Lane, 1999; Torvik, 2002; Melhum et al., 2006) and argue that economic institutions governing the private sector are key. Thus, natural resources hinder economic growth only if the quality of institutions that govern the profitability of productive enterprise is such that individuals switch from productive to unproductive activities. For example, Melhum et al. (2006) argue that the combination of resource abundance and *grabber friendly* institutions is detrimental for economic development, while *producer friendly* institutions help countries take full advantage of their natural resource endowments. The literature interested in the effects on growth has proposed additional mitigating mechanisms. Andersen and Aslaksen (2008) argue that what matters in reducing negative effects on growth is the constitutional arrangement: presidential regimes and proportional electoral systems are more likely to be afflicted by the resource curse. The detrimental effect of natural resources on growth may also be reversed by high human capital endowments (Kurtz and Brooks, 2011), while public spending could mitigate civil conflicts related to oil wealth (Bodea et al., 2016).

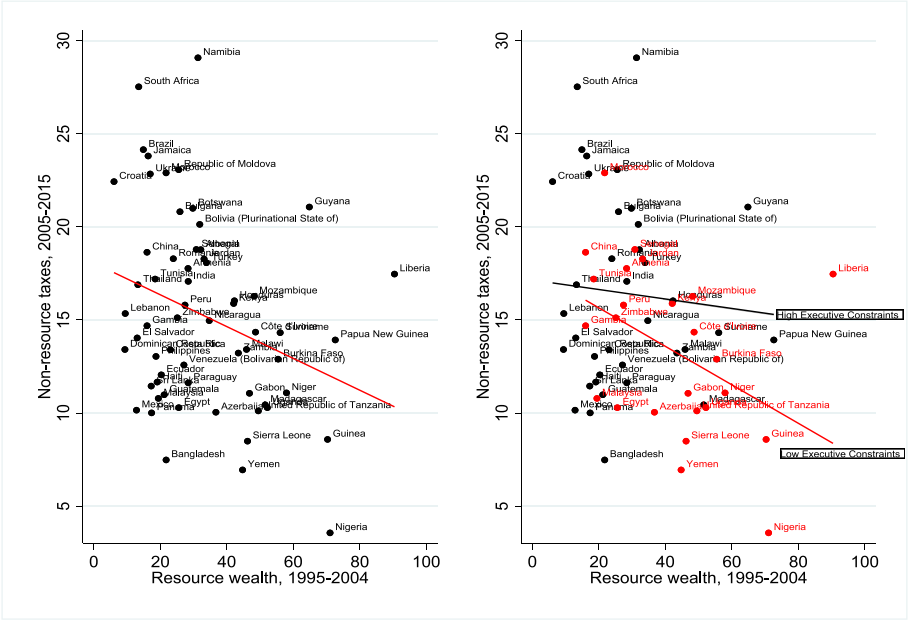


**Fig. 1.** Total (non-resource) tax revenues / GDP and natural resource rents.

finance state activities.

Under what conditions are patronage and inefficient use of public resources more likely to occur in resource-abundant countries? Besley and Persson (2011) argue that the presence of accountability mechanisms for state leadership can neutralize the perverse incentives that resource rents create for patronage spending. In particular, political institutions that place effective constraints on a ruler can play a major role, such that an economy can have state institutions that avert patronage mechanisms. Limits on the executive power promote a common interest environment in which the ruling minority is unable to hand out favours to cronies or themselves (Besley and Persson, 2011). This is because, when subject to institutionalized checks and balances, a ruler has less discretion over public finance decisions than one who is not, including over decisions on the use of natural resource rents. The crucial difference between a political leader operating under a system of checks and balances, and one that it is not, is that the former is subject to the scrutiny of public finance institutions regularly auditing the state of public finance and alerting to the danger of neglecting tax revenue mobilisation. One mechanism concerns the presence of independent institutional actors within the national government that can control and limit the use of state resources, so as to demand greater accountability with respect to budgetary planning and implementation. For example, in parliamentary systems, an effective parliament can institutionally oversee and audit the state budget (Dincecco, 2017, pp.21–22). This implies that the executive may be more likely to promote an effective and independent civil service (rather than one based on patronage, which may undermine the competence of the state bureaucracy) and so maintain or innovate fiscal infrastructures and the state's ability to raise revenues. Another mechanism concerns the possibility that chief executives who are subject to formal limitations to their power may be more likely to follow the rule of law, so that an independent judicial system may be more effective against any breach of tax laws or abuse in tax levies. Ricciuti et al., (2019a,2019b) provide evidence, based on IV estimation, consistent with such mechanisms. Recent historical evidence from resource rich economies suggests that, although the presence of a significant natural resources sector can weaken the incentive to invest in tax systems, this may not necessarily limit fiscal development. See Peres-Cajías (2015), for a case study on Bolivia. For a long-run comparison of public finance in Bolivia, Chile, Peru, Norway and Sweden, see Peres-Cajías et al. (2022). Similarly, further case studies from Africa and Latin America show that the emergence of a natural resources sector, depending on the type of political coalitions ruling during a resource boom, is not incompatible with the development of state institutions (Saylor, 2014; Dargent et al., 2017).

The above discussion ultimately calls for a reassessment of the fiscal resource curse hypothesis. The negative effect of natural resources rents on fiscal capacity can be mitigated or neutralised in countries with a higher level of executive constraints. As a preliminary piece of evidence, Fig. 1 seems to suggest that the level of resource rents a country collects is negatively correlated with the level of non-resource taxes (left-hand side scatter). However, splitting the sample into countries with political institutions placing high and low levels of constraints on the executive power (right-hand side scatter) shows that the effect of resource rents on taxation can be heterogeneous, depending on how much political institutions limit the executive power.[9]

With respect to the type of resources, one should consider the possibility that some natural resources may be more susceptible than others to a fiscal resource curse. A popular argument has suggested that the resource curse is specific to resources extracted from a narrow geographical base, *point-source resources*, as they are more susceptible to predatory behaviour on the part of local elites; while those extracted from a broad geographical base, called *diffuse resources*, are less so (Isham et al., 2005). The *point-source* Vs. *diffuse resources* distinction has been first proposed and empirically investigated with respect to economic growth, but it has not been applied to taxation yet. As point-source resources are easier to control and appropriate for political elites, they offer a greater incentive to substitute taxation with resource revenues. Diffuse natural resources are less easy to control and less prone to incentivise such substitution. Hence, a fiscal resource curse could be less likely to exist in economies rich in *diffuse resources*, as compared to economies rich in *point-source resources*.

