The effects of implementing the Extractive Industries Transparency Initiative (EITI) on domestic revenue mobilization in developing countries

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Abstract

This paper assesses the 'treatment effect' of EITI on domestic tax revenue mobilization through two main channels. The first channel is direct and it works through optimal and transparent resource tax regime. The second channel is the indirect effect that EITI has on non-resource revenue once transparency enhances accountability and thus the task of resource allocation to productive expenditures. We use a variety of propensity score matching (PSM) methods developed in the treatment effect literature to address the self-selection problem associated with EITI membership. Our treatment variables are based on the three main steps of the EITI implementation process: the dates of countries' commitment, candidacy and compliance. The empirical analysis, conducted on a sample of 83 resource-rich developing countries (44 EITI and 39 non-EITI) for the period from 1995 to 2017. Our findings show that on average EITI implementation has had a large and significant positive effect on domestic revenue collection (around 1.1 to 1.12 percentage points). Even more important is that the magnitude of ATTs is greater if we controle governance quality. Our results are robust to non-resource and income tax revenues. The influence of heterogeneity factors on ATT effect are more or less important depending on the stage of EITI implementation and the type of tax revenue. This study therefore provides empirical evidence that implementing the EITI standard improves domestic revenue mobilization of countries that have adopted this transparency policy. And clearly, compliance with the rules and virtuous governance are a plus.

Keywords: Natural resource dependence . EITI . Domestic Tax revenues . Developing countries
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1 Introduction

The international conference on financing for development and sustainable development held in Addis Ababa in August 2015 highlighted the priority of domestic revenue mobilization. Development aid and public debt should be complementary. While most resource rich-developing country governments have struggle to mobilize substantial revenue due to a range of challenges, both external, such as aggressive tax planning by multinationals, and internal, including weak enforcement of tax laws, overly generous tax incentives, and obviously the misuse of receipts.

The pioneering research by Sachs and Warner (1995) and other works that have followed (Sachs and Warner, 2001; Van der Ploeg, 2011) suggest that the dependence on natural resources has a negative impacts on the economic performance of the most resource-rich countries compared to the least resource-rich countries. This is generally known as the "resource curse". It is also referred to as a crowding out of non-resource revenues by resource revenues in several developing countries (Bornhorst et al., 2009; Ndikumana and Abderrahim, 2010; Crivelli and Gupta, 2014; Mawejje, 2019). As a result, a disparate literature has focused on the economics of natural resources in order to understand the phenomenon of the "resource curse" and to turn natural resource wealth into a source of economic development. These include the definition and rents sharing[1], the macroeconomic effects of abundance and dependence on natural resources[2], and institutional impacts[3]. The main reasons include the weak capacity of the tax administration, generous tax incentives for businesses, discretionary application of tax laws, the lack of a clear understanding of the tax system (Knack, 2009), misuse of public revenues (Robinson et al., 2006), and institutional quality including transparency and governance in the extractive industries.

However, in addition to other economic sectors, the tax capacity of resource-rich countries depends, on the one hand, on a fair tax regime for extractive industries that maximizes government revenue, and on the other hand, on the spillovers associated with the use of extractive resource revenues. Through an effective fiscal policy, revenues from extractive industries would contribute significantly to finance productive public spending (Daniel et al., 2013), which condition the non-resource tax effort. The Extractive Industries Transparency Initiative (EITI), created in 2003 at the instigation of the NGO "Publish What You Pay", aims to promote better governance of natural resources. Nowadays, it is an initiative recognized as an international standard of good governance. Since then, 52 countries around the world (including 22 African countries) have implemented the EITI standard. This standard requires extractive companies to publish all payments made in detail in the government's accounts. Similarly, governments are required to publish all payments received from extractive companies (oil, gas, and mining). In other words, governments and companies disclose information on the main stages of the value chain (contracts and licenses, production, income collection, and social and economic expenditure) (EITI, 2016). In addition to revenue collection, the EITI standard promotes accountability in the use of revenue to public spending. Several international organisations (World Bank, International Monetary Fund, OECD) have endorsed the initiative and provide technical and financial support for the implementation of the EITI standard. Their objective is to enhance transparency for better domestic resource mobilization and to promote inclusive economic growth and social development in developing countries (Liebenthal et al., 2005).

Some research has already focused on the effect of EITI on the quality of institutions, mainly corruption control, civil liberty and democracy (Villar and Papyrakis, 2017; Rustad et al., 2017; Ejiogu et al.,

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[1](Boadway and Keen, 2010; Charlet et al., 2013; Laporte and Rota-Graziosi, 2014)

[2](Corden and Neary, 1982; Sachs and Warner, 1995; Gylfason et al., 1999; Gylfason, 2001; Tornell and Lane, 1999; Sachs and Warner, 2001; Gylfason and Zoega, 2006)

[3](Alexeev and Conrad, 2011; Al-Kasim et al., 2013; de Medeiros Costa and dos Santos, 2013; Bhattacharyya and Hodler, 2010; Arezki and Brückner, 2011; Leite and Weidmann, 2002; Kolstad and Wiig, 2009; Norman, 2009; Saha and Gounder, 2013; Brunnschweiler, 2008; Bulte et al., 2005; Papyrakis et al., 2017; Amiri et al., 2019; Berman et al., 2017; Desai and Jarvis, 2012; Knutsen et al., 2017)

2019; Corrigan, 2014; Magno and Gatmaytan, 2017; Sovacool et al., 2016; Haufler, 2010; Papyrakis et al., 2017; Sovacool and Andrews, 2015) and on non-resource tax revenue (Mawejje, 2019). The results are increasingly controversial depending to analytical methods that are essentially based on linear models. These researchers do not consider the factors that motivated countries to implement the EITI standard. As well, Lujala (2018) argues that all impact evaluations of the EITI on resource governance and societal development need to correct for the selection biases in countries' decisions to commit to and implement the EITI standard. This paper aim to provide a relevant answers to the following questions: do EITI membership improves tax revenue mobilization after controlling for self-selection? Does the treatment effect vary with the status of EITI implementation (commitment, candidacy, and compliance)? Finally, is there heterogeneity in the treatment effect of EITI, depending on countries structural characteristics?

The aim of this paper is therefore to assess the effect of extractive industry transparency on tax revenue mobilization in developing countries. More specifically, we estimate the effect of EITI implementation on tax revenues compared to the situation of non-implementation. Our intuition is that EITI implementation would boost the quality of governance in resource-rich countries, and thus improve tax revenue mobilization. We consider two main channels through which this effect occurs. The first channel is direct and it works through optimal and transparent resource tax regime. This could improve the government's share of rents (resource revenue). The second channel is the indirect effect that EITI has on non-resource revenue once transparency enhances accountability and thus the task of resource allocation to productive expenditures. This will have a positive spillovers on government non-resource revenues. This study is aligned with work on the effectiveness of EITI in reducing the negative impacts of natural resources on economic development and the quality of governance (Corrigan, 2014, 2017), and in improving resources tax revenue mobilization (Mawejje, 2019).

Our study contribute to the existing literature on several points. First, to the best of our knowledge, our paper is the first study to take into account this self-selection problem while investigating the impact of implementing the EITI on domestic revenue. We use the propensity score matching method of Leuven and Sianesi (2018), which allows us to take into account the determinants that motivated countries to implement the EITI standard. Besides, our analysis distinguishes between commitement, candidature and compliance status in the EITI implementation process. Finally, we use a control function regression approach to analyze the heterogeneity of treatment effects on tax revenue mobilization, based on strucrural factors of countries. This takes into account country temporal and fixed effects, the sensitivity of compliance with standards and the time elapsed since EITI implementation. The main results show that EITI implementation exerts a positive and significant effect on tax revenue mobilization.

The rest of the paper is organized as follows. Section 2 discusses the related literature. Section 3 details the data and highlights key stylized facts. Section 4 describes the empirical strategy. Section 5 discusses the main results. Section 6 explores their sensitivity. Section 7 concludes the paper and draws some policy implications.

2 Literature review

2.1 Macroeconomic effects of natural resources

For a long time, natural resources have been considered as a solid basis in the economic development process. The intuition is that countries abondant in oil, gas and minerals are able to generate significant revenues that can be used to improve their economic performance (see Viner, 1952; Rostow, 1961). However, the resource bonus seems to be a curse rather than a blessing (Auty, 1994; Sachs and Warner, 1995). Causes often cited in order to explain resource curse include Dutch disease, insufficient or inefficient investment (including human capital), lack of fiscal discipline, institutional decay, and macroeconomic

instability (see Gylfason, 2001; Halland et al., 2015).

Based on the existing literature, we identify two main channels through which natural resources affect tax revenues.

The effects of EITI on domestic revenue mobilization would be reflected in the strengthening of the resource tax regime and linkages with the non-resource economy. The first channel concerns the efficiency of resource tax regime. The second channel is indirect, and it concerns the positive spillovers of resource revenue on the rest of the economy (example: infrastructure and human development, to promote economic diversification).