Is it only the geographical characteristics of natural resources that may lead to a heterogeneous effect of natural resources on taxation? The recent literature has questioned such focus and significantly refined the

[9] *Non-resource taxes* is the amount of total non-resource tax revenues excluding social contributions, from ICTD/UNU-WIDER (2019), averaged over 2005–2015. Resource rents are averaged between 1995 and 2004 and are from World Bank (2018a). To divide the sample, we consider the mean value of *Executive Constraints* from Polity IV (Marshall et al., 2014).

argument on natural resource heterogeneity. Rather than focussing on the geographical characteristics, Vahabi (2018) argues that the institutional characteristics of a given natural resource matters more in explaining the heterogeneity in its effects. In particular, building on a categorisation between *fugitive* and *captive* assets proposed in Vahabi (2016), one should consider the *appropriability* of natural resources in terms of appropriability by the state and its mobility to thwart appropriation. For example, oil is a non-lootable asset that presents relatively high appropriability by elites controlling the state (or by their rivals). This extends and generalises the idea that the effects of natural resources are specific to the degree with which key political actors can control them.

Empirically, as Isham et al. (2005) first noted, classifying *point-source* and *diffuse* resources is not always a clear-cut exercise. Similarly, no measurement effort has systematically captured the categorisation of *appropriability* of natural resources. Nonetheless, this does suggest that, when designing empirical work, one should distinguish between different types of natural resources. Some natural resources may be "special", such as oil. Ross (2015) has argued that oil is more capital intensive compared to other hard rock minerals. When a mineral is relatively more labour intensive, it opens a mechanism where the larger population benefits from the natural resources sector. The oil sector instead typically does not employ a significant share of the country's labour force. Yet, there are countries that have managed to harness oil income in a way that supports development (e.g. Norway) and oil-rich countries which have seen different development outcomes, such as the different development trajectories followed by Indonesia and Nigeria (see Lewis, 2009).

Ultimately, the above discussion suggests that not all natural resources may lead to a fiscal resource curse. Incumbent governments will face a stronger incentive to finance state activities via resource rents when it is easier to appropriate the revenues from a specific resource. The rest of the paper investigates the above hypotheses, starting with a discussion of the empirical strategy and data in the following section.

## 3. Empirical strategy and data

There are two possible approaches to estimate the effect of resource rents on fiscal capacity. The first one estimates the relationship under investigation using cross-country data in levels, since the type of mechanisms we seek to document look at the structural conditions under which countries develop capable states and are, therefore, long-term in nature. In this case, regressions based on cross-section averages, as shown in Figs. 1 and 1A, are suitable. However, there are at least two problems with this approach. The first is the vulnerability to omitted variable bias, as there may be several hard-to-capture factors correlated with both the volume of resource rents and state capacity. The second is that shaping the structure of the economy, including its degree of reliance on natural resources, is a process driven by a variety of social forces, including state institutions. Hence, the estimated effect of natural resource reliance could be affected by reverse causality and so subject to bias.

The second approach relies on assessing if the type of relationship documented in Figs. 1 and 1A disappears when looking at the effect of changes in resource rents on fiscal capacity. If it does not, we are probably capturing a causal effect. This approach involves the use of panel methods. In particular, looking at the effect of changes in resource income on fiscal capacity eliminates confounding time-invariant country-specific factors. That is, fixed effects can be added to take care of country-specific factors affecting both resource rents and fiscal capacity, while time effects can be added to control for common trends.

We prefer the panel approach, but also present cross-section estimates as we provide further results on how resource rents may affect the tax systems. This is coupled with the choice of a resource income variable which is both in line with the fiscal resource curse hypothesis and allows clean identification of its effect. We use the *share of natural capital wealth over total wealth*, from the Wealth Accounting dataset (World Bank, 2018a). The variable offering the closest alignment to the fiscal resource curse hypothesis, that greater expected income from natural resources may reduce the incentive to tax, is a variable estimating how much income from natural resources a government can rely on to finance state activities. That is what our variable is constructed to do: by estimating the present value of revenues from natural resources (aggregating hydrocarbons, minerals, forest and agricultural commodities), it expresses the expected size of the rents accruing from natural resources at a given point in time.[10] Moreover, as resource rents are based on commodity prices, this variable presents an additional advantage. It avoids identification problems related to the estimation of the effects of natural resources, under the assumption that both the identity of a country's commodities and world prices are exogenous to state institutions.[11] This assumption can be tested, albeit indirectly. We investigate whether it holds by excluding from the sample large commodity producing countries, potentially able to influence world prices.[12] We estimate:

$$FC_{i,t} = b_0 + b_1 RR_{i,t\text{-}bar} + b_2 EC_{i,t\text{-}4} + b_3 RR_{i,t\text{-}bar} * EC_{i,t\text{-}4} + \boldsymbol{bX_{i,t}} + \mu_i + \lambda_t + u_{i,t} (1)$$

$FC_{i,t}$ is fiscal capacity for country *i* at year *t*. Capturing this concept is particularly challenging.[13] The literature proposes two approaches. The first one, which is near ideal as closer to the concept one wants to capture, is to have a direct measure of the institutions that are part of the tax system, but such measures are scarce, cover few countries (when available), and are not immune from methodological challenges themselves.[14] The second one is to resort to outcome-based proxies, such as tax effort ratios. Such measures may well reflect political preferences of a polity towards the size of the public sector and the scope for redistribution (Lieberman, 2002), but they have the major advantage of being available for a large number of countries over time. Our main measure of fiscal capacity belongs to the second type and is given by the ratio: *Non-resource taxes on income, profit, and capital gains / Total (non-resource) tax revenues*. The choice to focus on income taxes rests on an established argument in the fiscal development literature, i.e., that levying direct taxes, and income taxes in particular, is one of the highest forms of fiscal capacity because states have to "earn" their taxes by engaging in a fiscal bargain with the citizens.[15] Indeed, collecting income taxes requires major investments in fiscal infrastructures compared to other types of taxes (see Besley and Persson, 2011: 41-42; on the empirical validity of this approach, see Rogers and Weller, 2014). Compared to previous proxies of fiscal capacity, this measure is more likely to separate the capacity to raise taxes from governments' policy choices. However, we

[10] Instead, previous measures used in the "resource curse" literature do neither directly capture nor closely align with the fiscal resource curse hypothesis. Consider alternative measures such as resources exports/GDP and estimated total subsoil wealth. Neither of these adequately captures the extent to which states can finance their activities via revenues from natural resources.

[11] Resource rent estimation is based on sources and methods fully described by the World Bank (2011), i.e., on the difference between the price of a commodity and the average cost of producing it, estimating the world price of units of specific commodities and subtracting estimates of average unit costs of extraction or harvesting costs (including a normal return on capital). The unit rents are then multiplied by the quantities countries extract or harvest to determine the rents for each commodity as a share of GDP.

[12] This approach was first proposed by Caselli and Tesei (2016).

[13] The key challenge of measuring state capacity is to avoid conflating *state capacity* (which is about institutions) with *state performance* (which is about outcomes). See the discussion in Centeno et al. (2017).

[14] The practice of measurement involves making choices subject to significant trade-offs (e.g., *objective* versus *subjective* measurement, or *de jure* versus *de facto*). On this, see Savoia and Sen (2015).

[15] See the classic book by Levi (1988, p.144), presenting the argument and historical evidence on European states; see also Kiser and Karceski (2017), for a review of the literature.

**Table 1**
Summary statistics.

| | Mean | Std. Dev | | | Minimum | Maximum |
|---|---|---|---|---|---|---|
| | | overall | between | within | | |
| Fiscal capacity | 0.30 | 0.11 | 0.10 | 0.05 | 0.12 | 0.65 |
| Executive constraints | 4.09 | 1.61 | 1.52 | 0.60 | 0 | 6 |
| Resource wealth | 0.29 | 0.17 | 0.18 | 0.04 | 0.06 | 0.99 |
| Diffuse resources wealth | 0.21 | 0.15 | 0.16 | 0.03 | 0.03 | 0.98 |
| Point-source resources wealth | 0.04 | 0.07 | 0.07 | 0.02 | 0 | 0.46 |
| Agricultural wealth | 0.17 | 0.12 | 0.13 | 0.03 | 0.01 | 0.54 |
| Forest wealth | 0.04 | 0.07 | 0.08 | 0.01 | 0 | 0.59 |
| Mineral wealth | 0.01 | 0.03 | 0.03 | 0.02 | 0 | 0.23 |
| Coal wealth | 0.002 | 0.008 | 0.008 | 0.02 | 0 | 0.07 |
| Gas wealth | 0.002 | 0.008 | 0.009 | 0.002 | 0 | 0.06 |
| Oil wealth | 0.03 | 0.07 | 0.07 | 0.02 | 0 | 0.41 |
| External debt | 57.81 | 43.87 | 46.54 | 32.30 | 9.46 | 443.62 |
| Trade | 78.17 | 34.17 | 34.83 | 10.73 | 18.99 | 219.46 |
| Net ODA and aid per capita | 47.99 | 47.79 | 45.07 | 20.41 | −4.52 | 239.41 |
| Population density | 111.03 | 154.17 | 162.14 | 14.06 | 1.87 | 1203.46 |
| External conflicts | 1.96 | 1.23 | 1.09 | 0.70 | 0 | 6.72 |
| Internal conflicts | 3.12 | 1.51 | 1.22 | 0.93 | 0 | 11.08 |

also use a range of alternative dependent variables. We test the robustness of our results using three alternative tax effort ratios (see Section 4.3).[16] Data is from the recent Government Revenues Dataset (ICTD, UNU-WIDER, 2019). This dataset combines data from several international databases, with marked improvements in data coverage. Crucially, it also allows to distinguish the natural resources component of tax revenues from the non-resource one, so improving the accuracy of measurement compared to sources used in previous studies.[17]

$RR_{i,t\text{-}bar}$ is the resource rents, as described above, averaged over *t*-4 to *t*-1 (with a non-overlapping structure), allowing for possible lags in the reaction of fiscal authorities to events in the natural resources sector and in the political system.[18] $EC_{i,t\text{-}4}$ captures the quality of political institutions (at the beginning of the 5-year episode). In line with our hypothesis, it is measured by the *Executive Constraints* variable (*xconst*), provided by the Polity IV dataset (Marshall et al., 2014) and defining the extent of constitutional limits on the exercise of arbitrary power by the executive.[19] $RR_{i,t\text{-}bar}$* $EC_{i,t\text{-}4}$ is the interaction between resources rents and political institutions. Figs. A1–A4, in the Appendix, illustrate the basic relationships between the two variables.

$X_{i,t}$ is a set of time-varying controls (also averaged over *t*-4 to *t*-1, with a non-overlapping structure). Some of them are standard variables from the literature on the origins of state capacity, including population density, external and internal conflict, and aid. *Population density* should be positively correlated with fiscal capacity, assuming that it is less challenging to develop a fiscal apparatus in states where the population is concentrated in urban areas (Herbst, 2014). We use the number of people per square kilometres of land, as calculated by the World Bank (2018b). External conflicts increase the demand for public services such as defence and thereby increase the incentive to invest in state capacity. On the contrary, civil wars hinder the development of an efficient fiscal

[16] We also present further results using indicators on the quality of specific characteristics of the tax system, albeit for a substantially smaller sample. See Appendix A3.