Resource tax regime can be quantitatively evaluated for their neutrality, revenue-raising potential, government risk (stability and timing of government revenue), effects on investor perceptions of risk, and their adaptability and progressivity (Daniel and Goldsworthy, 2010). The progressivity reassures investors and guarantees a "fair" share of rent to the government. This means that a tax regime will yield a rising present value of government revenue as the pre-tax rate of return on a project increases (Boadway and Keen, 2010). The rent sharing between the transnational company and the host country depends not only on the bargaining power of the government but also on the conduct of company operations (accounting, financial behavior, transfer pricing, and dividend repatriation). Besides, tax competition between countries forces the implementation of incentives to attract capital. From traditional public economics, this is detrimental to tax revenue and would require coordination or cooperation in tax matters between States. However tax coordination is impossible under the assumption of a Nash equilibrium in the presence of tax competition (see, Rota-Graziosi, 2019).

Countries with large nonrenewable resources can reap substantial benefits from them, and many countries have done so. For example, industrialized countries such as Australia, Canada, and the United States have successfully transformed resource extraction into economic growth and development. Recently others resource-rich countries Botswana, Chile, Malaysia and South Africa have reached the highest income level (Halland et al., 2015). But, the reliance on resource revenue poses challenges to policymakers, and governments must play an important role in how resource revenues are used (Ossowski and Halland, 2019). Daniel et al. (2013) indicates that with an effective fiscal policy, revenues from extractive industries would contribute significantly to finance productive spending. Investments in immediately productive sectors would promote job creation, and consequently will expand the tax base and the reduction of resources dependence. According to Knebelmann (2017), the impact of oil revenue collection efforts on the taxation of the non-oil economy and/or investments in fiscal capacity (tax administration capacity) could contribute to a synergy between these taxes. Conversely, a reduction in control and incentives of taxing non-oil economies because the ressouce revenue could lead to a crowding-out effect.

Several empirical analyses of the effect of natural resources on non-resource tax revenue have led to controversial results. Bornhorst et al. (2009) find that for each additional percentage point of GDP in oil and gas revenues leads to a decline in non-oil and gas revenues of 0.23 percentage points, across a sample of 30 oil countries over the period 1992-2005. Crivelli and Gupta (2014) find that for each additional percentage point of GDP in resource revenues, there is a reduction in domestic non-resource revenues of about 0.3 percentage points. Mohtadi et al. (2016) show that for each additional percentage point of GDP in resource revenues, there is a reduction in taxes on individuals of about 0.2 percentage points. Ossowski and Gonzáles (2012) find that the resource revenues/GDP impact negatively on the non-resource taxes/non-resource GDP on Latin American countries. Thomas and Trevino (2013) find that for every 1 percentage point increase in resource revenue as a proportion of GDP, non-resource revenue is lower by about 0.07 to 0.12 percent of GDP in sub-Saharan Africa. When they use GDP excluding resources, their results are not significant. However, Knebelmann (2017)'s replicas from ICTD data show that the results are sensitive to the change in the denominator (GDP by GDP excluding

oil). Non-resource taxes as a percentage of total GDP seem to be biased. According to Crivelli and Gupta (2014), "if resource revenue-to-GDP increases due to a sharp increase in resource production, non-resource revenue may appear depressed relative to GDP simply because of the increased income and the coefficient estimates may be biased downwards". In contrast, Knebelmann (2017) uses gross tax revenue, i. e. not related to GDP, for a sample of 31 countries. This study concludes that there is no crowding-out effect of oil revenues on non-oil revenues through tax channels.

In addition, some research index institutional quality as the solution to reverse resource curse or enhance resource blessing in resource-rich countries (see Collier and Hoeffler, 2005; Lujala et al., 2005). It's important to note that in resource-rich countries, the lower take up of non-resource taxes is correlated with higher levels of corruption in these countries, suggesting that weaker institutions affect non-resource revenue through incentives for tax evasion and/or overly generous tax incentives (Crivelli and Gupta, 2014). Also, natural resource abundance is the main source of illicit financial flows (Ndikumana and Boyce, 2003). Kolstad (2009) and Mavrotas et al. (2011) show theoretically as well as empirical evidence that natural resources can be a blessing in countries with good institutions and a curse in bad institutions countries. Grigorian and Davoodi (2007) find in Romania that lower of country political risk is positively associated with the tax ratio. Similarly, Bird et al. (2014) find that governance indicators (corruption, voice and accountability) affect significantly tax revenues. Using a sample of 46 SSA countries, Botlhole et al. (2012) provide evidence that natural resources are only detrimental to tax revenue mobilization in absence of good institutions. On the other hand, Eregha and Mesagan (2016) showed that institutional quality enhanced per-capita income growth in African countries. This thereby questioning institutional quality in these countries, that would not be able to reverse the resource curse.

To sum up, the issue of the political economy of natural resources requires private investment to discover and extract the resource, fiscal regimes to capture revenue, judicious spending and investment decisions, and policies to manage volatility and mitigate adverse impacts on the rest of the economy (Venables, 2016). Our analysis consists to highlight the effects of EITI on the tax revenues, through the two channels mentioned above in particular, and by the spillover effects on the capacity of tax administration in general.

2.2 Brief presentation of the EITI

Founded in 2002 under the intiative of "Publish What You Pay", an NGO the EITI has formally been launched in London in June 2003. It is a multi-stakeholder organization dedicated to the promoting of good management and governance of oil, gas and mineral resources (EITI, 2016). The EITI standard has so far been applied in 53 countries (including 24 African countries). This standard requires extractive companies to publish all payments made in detail in government accounts, and governments are also required to publish all payments received from extractive companies, with the objective of curbing corruption (Papyrakis et al., 2017). In other words, governments and companies disclose information on the main stages of the natural resource value chain such as exploration activities, licenses and contracts, beneficial owners, production, revenue collection, and revenue use. Several international organisations (World Bank, International Monetary Fund, OECD and so forth) have endorsed the initiative and provide technical and financial support for the implementation of the EITI standard. Their objective is to enhance transparency for better domestic resource mobilization and to promote inclusive growth and social development in developing countries (Liebenthal et al., 2005).

The EITI implementation process consists of three main steps: *Commitment, Candidate, and Compliance*. First, the country's government publicly committing to joining the EITI and to implementing the EITI Standard. Following the announcement of the commitment, government, companies and civil society must jointly commit to establish both a national EITI secretariat and a multi-stakeholder group

(MSG) to oversee the implementation process. The MSG requires the independent, active and effective participation of all stakeholders. The MSG thus adopts a costed work plan in line with the reporting and validation deadlines of the EITI Board. This work plan clearly sets out the country's objectives and priorities for implementing the EITI (EITI, 2016). This step takes time and allows the effects of accession to be examined before being accepted as a candidate country (Corrigan, 2014). This demonstrates the country's intention and implies its willingness to change transparency policies and accommodate with the requirements of EITI membership.

After the requirements of Commitment Status, the government must submit a request to the EITI Board to become a candidate country. The country becomes an EITI candidate if the Board considers that all membership requirements are met. To qualify for compliance status, the candidate country must publish a first EITI report within 18 months. It must also submit the final report for approval by the Board of Directors and approved by the MSG within two years and a half. Candidate countries that have not been able to comply with the requirements of the validation process, and/or have not submitted their final validation report at deadline risk a suspension (Anwar and Kannan, 2012). The suspension can also intervene if the country lives in a context of political instability. This is the case for the Central African Republic in 2013 and Madagascar in 2011. After compliance, the country must submit a validation report every three years as requested by the Board. Non-compliance with the latter obligation may also result in the suspension of the concerned country. Figure 1 shows countries by their stage of EITI implementation up to 2015.

Figure 1: 51 EITI implementing countries until 2015
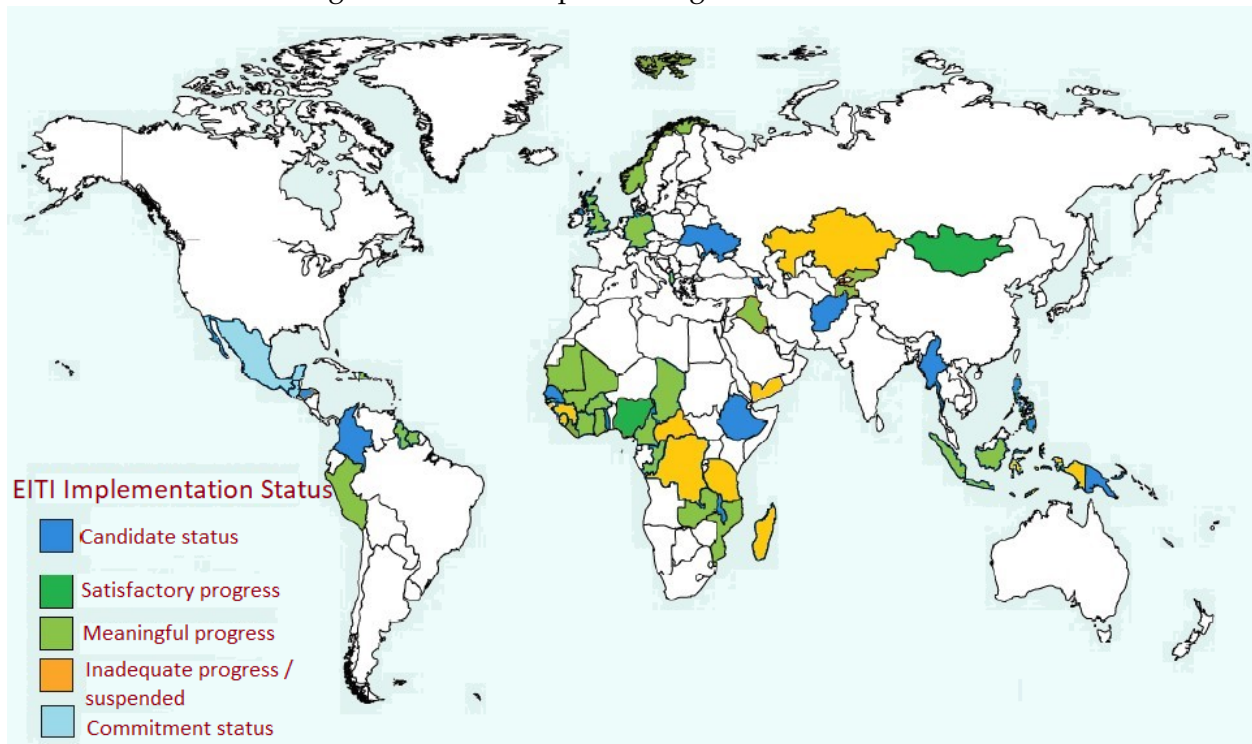
Source: authors, based on the EITI Report 2015