[17] See Prichard et al. (2014). We use the merged version of the dataset in order not to underestimate fiscal capacity in countries with a federal system.

[18] This approach appears to be standard in the resource curse literature (e.g., Caselli and Tesei, 2016, and Bhattacharyya and Hodler, 2010), as well as broader political economy literature investigating institutional factors (e.g., Klomp and de Haan, 2016). Presumably, empirical analyses using a panel with "high frequency" data (e.g., yearly) would fail to properly capture structural characteristics.

[19] Polity IV's *xconst* has long been used in empirical research. We obtain similar results when using more recent V-Dem's data, which are available on request.

**Table 2**
Fiscal capacity and resource wealth.

| | (1) All Resources | (2) Diffuse Resources | (3) Point-source Resources | (4) Diffuse and Point-source Resources |
|---|---|---|---|---|
| Executive constraints | −0.006 | 0.002 | −0.003 | −0.008 |
| | (0.007) | (0.006) | (0.005) | (0.008) |
| Resource wealth | −0.088 | | | |
| | (0.167) | | | |
| Resource wealth*Exec. constraints | 0.029 | | | |
| | (0.020) | | | |
| Diffuse resources | | 0.112 | | 0.121 |
| | | (0.153) | | (0.126) |
| Diffuse resources*Exec. constraints | | 0.008 | | 0.021 |
| | | (0.021) | | (0.019) |
| Point-source resources | | | −0.597* | −0.608** |
| | | | (0.303) | (0.300) |
| Point-source res. *Exec. constraints | | | 0.140** | 0.153*** |
| | | | (0.054) | (0.057) |
| External Debt | −0.001 | −0.001 | −0.001 | −0.001 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Trade | 0.001** | 0.001*** | 0.001*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Aid per capita | −0.000 | −0.000 | −0.000** | −0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| External conflicts | −0.000 | −0.001 | −0.000 | −0.002 |
| | (0.005) | (0.005) | (0.005) | (0.005) |
| Internal conflicts | 0.003 | 0.003 | 0.002 | 0.002 |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| Population density | 0.001*** | 0.001*** | 0.001*** | 0.001** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Constant | 0.165** | 0.089* | 0.164*** | 0.137*** |
| | (0.064) | (0.053) | (0.039) | (0.051) |
| Observations | 213 | 213 | 213 | 213 |
| Number of countries | 62 | 62 | 62 | 62 |
| Joint(p) | 0.341 | 0.658 | 0.0388 | 0.0091 |
| Adjusted R-squared | 0.409 | 0.404 | 0.453 | 0.457 |
| Year FE | YES | YES | YES | YES |
| Country FE | YES | YES | YES | YES |

Notes: The dependent variable is fiscal capacity measured as non-resource income tax as a percentage of non-resource total tax revenue. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

**Table 3**
Marginal effects of resource wealth at different levels of *executive constraints*.

| | All Resources | Diffuse Resources | Point-source Resources |
|---|---|---|---|
| Executive Constraints | b/se | b/se | b/se |
| 0 | −0.088 | 0.121 | −0.608** |
| | (0.17) | (0.13) | (0.30) |
| 1 | −0.059 | 0.142 | −0.455* |
| | (0.16) | (0.13) | (0.27) |
| 2 | −0.03 | 0.163 | −0.302 |
| | (0.16) | (0.14) | (0.25) |
| 3 | −0.001 | 0.183 | −0.148 |
| | (0.15) | (0.15) | (0.24) |
| 4 | 0.028 | 0.204 | 0.005 |
| | (0.16) | (0.16) | (0.24) |
| 5 | 0.058 | 0.225 | 0.159 |
| | (0.16) | (0.17) | (0.26) |
| 6 | 0.087 | 0.245 | 0.312 |
| | (0.16) | (0.19) | (0.28) |

Notes: The marginal effects of diffuse and point-source resources are calculated using the coefficients from Table 2, Column 4.

apparatus (Besley and Persson, 2011). To capture these effects, we use *external* and *internal conflicts* (ICRG, 2018), respectively. Development assistance has been compared to natural resources, in terms of its possible *patronage effect* (e.g., Morrison, 2012). So we use data from the World Bank (2018b) measuring aid dependence to control for potential negative effects of development assistance. Finally, given the nature of our proxy for fiscal capacity, we also add controls that are macroeconomic in nature to pick up the effects on taxation that may result from changes in the level of economic activity and economic conditions, following previous empirical studies on tax effort (e.g., Crivelli and Gupta, 2014): the level of external debt (IMF, 2019) and the sum of exports and imports of goods and services measured as a share of gross domestic product (World Bank, 2018b). Tables A1 and A2 (in the Appendix) describe variables, sources, and the sample.

All regressions include country and year dummies ($\mu_i$ and $\lambda_t$, respectively). Standard errors are clustered at the country level to allow for unknown forms of heteroskedasticity and serial correlation. We study a sample of 62 developing countries from 1995 to 2015. The descriptive statistics presented in the Table 1 show that our key variables vary both across countries and over time.

## 4. Results

This section presents the results. We begin by assessing panel evidence on whether the effect of resource rents on fiscal capacity depends on the level of constraints on the executive and the type of natural resources. Then we illustrate the results with a comparison between Nigeria and Indonesia. A series of robustness checks follows. Finally, we assess the identifying assumption.

### 4.1. The effect of natural resources rents on fiscal capacity

Table 2 presents our baseline results. Column 1 shows a negative but insignificant effect of total natural resource rents on fiscal capacity. Apparently, there is no support for the hypothesis under scrutiny, when considering all types of natural resources together. What if the effect is different for different types of natural resources? To consider such possibility, we divide resource rents in two groups, trying to capture the distinction between "point-source" and "diffuse" resources. We isolate the effect of *point-source* rents by grouping together oil, minerals, gas and coal rents. Similarly, we sum agricultural and forest rents to isolate the effect of *diffuse resources*.[20] The results show that, on average, fiscal capacity tends to be lower when countries experience an increase in resource rents coming from *point-source resources*. However, the interaction term is significantly positive, suggesting that the negative effect of such resource rents is offset when the level of executive constraints increases. Such effect seems to be absent for *diffuse natural resources*.

Table 3 and Fig. A5, in the Appendix, show the marginal effects of natural resource rents at different levels of constraints on the executive. This confirms that *diffuse natural resources* have no significant effect. *Point-source* resources, instead, negatively affect fiscal capacity, when the level of executive constraints is very low (0 or 1). For countries, such as Nigeria and Saudi Arabia, where constitutional restrictions on executive action are weak for significant periods, a one percentage point increase in *point-source* resources rents would reduce the ability to raise direct taxes, our proxy for fiscal capacity, by approximately 0.61 percentage points. Considering that the (*within*) standard deviation in resource rents is above three percentage points, such effects also appear to be economically significant. Resource rents, instead, have no effect in countries with medium or high levels of checks and balances on the executive power (e.g., Peru and Chile).

### 4.2. Do different natural resources have different effects?

Next, we study in more detail the effect of specific natural resources. This may reveal if and which resources are more likely to affect fiscal capacity. Hence, in Table 4, we consider individual components of total natural resource rents: agricultural, forest, oil, gas, coal and mineral rents. When disaggregating by type of resource, the results find that agricultural and oil may be the main drive of the heterogeneous effect on fiscal capacity. Indeed, linear restriction tests on their coefficient and the respective interaction terms always reject the null that the effect of such resources is different from zero, while this is not the case for forest, mineral, gas and coal rents. However, Table 5 and Fig. A6, reporting the marginal effects for each type of resource rent, show that oil only has a negative and significant effect on fiscal capacity, but such effect vanishes when the level of executive constraints is at least 3.[21]

The general message remains: natural resources may be a curse or not, depending on the level of executive constraints and on the type of natural resources. In particular, this set of results confirms earlier empirical findings on the negative effects of *point-source resources* and offers support to those arguing in favour of a curse of oil (e.g., Ross, 2015), but extends and qualifies them, suggesting that negative effects may not materialise, depending on the nature of political institutions.

### 4.3. Comparing Nigeria and Indonesia

A comparison between Nigeria and Indonesia, drawing on Lewis (2007), illustrates well how moving from low to intermediate values of

[20] As Isham et al. (2005) noted, classifying *point-source* and *diffuse* resources is not always a clear-cut exercise. Hence, no related measurement is perfect, including ours. Nonetheless, this exercise is in line with the original idea and the subsequent research that has pursued it.

[21] Note that collinearity may prevent us from giving a clearer verdict, so we cannot conclusively rule out that no other interaction effect for other resources is at work. It is not uncommon that introducing (multiple) interaction terms generates significant collinearity. For example, in the last column of Table 4, most interaction terms are insignificant, but a test of the linear restriction that all resources and their interaction terms are jointly zero, rejects the null. Tests on the linear restriction that the coefficient of both oil and agricultural rents and its respective interaction terms are jointly equal to zero always reject it (the related p-value is 0.07 in both cases). Instead, the related p-value of the same tests for forest rents is 0.12, for mineral rents is 0.11, for coal rents is 0.95, and for gas rents is 0.29.

**Table 4**
Fiscal capacity and different types of resource wealth.

| | (1) Agricultural wealth | (2) Forest wealth | (3) Mineral wealth | (4) Coal wealth | (5) Oil wealth | (6) Gas wealth | (7) All resources |
|---|---|---|---|---|---|---|---|
| Executive constraints | −0.003 | 0.007 | 0.004 | 0.004 | −0.000 | 0.001 | −0.011 |
| | (0.006) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.007) |
| Agricultural wealth | 0.013 | | | | | | −0.087 |
| | (0.203) | | | | | | (0.153) |
| Agric. wealth*Exec. constraints | 0.033 | | | | | | 0.055** |
| | (0.028) | | | | | | (0.023) |
| Forest wealth | | 0.119 | | | | | 0.208 |
| | | (0.158) | | | | | (0.176) |
| Forest wealth*Exec. constraints | | −0.082 | | | | | −0.036 |
| | | (0.053) | | | | | (0.062) |
| Mineral wealth | | | −0.049 | | | | −0.002 |
| | | | (0.249) | | | | (0.354) |
| Mineral wealth*Exec. constraints | | | 0.091* | | | | 0.067 |
| | | | (0.046) | | | | (0.065) |
| Coal wealth | | | | −0.200 | | | −1.193 |
| | | | | (1.883) | | | (1.167) |
| Coal wealth*Exec. constraints | | | | 0.033 | | | 0.064 |
| | | | | (0.262) | | | (0.231) |
| Oil wealth | | | | | −0.664** | | −0.667** |
| | | | | | (0.264) | | (0.266) |
| Oil wealth*Exec. constraints | | | | | 0.095 | | 0.081* |
| | | | | | (0.061) | | (0.041) |
| Gas wealth | | | | | | −2.590 | −0.993 |
| | | | | | | (4.462) | (4.842) |
| Gas wealth*Executive constraints | | | | | | 1.328 | 0.991 |
| | | | | | | (1.095) | (1.105) |
| External Debt | −0.001 | −0.001 | −0.001 | −0.001 | −0.001 | −0.001 | −0.001 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trade | 0.001** | 0.001*** | 0.001** | 0.001*** | 0.001*** | 0.001*** | 0.001** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Aid per capita | −0.000 | −0.000 | −0.000** | −0.000* | −0.000* | −0.000* | −0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| External conflicts | −0.001 | −0.000 | 0.001 | 0.000 | −0.000 | 0.000 | −0.002 |
| | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| Internal conflicts | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| Population density | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Constant | 0.126** | 0.109*** | 0.117*** | 0.119*** | 0.157*** | 0.133*** | 0.177*** |
| | (0.054) | (0.041) | (0.041) | (0.043) | (0.038) | (0.044) | (0.056) |
| Observations | 213 | 213 | 213 | 213 | 213 | 213 | 213 |
| Number of countries | 62 | 62 | 62 | 62 | 62 | 62 | 62 |
| Joint(p) | 0.353 | 0.0603 | 0.0444 | 0.992 | 0.0439 | 0.385 | 0.00007 |
| Adjusted R-squared | 0.407 | 0.411 | 0.416 | 0.399 | 0.451 | 0.413 | 0.470 |
| Year FE | YES | YES | YES | YES | YES | YES | YES |
| Country FE | YES | YES | YES | YES | YES | YES | YES |