The phenomenon of the "resource curse" is one of the main reasons for the EITI creation. The pioneering work of Auty (1994) and Sachs and Warner (1995) showed that resource-rich countries (oil, gas or mining) have below-average economic activity. Also, these countries have a higher frequency of conflicts and suffer from poor governance (Humphreys, 2005; Collier, 2003). Thus, international organizations (World Bank, IMF and other multilateral cooperatives) believe that with greater transparency in the governance of the extractive industries, these negative effects could be mitigated.

Indeed, the implementation of the EITI would allow countries to observe a better foreign direct investment climate. This initiative would not only contribute to strengthening accountability and good governance, but also to ensure greater economic and political stability. For companies, mitigating the political risks caused by opaque governance is a benefit for investments. Investments in the extractive sector are highly capital intensive, which requires a high degree of long-term stability to generate profits. Transparency of payments to governments allows companies to demonstrate their contribution to public finances. For civil society organizations, the benefits mainly concern the availability of information on the management of resource revenues by governments. This requires more responsibility in allocating income to social and economic expenditures (EITI, 2016).

However, the EITI still has several limitations. First, the fact that a country is an EITI Candidate or compliant country does not necessarily mean that its extractive sector is fully transparent or free of corruption. This simply indicates an effective process for monitoring and improving the disclosure of information (EITI, 2016). Also, international pressure for reform and the high implementation costs of international standards are pushing some governments to so-called fictitious or facade compliance (Walter, 2008; Öge, 2017). Civil society organizations participation in MSG in authoritarian countries satisfies this form of compliance. Global donor actors exert some form of external pressure for reforms in the management of extractive industries. They require strict compliance with good governance standards (Gillies, 2010; O'Neill et al., 2004). Since the EITI creation, it has been strongly supported by the World Bank, the IMF and the G-20 as an instrument of transparency in developing countries. In this logic, countries are obliged to implement EITI in order to benefit from a better solvency of external financing (Simmons, 2001; Walter, 2008) and a good global reputation as FDI destinations (David-Barrett and Okamura, 2013; Henisz, 2002; Öge, 2017). These external incentives associated with the EITI require countries to formally accept civil society organizations as important stakeholders in the management of extractive resources. But in practice, these groups are often marginalized and silenced. Finally, it is important to note that during the EITI creation, the responsible use of resource revenues was not a concern in the EITI implementation. This does not allow corruption to be combated throughout the value chain.

2.3 How does the EITI process influences tax revenue mobilization?

The EITI literature examines both the factors behind a country's joining the initiative (see for instance Pitlik et al., 2010; Cockx and Francken, 2014; Öge, 2016; Kasekende et al., 2016; David-Barrett and Okamura, 2016; Lujala, 2018) and the impact of the initiative on resource sector governance, FDI flows and development in general (see for instance Duru, 2011; Sovacool and Andrews, 2015; Rustad et al., 2017; Corrigan, 2017; Mawejje, 2019). The EITI is considered as the global standard for the good governance of oil, gas and mineral resources. The national platforms of EITI for accountability improve reforms and governance, as well as promoting greater economic and political stability (Duru, 2011).

The effects of EITI on domestic revenue mobilization would be reflected in the strengthening of the resource tax regime and linkages with the non-resource economy. The first channel is direct and it works through optimal and transparent resource tax regime. The second channel is the indirect effect that EITI has on non-resource revenue once transparency enhances accountability and thus the task of resource allocation to productive expenditures (example: infrastructure and human development, to promote economic diversification). First, the EITI improves the transparency of the extractive business taxation system, this can improve the government's share of rents. It broadens access to detailed information on extractive sector revenues in several countries and informs citizens about the amounts of payments made by companies. For example, in Chad, the national oil company discloses detailed information about Glencore's sale of oil. For each shipment of cargo, sales volumes, prices, sales amounts, public debt repayment and the balance transferred to the treasury are presented in detail (EITI, 2018). For a

long time, the identity of the beneficial owners of companies holding oil, gas and mineral extraction rights has often been unknown. This lack of transparency in the governance of extractive industries fuels corruption, money laundering, tax evasion and illicit financial flows, as evidenced by the Panamas Papers (Chohan, 2016). EITI requires disclosure of the real ownership of extractive companies (the holders of extraction rights), i.e. residence, parent company and subsidiaries. This shows that EITI leads to more efficient tax collection from extractive industry companies. The second channel is the indirect effect that EITI has on non-resource revenue once transparency enhances accountability and thus the task of resource allocation to productive expenditures (example: infrastructure and human development, to promote economic diversification). The transparency of the use of resource revenues to productive expending, which condition the non-resources tax effort. This raises the complementarity between resource revenues and non-resource tax revenue. In general, transparency or access to information by citizens can reduce bureaucratic corruption by making acts of corruption riskier, and promote the selection of honest and efficient agents for the public service. According to the resource curse literature, appropriate institutions can prevent the adverse impact of natural resources. It is not immediately clear that EITI transparency reform should be the priority. It is important to consider other indicators of institutional quality, which are crucial to the effectiveness of tax revenues.

The question of the effects of EITI on tax revenues is still little empirically addressed in the existing literature. Only Mawejje (2019) achieves to analyze a direct relationship between the EITI and tax revenues. The author considers 31 sub-Saharan African resource-rich countries over the period 2003-2015. The Fixed effects and dynamic panel models indicate a negative relationship between natural resource dependency and non-oil revenue mobilization. The effect becomes weakly positive by using the interaction between EITI membership and natural resource dependency *(Total rents in % GDP)*. The author concludes that EITI membership partially improves tax revenues, since the coefficient decreases with adding of control variables. With a panel of 186 countries over the period 1997-2014 and using the fixed-effect model, Corrigan (2017) shows that the EITI membership affects positively and significantly the economic development. However, the effect on the control of corruption is not significant. An ordinary least squares (OLS) analysis over the period 2005 to 2009 by Cockx and Francken (2014) finds no evidence for a positive effect of the EITI membership on public health spending.

However, there are several limitations to this empirical literature in particular and EITI policy in general. The regression methods is no appropriate because a country decision to implement the EITI standard is endogenous. This work considers EITI membership as the date on which the country publicly expresses its intention to implement the EITI standard. Demonstrating a country's intention to join the EITI implies a willingness to change transparency policies and comply with EITI requirements. By considering only this step, the analysis risks underestimating the impact of the EITI. Corrigan (2017) points out that this variable, as defined, does not take into account all policies or plans that aim to increase transparency and accountability in the governance of extractive industries. This suggests restraint in interpreting the results, as EITI implementation extends over several years. The specification with an interaction term indicates the heterogeneity of the effect of EITI via the level of dependence on natural resources between countries that are already EITI Members. The result does not allow a comparison of the effectiveness of non-resource tax revenues between EITI and non-EITI implementing countries. In other words, this result is much more reflective of the sensitivity in terms of extractive capacity and value of natural resources between EITI countries.

In addition to the limitations of empirical analysis, the EITI faces some challenges. Initially, EITI policy focuses only on revenues from extractive industries. Other aspects of the extractive value chain such as the use of these revenues are not considered. Yet resource-rich countries face many corruption problems that are largely expenditure-based (Öge, 2017). Similarly, Robinson et al. (2006) suggest that responsible use of public resources is the way to avoid the "resource curse". Thus, the introduction

of EITI seems a little late in the logic of real impact, because corruption is already present at the contracting and procurement stages. As membership of the EITI is voluntary for countries and companies, countries and companies can express their intention to join the initiative and whether or not to follow up on it. This depends on the opportunity cost of complying with the standards. For example, highly corrupt governments may have an interest in not promoting transparency in the extractive industries (Öge, 2017). For such governments, restrictions on access to international financial markets and development support could be an effective way to increase their compliance costs. Also, there is a risk that the multi-stakeholder group may be populated by supporters of the government regime. This reduces the exposure of bad practice in EITI implementation. Members of multi-stakeholder groups also need to be able to process and act on the information conveyed.