Notes: The dependent variable is fiscal capacity measured as non-resource income tax as a percentage of non-resource total tax revenue. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

**Table 5**
Marginal effects of resource wealth at different levels of executive constraints.

| | Agric. wealth | Forest wealth | Mineral wealth | Coal wealth | Oil wealth | Gas wealth |
|---|---|---|---|---|---|---|
| Executive Constraints | b/se | b/se | b/se | b/se | b/se | b/se |
| 0 | −0.087 | 0.208 | −0.002 | −1.193 | −0.667** | −0.993 |
| | (0.15) | (0.18) | (0.35) | (1.17) | (0.27) | (4.84) |
| 1 | −0.032 | 0.172 | 0.066 | −1.129 | −0.585** | −0.003 |
| | (0.15) | (0.2) | (0.31) | (1.07) | (0.25) | (3.98) |
| 2 | 0.024 | 0.135 | −0.133 | −1.064 | −0.504** | 0.988 |
| | (0.16) | (0.25) | (0.26) | (1.02) | (0.25) | (3.26) |
| 3 | 0.079 | 0.099 | 0.201 | −1.00 | −0.423* | 1.979 |
| | (0.16) | (0.29) | (0.23) | (1.02) | (0.25) | (2.8) |
| 4 | 0.134 | 0.063 | 0.268 | −0.936 | −0.342 | 2.969 |
| | (0.17) | (0.35) | (0.22) | (1.07) | (0.26) | (2.74) |
| 5 | 0.189 | 0.027 | 0.335 | −0.872 | −0.261 | 3.96 |
| | (0.18) | (0.4) | (0.22) | (1.16) | (0.27) | (3.11) |
| 6 | 0.244 | −0.01 | 0.403* | −0.807 | −0.18 | 4.951 |
| | (0.2) | (0.46) | (0.24) | (1.29) | (0.29) | (3.77) |

Notes: The marginal effects of diffuse and point-source resources are calculated using the estimates from Table 4, Column 7.

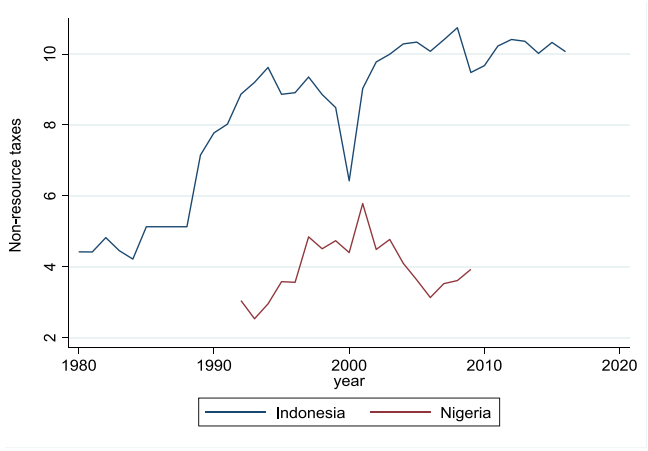


**Fig. 2.** Total (non-resource) tax revenues / GDP in Indonesia and Nigeria.

*executive constraints* implies a significant shift in the type of checks and balances that the executive power faces leading to different development trajectories. Indonesia and Nigeria are both populous countries with culturally diverse communities, and both are major oil exporters. After the OPEC inspired oil price hikes of 1973–1974, both countries saw a rapid increase in oil revenues. Indonesia's oil and gas sales increased from 10 per cent of exports in 1965 to 75 per cent ten years later. Oil revenues as a share of public revenues increased from 21 per cent in 1971 to 62 per cent in 1981. Similarly, Nigeria's oil sales increased from 26 per cent of total export revenues in 1965 to 93 per cent in 1974. Oil revenues as a share of public revenues increased from 7 per cent in 1965 to 82 per cent in 1974. Therefore, both Indonesia and Nigeria experienced large windfalls from their main point source resource – oil – in the same period. However, the outcomes with respect to non-resource taxes were quite different for these two countries. Fig. 2 shows that Indonesia has consistently performed better than Nigeria. Starting from 1990, Indonesia has seen an upward trend in non-resource revenues (interrupted by the Asian crisis of the late 1990s), doubling from about 5 % in 1990 to 10 % in 2015. Instead, Nigeria has seen a stagnation in non-resource revenues, from about 3 % in the early 1990s to 4 % in 2010. What may explain the divergent outcomes, from very similar experiences with resource windfalls? As our cross-country econometric analysis suggests, one potential explanation is the difference in the level of constraints to the executive in the two countries.

In the case of Indonesia, after the demise of the Sukarno regime following the military coup in 1965, and coming to power of General Soeharto, Indonesia entered a protracted period of authoritarian rule till 1998, when popular protests led the resignation of the General and the advent of democracy. In the case of Nigeria, there was a succession of military rulers (except for a brief interregnum of civilian rule in 1979 to 1983) till the mid 1990s, when the death of the military ruler, Sani Abacha, led to a return of civilian rule. While both Indonesia and Nigeria were authoritarian regimes for the initial period of the resource windfall and for much of the 1970s and 1980s, there was an important difference in the political institutions between the two countries, and this was to do with the *de facto* constraints that the executive faced in Indonesia and Nigeria.