On the other hand, we use a more appropriate methodology to assess the impact of EITI membership on tax revenues. Indeed, we consider two main stages (commitment status and candidate country status) of EITI implementation to measure EITI adherence. Besides, we take into account the heterogeneity of effect (ATT) related to Compliance with EITI standards. The main variable of interest is EITI Candidate country status. With this variable we can ensure more transparency in the governance of the extractive industries, as it meets the first five (05) requirements of EITI implementation. We use the propensity score matching (PSM) method, which takes into account the impact of the main factors that motivate countries to join EITI. The PSM assesses the impact of EITI membership on tax revenue mobilization for a given country compared to what it would have been like to remain a non-EITI country. In other words, this method gives the average effect of EITI membership on tax revenue mobilization. We also analyse the heterogeneity of the effect across countries, related to macroeconomic variables, institutional quality and the time elapsed since EITI membership.

3 Data and Stylized facts

3.1 The Data

Our dataset consists of 83 resource-rich developing countries covering the period 1995-2017. The choice of this large panel is based on the dependence on extractive resources and the availability of tax revenue data. Extractive-dependent countries are defined as countries that depend on minerals for at least 25% of their tangible exports (Haglund, 2011). The panel is unbalanced because of missing observations. The sample includes 44 countries that have implemented the EITI standard at different accession dates *(called EITI countries, EITI member or treatment group)* and 39 non-EITI countries *(control group)*. We use Government Revenue Dataset (GRD) developed by the International Centre for Tax and Development (Prichard et al., 2014; McNabb, 2017). It's the most complete source of cross-country data available and extensively used in the studies surrounding the effects of tax policy on development. In particular, total tax revenue (% GDP) is our main dependent variable *(Tax_revenue)*. It represents the total taxes excluding social security contributions, which are levied for the benefit of social welfare institutions. This coverage of tax revenue data is better because it is specific to taxes and consistent across countries. For the robustness of our results we use Non-resource tax *(Non-res_tax)* calculeted as total tax revenue excluding social security contributions minus resource taxes (oil, gas and mining) and icome tax that include taxes on income, profits, and capital gains *(Icome_tax)*.

The interest variable is a dummy. It is measured by the three stages of implementing the EITI standard, namely *Commitment, Candidate and Compliance*. We also use it as a dependent variable for the initial probit estimation of the Propensity Score for the set of explanatory variables suspected to be endogenous to EITI adherence. This variable is constructed from information available on the EITI website (EITI, 2016). Before becoming an EITI Candidate country, the country must first publicly announce its

commitment to implement the EITI standard. Then, the country must adopt a work plan that sets out its expected targets and how it intends to achieve Compliance status (EITI, 2016; Corrigan, 2017). The dummy variable takes the value 1 for the years that the country is EITI member and 0 for the years that the country is not EITI member according to the stage of implementing the EITI standard. The propensity score matching includes both EITI countries and non-EITI countries. This provides a measure of the actual average effect of EITI implementation.

The control variables are composed mainly of structural factors and institutional indicators, and their choice is justified in subsection 4.2. The propensity score matching method suggests that the control factors are correlated simultaneously with the interest variable and the dependent variable. Otherwise, these factors are likely to explain both the choice to join EITI and tax revenues for a given country. Based on existing literature, we monitor the endogeneity of the following factors: the total rents of extractive industries (oil, gas, mineral), GDP per capita, Financial development, Inflation, Commodity prices, Trade openness, Net official development assistance per capita (AID), Foreign direct investment (FDI), Industry value added, Coal rents, Forest rents, Human development index (HDI), Index of institutional quality (control of corruption, Gouvernment effectiveness, Rule of law), Regulatory quality, Voice and accountability. It is not possible to control for unobserved factors that may affect the likelihood of joining the EITI. But the control variables allow us to take into account some of the known sources of bias. These data come mainly from the datasets of World Development Indicators (WDI), International Monetary Fund (IMF) and The World Governance Indicators (WGI). The table A12 presents the data sources and definitions of the different variables.

3.2 Stylized facts

Governments of resource rich countries receive revenues from taxing the extractive companies, from the royalties, and from economic rent-sharing arrangements. The mustache box diagram in fig.2 visualizes the distribution of tax revenue in EITI countries before and after commitment. It can be seen that for each type of tax revenue, the range is higher for EITI member time periods. The same is true for the median, i.e. the amount that divides the distribution of tax revenue into two equal shares for EITI member time periods is higher compared to non-EITI time period. However, we can see from the mustache box diagram in figure 3 that the median of the tax revenue distribution increases with the stages of EITI implementation (commitment, candidate, and compliance). Unlike the mustache box diagrams, Figure 4 takes into account not only the period before the commitment to implement EITI but also countries that are not yet EITI Members. This figure shows the relationship between natural resource dependency (sum of oil, mining, and gas rents) and non-resource tax revenue. We find that the mobilization of non-resource tax revenue is a decreasing function of natural resource dependency. However, the slope of the adjustment line is less steep in EITI countries than in non-EITI countries. This reflects the more responsible use of revenues under the EITI standard. We explain this by the creation of linkages with the rest of the economy, such as job creation and the allocation of revenues to productive expenditures that generate other non-resource revenues. The implementation of EITI, therefore, helps to mitigate the crowding out of non-resource tax revenue. In other words, the negative effect of extractive resource dependence on non-resource fiscal revenues is mitigated for EITI countries. At the end of our statistical analysis, countries would mobilize more revenue by implementing EITI and more by achieving compliance status. Before being able to conclude on these results, we conduct an econometric verification because the stylized representation of economic variables does not take into account specific endogenous factors. Likewise, the periods before and after EITI are not necessarily comparable. In the following, we begin an analysis using the method of propensity score matching on two more comparable groups.

Figure 2: Distribution of various taxes before and after EITI implementation
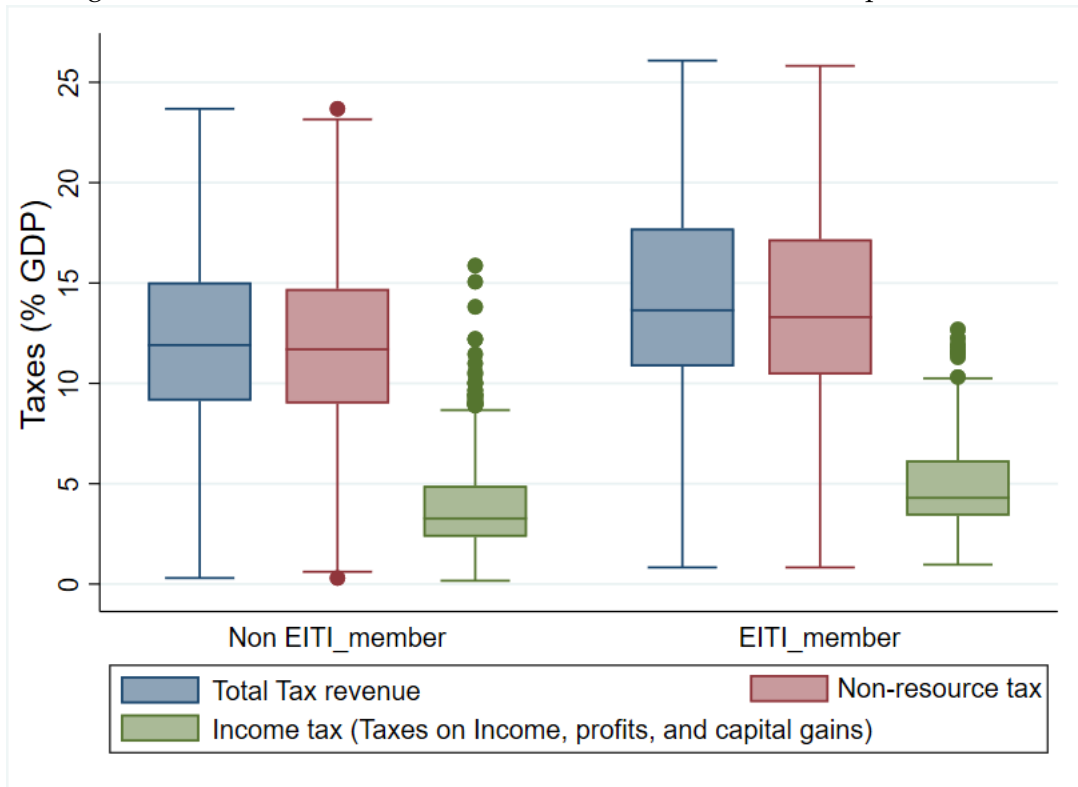
Figure 3: Distribution of total tax revenue of EITI countries over different time periods
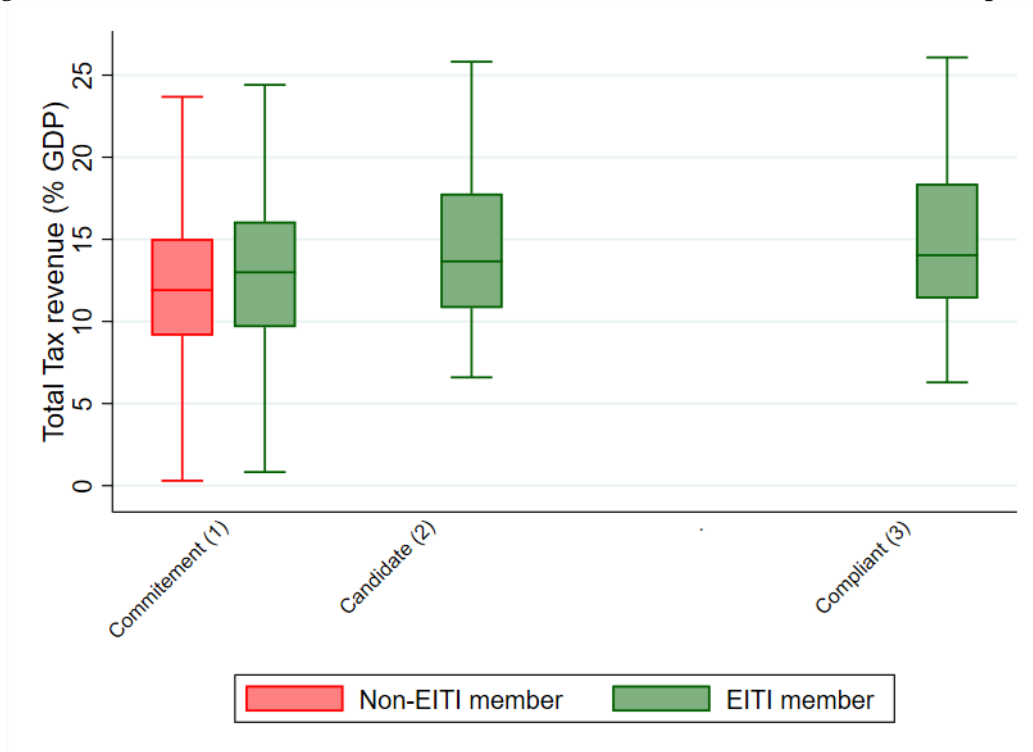
Figure 4: Extractive resources dependence and non-resource tax revenue
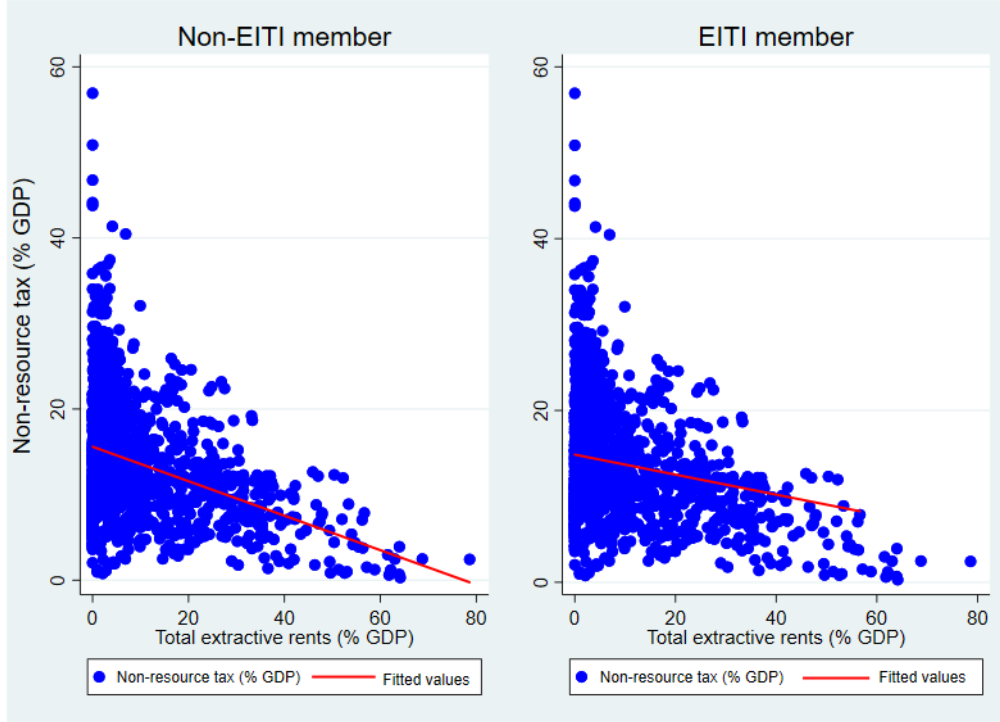
4 Empirical strategy

Our objective is to evaluate the treatment effect of EITI implementation on tax revenue mobilization, and considering the selection bias. The treatment is the EITI implementation for a given country over a given period. We refer to EITI countries as the treated group, and non-EITI countries as the control group. The equation of the estimated average treatment effect on the treated (ATT) is expressed as follows:

$$ATT = E[(Y_{it}^1 - Y_{it}^0)|EITI_{it} = 1] = E[Y_{it}^1|EITI_{it} = 1] - E[Y_{it}^0|EITI_{it} = 1] \quad (1)$$

where *EITI* is the dummy (independent variable) corresponding to the *EITI* implementation and *Y* is the domestic tax revenue. $Y_{it}^0|EITI_{it} = 1$ is the value of tax revenue mobilization at time t that would have been observed if an EITI country i had not implemented the EITI and $Y_{it}^1|EITI_{it} = 1$ the outcome value actually observed in the same country. Equation (5) tells us that a simple comparison between the value of tax revenue mobilization observed in the treatment group and the value of tax revenue mobilization observed for the same countries if they had not implemented the EITI would give an unbiased estimate of ATT. However, the main difficulty in estimating the ATT is that the second term on the right-hand side $(E[Y_{it}^0|EITI_{it} = 1])$ is not observable. We cannot observe the value of domestic tax revenue of an EITI country if it had not implemented the EITI standard. We face an identification problem, as is often the case with experimental studies. A commonly used approach to adress this difficulty is to compare the sample mean of the treatment group (EITI-counties) with that of the control group (non-EITI countries) if and only if a country's implementing choice is random. This method would generate biased estimates if the EITI implementation decision is not random. However, the EITI implementation may be non-random, as choices to join or no may be correlated to a set of observables that also affects tax revenue mobilization. Then we will have the "selection on observables" problem, which makes traditional linear regression an unreliable method (for detailed discussions, see Dehejia and Wahba, 2002; Heckman et al., 1998). As Lin and Ye (2007) we use various propensity score matching methods recently developed in

the treatment literature to address the selection problem on observables[4].

4.1 Matching on propensity scores

The PSM method consists of comparing EITI and non-EITI countries having similar observed characteristics so that the difference in tax revenue values between the two groups of countries can be attributed as the effect of treatment. In other words, to be able to determine treatment effects, it is essential that before the experimental treatment is implemented that the two groups (EITI and non-EITI countries) are as comparable as possible. The key assumption needed to apply the matching method is the "conditional independence" $(Y^0, Y^1 \perp EITI|X)$. It requires that conditionally to observables *(X)* unaffected by the treatment, the outcomes be independent of the *EITI implementation* dummy. This implies that all factors influencing treatment and outcome must be considered by the researcher (Caliendo and Kopeinig, 2008). Under this assumption, equation (1) can be rewritten as follows:

$$ATT = E[Y_{it}^1|EITI_{it} = 1, X_{it}] - E[Y_{it}^0|EITI_{it} = 0, X_{it}] \qquad (2)$$

where we have replaced $E[Y_{it}^0|EITI_{it} = 1, X_{it}]$ with $E[Y_{it}^0|EITI_{it} = 0, X_{it}]$, which is observable. The PSM method would consist of matching processed units to control units with similar values of X. As the number of covariates in *X* increases, matching on *X* will be difficult to implement in practice. To overcome this large problem, we follow Rosenbaum and Rubin (1983) which propose one can match the treated units and control units on their propensity scores. The Propensity Score (PS) is the probability of implementing the EITI standard, conditional on the observable covariates *(X)*, and can be estimated using simple probit or logit models.

$$p(X_{it}) = E[EITI_{it}|X_{it}] = Pr(EITI_{it} = 1|X_{it}) \qquad (3)$$

A further assumption needed to apply propensity score matching is the "common support" $p(X_{it}) < 1$, i.e. the existence of some comparable control units for each treated unit. Using PSM, the estimated ATT now can be as:

$$ATT = E[Y_{it}^1|EITI_{it} = 1, p(X_{it})] - E[Y_{it}^0|EITI_{it} = 0, p(X_{it})] \qquad (4)$$

A variety of commonly used PSM methods are considered here (see Section 5.3).

4.2 Expected effects of independent variables

Lujala (2018) argues that it is crucial to examine what factors influence a country's decision to join and implement the Standard, to understand whether and how adherence tothe EITI Standard can affect resource governance and development. We estimate the PS by using a probit model with the binary variable *EITI* as the dependent variable. The aim is to measure the impact of the control variables on the probability of implementing the EITI standard. Based on existing literature our basic selection equation consists of three categories of structural factors that can influence both EITI implementation and tax revenue mobilization: internal motivation, internal capacity, and external pressure, such as development agencies and organizations (see Lujala, 2018).