In the case of Indonesia, from a *de jure* perspective, General Soeharto faced very limited constraints on his authority. At the same time, the Soeharto regime delegated economic policy to "a technocratic team, bolstering a small clustering of economic agencies, imposing fiscal discipline" and assuring the mobility of capital as an exit option (Lewis, 2009, p. 18). These measures functioned as lock-in mechanisms, acting as *de facto* constraints on the executive, and incentivising state investments in fiscal capacity. In addition, Soeharto established an informal alliance with key producers, with "provisional assurance of property rights and contracts" (ibid., p. 18). The *de facto* constraints on Soeharto's authority is reflected in the coding of the Soeharto regime as "intermediate category", by Polity's *Xconst*, with a score of one (as coded in our paper).

**Table 6**
Synthetic Difference-in-Differences estimates: average treatment effect on the treated.

| | Indonesia | Nigeria |
|---|---|---|
| ATT | 0.709 | −2.480** |
| | (1.498) | (1.196) |

Notes: Estimates for average effect of increased oil price. Standard errors in parentheses, estimated using the "placebo method". *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In contrast, in the case of Nigeria, under the various military regimes, there has been no similar *de facto* constraints on the executive in the period between the mid 1960s and late 1990s. The instability and fragmentation among the power-centres such as the military, the bureaucracy and political parties has led to a situation where the "institutions of enforcement, including regulatory agencies, the civil service, the police and judiciary, are weak and politicized" (ibid., p. 20) and there were no effective checks on the executive's power. Oil revenues were mostly used in this period for patronage and rent-seeking, instead of building capable state organisations, including revenue authorities. Consequently, Polity codes the period between 1966 and 1997 (except for the brief period of civilian rule between 1979 and 1983) as "Unlimited Authority", with a score of zero. Our case-studies of Indonesia and Nigeria provides suggestive evidence on why there is a significant increase in fiscal capacity when a regime is classified as one (intermediate category), as compared to zero (unlimited authority). Clearly, some *de facto* limits to executive power can play a powerful role on incentivising investments in fiscal capacity on the part of the executive.

Last, we take this comparison one step further. Exploiting the oil price boom that began in 2002 as a natural experiment, we provide counterfactual inference based on Synthetic Difference-in-Differences (Arkhangelsky et al., 2021). The details of the methodology are in the Appendix. The new estimates, in Table 6, suggest that the increase in oil prices beginning in 2002 had no significant effect on Indonesia's non-resource taxes. In contrast, Nigeria experienced a substantial negative effect, indicating that its non-resource taxes would have been approximately 2.5 percentage points higher in the absence of the oil boom. This is in line with the above "qualitative" illustration of the natural resources experience in the two countries.

### 4.4. *Are the results robust?*

Panel regressions results are already robust to controlling for all time-invariant variables and for time effects, as well as for a number of time-varying variables included in the regressions. Moreover, we note that both our dependent variable and the *Executive constraints* index are mismeasured: measurement error arises from the discrepancy between our set of institutional measures and the 'true' concept of institutions that such measures aim to capture. Resource rents are also subject to measurement error, which arises because such measures are based on estimates. The consequence of error from the 'left' is that it inflates the standard errors of the estimates, while error from the 'right' is a source of *attenuation bias* (assuming the noise is approximated by classic errors in variables). All this stacks the odds against our results. Nonetheless, the estimates find support for our hypotheses even in the presence of measurement error.

We conduct a series of robustness checks. First, we experiment with further controls. Following earlier empirical studies on tax effort, our findings are largely confirmed (or are even stronger) when adding to our regressions an index of political instability (from ICRG, 2018) and when

**Table 7**
Robustness checks: excluding big producers and OPEC countries.

| | Excluding Big producers | | | | Excluding OPEC countries | | | |
|---|---|---|---|---|---|---|---|---|
| | All Resources | Diffuse Resources | Point-source Resources | Diffuse and Point-source Resources | All Resources | Diffuse Resources | Point-source Resources | Diffuse and Point-source Resources |
| Executive constraints | −0.011 | −0.003 | −0.004 | −0.012 | −0.002 | 0.005 | −0.002 | −0.005 |
| | (0.007) | (0.007) | (0.006) | (0.008) | (0.007) | (0.007) | (0.005) | (0.008) |
| Resource wealth | −0.117 | | | | −0.034 | | | |
| | (0.196) | | | | (0.189) | | | |
| Resource wealth*Exec. constraints | 0.042** | | | | 0.014 | | | |
| | (0.019) | | | | (0.020) | | | |
| Diffuse resources | | 0.169 | | 0.218 | | 0.210 | | 0.148 |
| | | (0.184) | | (0.151) | | (0.140) | | (0.130) |
| Diff. resources*Exec. constraints | | 0.030 | | 0.037* | | −0.009 | | 0.012 |
| | | (0.024) | | (0.022) | | (0.019) | | (0.021) |
| Point-source resources | | | −0.664** | −0.692** | | | −0.873*** | −0.874*** |
| | | | (0.312) | (0.300) | | | (0.270) | (0.269) |
| Point-source res.*Exec. constraints | | | 0.162** | 0.180** | | | 0.239*** | 0.248*** |
| | | | (0.073) | (0.075) | | | (0.069) | (0.074) |
| External Debt | 0.000 | −0.000 | −0.000 | −0.000 | −0.000 | −0.000 | −0.000 | −0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trade | 0.001** | 0.001** | 0.001*** | 0.001** | 0.001*** | 0.001*** | 0.001*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Aid per capita | −0.000 | −0.000 | −0.000 | −0.000 | −0.000 | −0.000 | −0.000** | −0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| External conflicts | 0.001 | −0.001 | −0.000 | −0.003 | 0.001 | −0.001 | −0.001 | −0.003 |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| Internal conflicts | 0.003 | 0.003 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.003) | (0.003) | (0.003) |
| Population density | 0.000** | 0.000** | 0.000** | 0.000 | 0.001** | 0.001** | 0.001*** | 0.001** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Constant | 0.161* | 0.048 | 0.158*** | 0.095 | 0.146** | 0.070 | 0.158*** | 0.121** |
| | (0.081) | (0.069) | (0.047) | (0.064) | (0.066) | (0.056) | (0.039) | (0.050) |
| Observations | 173 | 173 | 173 | 173 | 198 | 198 | 198 | 198 |
| Number of countries | 51 | 51 | 51 | 51 | 58 | 58 | 58 | 58 |
| Joint(p) | 0.106 | 0.279 | 0.0488 | 0.0307 | 0.762 | 0.311 | 0.00262 | 0.00886 |
| Adjusted R-squared | 0.436 | 0.431 | 0.481 | 0.498 | 0.406 | 0.416 | 0.479 | 0.482 |
| Year FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Country FE | YES | YES | YES | YES | YES | YES | YES | YES |