Internal motivation: we assume that countries with a relatively higher level of dependence on the extractive sector are more likely than countries with a lower dependence rate to implement the EITI in order to prevent the curse and attract more FDI. The World Bank justifies the EITI's creation with the "paradox of abundance". We expect that *Extractive rents* (similarly for coal rents and forest

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[4]The selectivity problem here is neither omitted variables nor a Heckman-type sample selection problem

rents) will positively affect the likelihood of implementing the EITI, as indicated in the literature (see Pitlik et al., 2010; Öge, 2016; Kasekende et al., 2016; David-Barrett and Okamura, 2016; Lujala, 2018). All of these studies also find that poor countries are likely to implement the EITI Standard faster than richer countries. In addition to the objective of benefiting more from the EITI, these countries may face external pressures for the reason of receiving international assistance. Using per capita income and its square term Lujala (2018) provide evidence that there is a curvilinear. This shows that compared to others, poorer and richer countries are more likely to implement the EITI Standard. In our specific case which consists only developing countries, we expect a positive impact of *GDP per capita* on the likelihood of the EITI implementation. This is also valid for the *Human Development Index (HDI)*. In the majority of developing countries, industrial exploitation of natural resources is generally carried out by multinational companies (Manyika et al., 2013). The governments of these countries, not being equipped with adequate technology for resource exploitation, must have the incentives to attract foreign direct investment (FDI). Following the evidence of David-Barrett and Okamura (2016) and Lujala (2018) we assume that a higher level of *FDI flows* is positively associated with the likelihood of becoming an EITI member. For illustration purposes, the EITI members receive even more FDI after becoming members (Öge, 2016).

Internal capacity: Most resource-rich countries are still in a primary insertion into international trade. The World Bank calls on these countries to comply with EITI standards in order to attract FDI in the extractive sector to increase their exports. We therefore expect a negative relationship between the high level of past *Trade openness* and the likelihood of EITI implementation. Pitlik et al. (2010) don't find a significant effect. Although the industry remains embryonic in most developing countries, but it is proving to be an important source of domestic revenue mobilization. It includes value added in mining, manufacturing, construction, electricity, water and gas. We make the assumption that countries with relatively high *Industrial value added* will be less interested in implementing the EITI standard. With regard to the quality of institutions, countries with a good performance in *Control of corruption, Government effectiveness* and enforcement of *Rules of laws* will be less interested in implementing the EITI compared to others. As illustration, Lujala (2018) finds that countries that are more corrupt than others are more likely to at least start the EITI process. The countries with both high corruption and high dependence on extractive rents are less likely to implement the EITI quickly (David-Barrett and Okamura, 2016) . Others studies suggest that the corruption in the EITI countries may decrease in the implementation period (Papyrakis et al., 2017; Villar and Papyrakis, 2017). However, Regulatory quality and Voice & Accountability which refer much more to respect for democracy could motivate countries to join EITI. Governments that respect civil rights may tend to adopt progressive norms, because the social society participating in the MSG can exert greater pressure for implementing the EITI standard (Lujala, 2018). In authoritarian regimes, NGOs will not have some freedom to voice their concerns in this process and act as whistleblowers (Öge, 2017).

External pressure: Dependence on development agencies and international organisations can influence a country's likelihood of joining the EITI (Lujala and Rustad, 2012; Sovacool and Andrews, 2015). We assume that countries which receive high levels of incoming development assistance are likely to implement the EITI Standard faster than others, as David-Barrett and Okamura (2016); Lujala (2018). These countries need some guarantee of transparency in order to continue to receive aid. The Natural Resources Governance Institute (NRGI) indicates that nowadays, resource-rich countries tend to turn away from multilateral loans at detriment of private sources of finance. We capture the effects of macroeconomic fluctuations through the *Inflation rate, Commodity prices, and Financial development index.*

We expect a negative relationship between the high level of past *Inflation rate, and Financial development index* and the likelihood of EITI implementation, and négative effect for *Commodity prices*.

5   Baseline results

The estimation process of the average treatment effect of EITI implementation on the tax revenue mobilization is done in two steps. The first consists of estimating the propensity scores with a binary outcome model (probit model in our case), while the second consists of matching treated (EITI countries) and untreated (Non-EITI countries) observations to estimate the average treatment effect on the treated (ATT).

5.1   The estimation of propensity scores

Table 1 and A1 reports the probit estimates of propensity scores on the full sample, which includes only developing resource-rich countries, based on starting dates of EITI implementation (respectively to the date of commitment, date of candidate, and date of compliance). Recall that EITI implementation is a binary variable. It takes the value 1 during the period that a given country implement EITI and 0 otherwise. Most of the coefficients are significant and have the expected signs for EITI commitement. Almost all explanatory variables are also significant for EITI candidate and EITI compliance (table A1). Total extractive rents, GDP per capita, commodity prices, AID, FDI, coal rents, forest rents, HDI, regulatory quality and voice and accountability are positively correlated with EITI implementation. However, financial development, industry value added, institutional composite index, control of corruption governement effectiveness and rule of law are negatively associated with the likelihood of EITI implementation. The overall significance of the regression is reasonable with a pseudo R2 of about 20%. After estimating the propensity score for the sample, it is important to ensure that for each EITI country there is at least one non-EITI country that has the same propensity score.

5.2   Validity tests of Propensity Score

First of all, we estimate the Area Under the Curve (AUC) from the probabilities predicted by the propensity score model. The objective is to investigate the relationship between the area under the Receiver Operating Characteristic curve (AUC) of the propensity model for exposure and the accuracy of the estimated effect of the exposure on the outcome of interest.

The AUC of the propensity score model for exposure provides a single, relatively easy to compute, and suitable for various kind of data statistic, which can be used as an important indicator of the accuracy of the estimated effect of exposure on the outcome of interest.

According to Heckman et al. (1999), the common support is an area of overlap of treated and untreated individuals on the set of propensity score values. It ensures that for each of the treated individuals, there is at least one individual in the control group with simulated observed characteristics (Bryson et al., 2002). The two main techniques for determining common support are: comparison of minima and maxima between the two groups of individuals (Dehejia and Wahba, 1999) and comparison of trimming distributions (Smith and Todd, 2005). The first is to retain all treated and untreated individuals, except those with no counterfactuals. The propensity score of the latter is lower than the minimum (respectively higher than the maximum) score of the individuals in the control group. A disadvantage of this method is that observations within the limits will be discarded even if they are close to the limits. We use the second method which consists in estimating the density of the distribution in the two groups (trimming). We exclude the untreated individuals for whom the proportion of potential counterfactuals is lower, i.e. the treated individuals who have a propensity score very close to the propensity score of

Table 1: Probit estimates of the propensity score

	EITI commitment status						EITI Candidate status					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Total extract. rents	0.045***	0.048***	0.045***	0.057***	0.047***	0.067***	0.045***	0.048***	0.043***	0.055***	0.047***	0.064***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)
LOG.GDP/CAPITA	0.045***	0.042***	0.050***	0.053***	0.045***	0.079***	0.049***	0.048***	0.053***	0.056***	0.049***	0.080***
	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)	(0.018)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.019)
Financial Dev.	-2.499***	-2.764***	-2.454***	-3.530***	-2.649***	-4.147***	-2.608***	-2.929***	-2.405***	-3.512***	-2.764***	-4.112***
	(0.591)	(0.581)	(0.594)	(0.574)	(0.586)	(0.580)	(0.625)	(0.614)	(0.628)	(0.608)	(0.618)	(0.613)
Inflation	-0.015***	-0.015***	-0.013***	-0.012***	-0.015***	-0.011***	-0.026***	-0.026***	-0.025***	-0.023***	-0.026***	-0.023***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Commodity prices	0.048***	0.048***	0.046***	0.043***	0.049***	0.040***	0.056***	0.054***	0.054***	0.050***	0.056***	0.046***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)	(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.009)
Openess (Trade)	-0.002*	-0.003*	-0.003*	-0.003**	-0.002*	-0.004***	-0.004***	-0.005***	-0.004***	-0.005***	-0.004***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
LOG.AID	0.411***	0.400***	0.401***	0.381***	0.418***	0.411***	0.385***	0.375***	0.380***	0.361***	0.390***	0.386***
	(0.046)	(0.046)	(0.045)	(0.045)	(0.047)	(0.046)	(0.048)	(0.047)	(0.047)	(0.047)	(0.048)	(0.048)
FDI	0.025***	0.024***	0.025***	0.022***	0.025***	0.027***	0.031***	0.030***	0.032***	0.029***	0.032***	0.033***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Industry V.A	-0.026***	-0.026***	-0.026***	-0.030***	-0.027***	-0.035***	-0.024***	-0.024***	-0.023***	-0.027***	-0.024***	-0.031***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Coal rents	0.153**	0.146**	0.149**	0.142**	0.162***	0.087	0.137**	0.133**	0.133**	0.129**	0.144**	0.082
	(0.061)	(0.061)	(0.062)	(0.060)	(0.061)	(0.059)	(0.057)	(0.056)	(0.058)	(0.056)	(0.057)	(0.054)
Forest rents	0.053***	0.057***	0.051***	0.064***	0.052***	0.059***	0.042***	0.047***	0.039***	0.053***	0.042***	0.049***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
HDI	4.024***	3.897***	4.222***	3.820***	3.890***	4.053***	4.032***	3.907***	4.312***	3.846***	3.906***	4.057***
	(0.552)	(0.547)	(0.556)	(0.538)	(0.549)	(0.546)	(0.581)	(0.575)	(0.591)	(0.569)	(0.577)	(0.576)
Index Governance.(e)	-0.331***						-0.291***					
	(0.071)						(0.075)					
Cntrl of Corruption(e)		-0.428***						-0.304***				
		(0.111)						(0.116)				
Gov. Effectiveness(e)			-0.523***						-0.578***			
			(0.121)						(0.129)			
Regulatory Quality(e)				0.202**						0.166		
				(0.100)						(0.106)		
Rule of Law(e)					-0.492***						-0.410***	
					(0.108)						(0.114)	
Voice and Account.(e)						0.545***						0.504***
						(0.076)						(0.079)
Constant	-15.886***	-15.376***	-15.586***	-13.983***	-15.964***	-14.330***	-16.112***	-15.486***	-16.172***	-14.414***	-16.074***	-14.492***
	(1.447)	(1.418)	(1.422)	(1.364)	(1.458)	(1.378)	(1.559)	(1.525)	(1.549)	(1.486)	(1.564)	(1.493)
N.Obs.	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221
Pseudo R2	0.208	0.203	0.206	0.196	0.207	0.230	0.207	0.201	0.211	0.197	0.205	0.228

Standard errors in parentheses   * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variable: **EITI**=1 if a country is ITIE and 0 otherwise.