The dependent variable is fiscal capacity measured as non-resource income tax as a percentage of non-resource total tax revenue. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

**Table 8**
Robustness checks: marginal effects of resource wealth at different levels of executive constraints.

| | Excluding Big Producers | | | Excluding OPEC countries | | |
|---|---|---|---|---|---|---|
| | All Resources | Diffuse Resources | Point-source Resources | All Resources | Diffuse Resources | Point-source Resources |
| Executive Constraints | b/se | b/se | b/se | b/se | b/se | b/se |
| 0 | −0.117 | 0.218 | −0.692** | −0.025 | 0.296* | −0.789* |
| | (0.2) | (0.15) | (0.3) | (0.25) | (0.18) | (0.47) |
| 1 | −0.075 | 0.255 | −0.511* | −0.05 | 0.251 | −0.694* |
| | (0.19) | (0.16) | (0.27) | (0.22) | (0.16) | (0.38) |
| 2 | −0.034 | 0.291* | −0.331 | −0.074 | 0.207 | −0.599** |
| | (0.19) | (0.17) | (0.27) | (0.2) | (0.14) | (0.3) |
| 3 | 0.008 | 0.328* | −0.15 | −0.099 | 0.162 | −0.504* |
| | (0.19) | (0.18) | (0.28) | (0.18) | (0.14) | (0.26) |
| 4 | 0.049 | 0.365* | 0.03 | −0.123 | 0.118 | −0.409 |
| | (0.19) | (0.2) | (0.31) | (0.17) | (0.15) | (0.27) |
| 5 | 0.091 | 0.401* | 0.21 | −0.148 | 0.073 | −0.314 |
| | (0.19) | (0.21) | (0.36) | (0.17) | (0.16) | (0.32) |
| 6 | 0.132 | 0.438* | 0.391 | −0.172 | 0.029 | −0.219 |
| | (0.2) | (0.23) | (0.41) | (0.18) | (0.18) | (0.4) |

Notes: The marginal effects of diffuse and point-source resources are calculated using the estimates from Tables 7, Columns 4 and 8.

controlling for GDP per capita and education levels (both from World Bank, 2018b). The key results are in the Appendix (Tables A5 and A6).

Second, we test if the results hold with three alternative dependent variables. As it has been considered in earlier studies, we replace our dependent variable with the total amount on non-resource tax revenues as a share of GDP (data from ICTD, UNU-WIDER, 2019). We also construct two additional measures: *(Income taxes + VAT taxes)/Total taxes* and *(Income taxes + VAT taxes)/GDP*. By including VAT taxes to the numerator of these ratios, we recognise that building a VAT system can imply significant ability to raise revenues. Tables A7–A9 report the marginal effects from this exercise, in the Appendix. For all three alternative dependent variables, the results are strikingly similar and they largely confirm our findings.

### 4.5. Does the identifying assumption hold?

Our results are based on the assumption that resource rents, measured on the basis of international commodity prices, are exogenous to a country's institutions, whereas large commodity producers can potentially influence world commodity prices and so raise endogeneity concerns with respect to our variable of interest. Here we provide an indirect test of this assumption, by excluding from the sample all OPEC members and countries accounting for more than 3 % of total world production of a certain commodity.[22] As a result, the key findings on the heterogeneous impact of natural resources prove to be robust (Tables 7 and 8, and Fig. A7 in the Appendix).

## 5. Conclusions

We often heard the claim that countries developing a natural resources sector may miss out on fiscal development: they don't learn how to tax. This paper offers a systematic econometric assessment of this proposition and demonstrates that this hypothesis does not have general validity. It is justified only in the presence of weak political institutions and for specific natural resources. In particular, using panel data covering the period 1995–2015 for 62 developing countries, the paper offers two main findings. First, we find that *point-source resources* are negatively associated with fiscal capacity, while *diffuse resources* are not. Second, developing economies with political institutions placing institutionalised constraints on the executive power are able to neutralise the negative effect of *point-source resources* on fiscal capacity.

Our results are in line with the recent literature arguing that resource abundance does not lead to worse development outcomes, if a country has the "right" institutions (e.g., Robinson et al., 2006; Mehlum et al., 2006), but we extend this view to the case of fiscal capacity. Our findings are equally relevant to the emerging literature on the determinants of state capacity, where it has been argued that political institutions constraining the power of the executive foster fiscal (and legal) capacity by creating a situation of *common interest* (Besley and Persson, 2011). We add to this claim that another channel through which such political institutions may foster state capacity is by averting any deleterious effect of resource rents on taxation.

Finally, in policy terms, our findings indicate that, in polities providing strong checks and balances on the executive power, it is possible to develop both fiscal capacity and the natural resources sector, without any trade-off. Whether a fiscal resource curse exists or not is also a question of what type of political institutions countries have adopted before they became resource-rich.

## CRediT authorship contribution statement

**Tania Masi:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Antonio Savoia:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Kunal Sen:** Conceptualization, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

[22] We identify OPEC members and big producers following Caselli and Tesei (2016).

## Data availability

Data will be made available on request.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.worlddev.2024.106532.

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