(e) = Estimate

Table 2: Test from Area Under the Curve (AUC) of the propensity score model

		ROC		-Asymptotic Normal-	
	Obs.	Area	Std. Err.	[95% Conf. Interval]	
EITI Commitement	1,254	0.7925	0.0137	0.76574	0.81929
EITI Candidate	1,254	0.7977	0.0142	0.76983	0.82566
EITI Compliance	1,254	0.7959	0.0199	0.75689	0.83482

the untreated individuals under consideration. The **figure 5** indicates the existence of common support between EITI implementing countries and non-EITI countries.

5.3   Results from matching

Following Lin and Ye (2007), we use four commonly used propensity score-matching methods to match each EITI country with non-EITI countries given the closeness of their propensity scores [5]. The

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[5]While matching EITI countries with non-EITI countries, we limit the analyses to "common support". This restriction allows us to exclude treated countries whose propensity score is above the maximum or below the minimum of non-treaties.

Figure 5: graphic representation of the common support between treated and controls countries
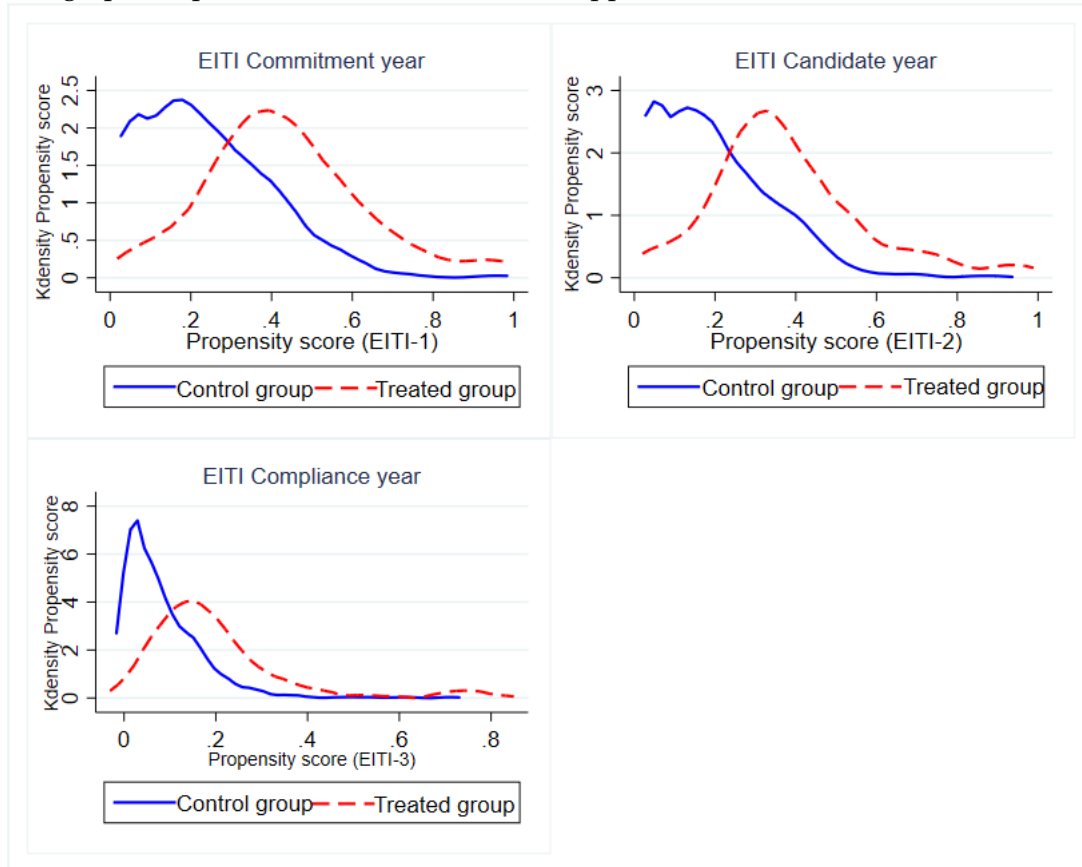
tables 3, 4 and 5 report the main results of matching and robustness check. This is the ATT (average Treaty Treatment Effect) on tax revenues. Recall that the treatment here consists of a country's implementing the EITI. The control group is the non-EITI countries.

The first three columns show the results of n-Nearest neighbors matching (n-NNM), with n = 1,2,3 (LaLonde, 1986). This technique is subject to the risk of inaccurate matching in the case where the nearest neighbor is numerically distant. The next three columns show the results of Radius matching (r-RM), which matches a treated unit to the control units with estimated propensity scores falling within a radius (or caliper) of length r (we consider a small radius r=0.005, a medium radius r=0.01 and a large radius r=0.05). In other words each EITI country is associated only with a non-EITI country whose propensity score falls within a predefined neighbourhood of the EITI country's propensity score (Dehejia and Wahba, 2002). This approach has an advantage because it uses only the number of matching units available within a predefined radius. A possible drawback is that it is difficult to know a priori the reasonable radius. We also consider Karnel matching (KM) where a treated unit (EITI country) is matched to a weighted average of all control units (non-EITI countries). All non-EITI countries are used but weighted by their propensity score closeness to EITI country. And, all control units contribute to the weights, so the variance is then reduced. The further the control unit is from the treated unit, the lower the weight (Dehejia and Wahba, 2002). Finally, we consider the regression-adjusted local linear matching (LLRM) in the last column. This method developed by (Heckman et al., 1998) is similar to kernel matching but includes a linear term in the weighting function instead of kernel. Each of these types of methods has advantages and disadvantages. A contrast between the simplest method (Nearest neighbors matching) and the most complex (Kernel matching) reflects the classic dilemma between

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This is a sine qua non condition to avoid structural confusion bias when estimating the effects of treatment with the propensity score. (Dehejia and Wahba, 1999; Lucotte, 2012)

bias and variance. In practice, it is recommended to test the sensitivity of the results according to the method used. We follow Dehejia and Wahba (2002) and compute standard errors by bootstrapping because matching estimator has no analytical variance.

Line 1 of table 3 indicates that the estimated ATTs remains positive and statistically significant for all the matching algorithms regarding the commitment to EITI. Likewise the status of candidate and compliance to EITI present satisfactory effects. This suggests that on average, EITI countries are more effective than non-EITI countries in tax revenue mobilization. There is a significant improvement in the estimated ATTs depending on the stage of EITI implementation *(Commitment, Candidate and Compliance)*. For the compliance analysis, we have only considered EITI countries that have not achieved compliance status in the Control group. So, compliance as a treatment variable in our case estimates the additional revenue that a country already implementing the EITI would receive if it became Compliant. The results suggest that compliant EITI countries improve tax revenue mobilization more than non-compliant EITI countries. The estimated ATT on tax revenues can achieve about 0.104 (1.11 percentage points)[6] in the case of commitment to implement the EITI standard, around 0.107 (1.113 percentage points) in the case of a country achieving candidate status and 0.110 (1.116 percentage points) for an EITI Compliant country, when we assume Karnel matching. Our results support the theoretical arguments presented in Section 2.3 and confirm stylized facts (Section 3.2) that the adoption of EITI implementation has encouraged the governments of developing countries to improve the collection of tax revenue. We also control for the sensitivity of some institutional transparency variables by adding an index calculated by the principal component analysis, then individually. There is a clear improvement in the estimated ATTs for all the institutional variables relating to commitment and EITI candidate status, but mixed for compliance status. This could be explained by the fact that almost all of the group of non-compliant EITI countries have made significant and satisfactory progress, and have therefore good institutions.

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[6]The values of total tax revenue is in logarithme., thus $e^{0.104} = 1.11$

Table 3: Matching estimates of treatment effect on the tax revenues

Treatment: EITI Commitment date (EITI1)				**Dependent variable: Log Total Tax_revenue (% GDP)**				
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.148**	0.0952*	0.0970*	0.0619*	0.0645*	0.106***	0.104***	0.0940**
	(0.0620)	(0.0560)	(0.0496)	(0.0341)	(0.0371)	(0.0351)	(0.0368)	(0.0425)
N	1311	1311	1311	1311	1311	1311	1311	1311
[2] Index Governance	0.119*	0.115**	0.102*	0.0559	0.0759**	0.141***	0.147***	0.154***
	(0.0639)	(0.0550)	(0.0552)	(0.0389)	(0.0383)	(0.0391)	(0.0380)	(0.0444)
[3] Corruption(e)	0.167***	0.146***	0.158***	0.102***	0.0858**	0.131***	0.135***	0.131***
	(0.0604)	(0.0529)	(0.0479)	(0.0376)	(0.0353)	(0.0361)	(0.0358)	(0.0425)
[4] Gov. Effectiveness(e)	0.142**	0.115*	0.121**	0.0770**	0.0844**	0.155***	0.166***	0.157***
	(0.0714)	(0.0608)	(0.0585)	(0.0386)	(0.0379)	(0.0437)	(0.0420)	(0.0519)
[5] Rule of Law(e)	0.135**	0.136**	0.135***	0.0922**	0.0915**	0.127***	0.126***	0.134***
	(0.0629)	(0.0578)	(0.0511)	(0.0385)	(0.0362)	(0.0365)	(0.0372)	(0.0439)
N	1111	1111	1111	1111	1111	1111	1111	1111

Treatment: EITI Candidate date (EITI2)				**Dependent variable: Log Total Tax_revenue (% GDP)**				
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.0762	0.0683	0.0723	0.0784**	0.100***	0.105***	0.107***	0.0975***
	(0.0624)	(0.0524)	(0.0511)	(0.0367)	(0.0387)	(0.0314)	(0.0335)	(0.0372)
N	1311	1311	1311	1311	1311	1311	1311	1311
[2] Index Governance	0.137**	0.120**	0.123**	0.103**	0.106***	0.140***	0.134***	0.128***
	(0.0633)	(0.0600)	(0.0510)	(0.0405)	(0.0399)	(0.0373)	(0.0388)	(0.0404)
[3] Corruption(e)	0.162***	0.127**	0.102**	0.0795**	0.0960***	0.105***	0.106***	0.108***
	(0.0569)	(0.0528)	(0.0495)	(0.0368)	(0.0365)	(0.0361)	(0.0344)	(0.0372)
[4] Gov. Effectiveness(e)	0.118	0.126*	0.178***	0.101**	0.114***	0.130***	0.134***	0.132***
	(0.0760)	(0.0664)	(0.0643)	(0.0393)	(0.0380)	(0.0414)	(0.0455)	(0.0481)
[5] Rule of Law(e)	0.0673	0.0704	0.0727	0.0688*	0.0751**	0.106***	0.109***	0.104***
	(0.0613)	(0.0538)	(0.0461)	(0.0376)	(0.0361)	(0.0359)	(0.0352)	(0.0361)
N	1111	1111	1111	1111	1111	1111	1111	1111

Treatment: EITI Compliance date (EITI3)				**Dependent variable: Log Total Tax_revenue (% GDP)**				
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.0691	0.0919	0.103*	0.0945**	0.121***	0.114***	0.110***	0.116***
	(0.0687)	(0.0617)	(0.0544)	(0.0437)	(0.0386)	(0.0359)	(0.0356)	(0.0372)
N	743	743	743	743	743	743	743	743
[2] Index Governance	0.0331	0.0822	0.0667	0.0883*	0.0809*	0.0940**	0.0943***	0.107***
	(0.0711)	(0.0667)	(0.0572)	(0.0475)	(0.0439)	(0.0398)	(0.0355)	(0.0381)
[3] Corruption(e)	0.0763	0.100	0.107**	0.122***	0.0906**	0.100***	0.0971***	0.107**
	(0.0693)	(0.0629)	(0.0508)	(0.0462)	(0.0430)	(0.0350)	(0.0369)	(0.0416)
[4] Gov. Effectiveness(e)	0.123*	0.107*	0.0909	0.0844*	0.113***	0.0850**	0.0846**	0.0980***
	(0.0712)	(0.0596)	(0.0572)	(0.0466)	(0.0418)	(0.0365)	(0.0379)	(0.0349)
[5] Rule of Law(e)	0.0918	0.0879	0.0872	0.112**	0.110***	0.0975**	0.0949**	0.105***
	(0.0735)	(0.0642)	(0.0589)	(0.0490)	(0.0404)	(0.0394)	(0.0406)	(0.0407)
N	624	624	624	624	624	624	624	624

Standard errors in parentheses   * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Bootstrap replications = 500

All the control variables estimating the propensity score are included beforehand, then we introduce the institutional variables one by one to test their influence. (e)= Estimate

5.4 Robustness checks

For more robustness of our empirical results, we check the sensitivity of two important components of tax revenues, namly non-resource tax (excluding social contributions) to GDP ratio and income tax (including Taxes on income, profits, and capital gains) to GDP ratio. The matching results based are respectively presented in Tables 4 and 5. We found that results remain robust to the combination of control variables. The estimated ATTs by adding for all the institutional variables relating to commitment and EITI candidate status have clearly improved. But the estimated ATTs are mixed for compliance status as well as on total tax revenues, only the control of corruption resulted in a significant increase in the estimated ATT on non-resource tax revenue. Also, the estimated ATTs on non-resource tax revenue are highly sensitive to control of institutional transparency for stages of EITI commitment and candidate. We therefore raise doubts about the positive effect of EITI on the mobilization of non-resource revenues of EITI countries compared to non-EITI countries. When we assume LLRM (Table 4 line [1]), the estimated ATT on non-resource tax revenue can achieve about 0.0819 (1.085 percentage points) in the case of commitment to implement the EITI standard, around 0.107 (1.113 percentage points) in the case of a country achieving candidate status and 0.154 (1.166 percentage points) for an EITI compliant country. This suggests that EITI implementation helps to mitigate the crowding out of non-resource revenues by resource revenues, thereby reducing resource dependence[7]. EITI therefore promotes complementary linkages between the extractive natural resources sector and other sectors in resource-rich economies.

Likewise, when we assume for example LLRM (Table 5 line [1]), the estimated ATT on icome tax revenue can achieve about 0.267 percentage points for EITI commitment status, around 0.258 percentage points for candidate status and 0.167 percentage points for an EITI compliant country.

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[7]The degree to which countries do—or do not—have access to alternative sources of income other than resource extraction, at some point in time (Brunnschweiler and Bulte, 2008)

Table 4: Matching estimates of treatment effect on the Non_resource_tax_revenues

Treatment: EITI Commitment date (EITI1)	**Dep. var.: Log Non_resource_tax_revenues (% GDP)**							
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.0125	0.0214	0.0345	0.0383	0.0373	0.0961**	0.0907**	0.0819*
	(0.0655)	(0.0642)	(0.0576)	(0.0428)	(0.0420)	(0.0413)	(0.0428)	(0.0446)
N	1263	1263	1263	1263	1263	1263	1263	1263
[2] Index Governance	0.222***	0.192***	0.191***	0.131***	0.131***	0.203***	0.203***	0.200***
	(0.0687)	(0.0650)	(0.0533)	(0.0431)	(0.0419)	(0.0402)	(0.0407)	(0.0468)
[3] Corruption(e)	0.197***	0.172***	0.165***	0.117***	0.131***	0.166***	0.168***	0.166***
	(0.0619)	(0.0542)	(0.0529)	(0.0410)	(0.0372)	(0.0372)	(0.0368)	(0.0403)
[4] Gov. Effectiveness(e)	0.121	0.131**	0.157**	0.0853**	0.121***	0.174***	0.178***	0.187***
	(0.0738)	(0.0627)	(0.0625)	(0.0432)	(0.0455)	(0.0429)	(0.0455)	(0.0498)
[5] Rule of Law(e)	0.169**	0.169***	0.165***	0.108**	0.124***	0.185***	0.187***	0.179***
	(0.0686)	(0.0627)	(0.0568)	(0.0429)	(0.0402)	(0.0418)	(0.0408)	(0.0483)
N	1069	1069	1069	1069	1069	1069	1069	1069

Treatment: EITI Candidate date (EITI2)	**Dep. var.: Log Non_resource_tax_revenues (% GDP)**							
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.109	0.104*	0.113**	0.0757*	0.0820*	0.108***	0.107***	0.107***
	(0.0681)	(0.0599)	(0.0560)	(0.0438)	(0.0423)	(0.0359)	(0.0402)	(0.0388)
N	1263	1263	1263	1263	1263	1263	1263	1263
[2] Index Governance	0.147*	0.115*	0.127**	0.0947**	0.123***	0.182***	0.185***	0.196***
	(0.0756)	(0.0649)	(0.0625)	(0.0467)	(0.0470)	(0.0415)	(0.0439)	(0.0430)
[3] Corruption(e)	0.126**	0.129**	0.145***	0.101**	0.114***	0.160***	0.160***	0.166***
	(0.0597)	(0.0557)	(0.0535)	(0.0413)	(0.0388)	(0.0368)	(0.0358)	(0.0368)
[4] Gov. Effectiveness(e)	0.176**	0.170**	0.148**	0.125***	0.151***	0.193***	0.190***	0.202***
	(0.0861)	(0.0717)	(0.0675)	(0.0481)	(0.0488)	(0.0469)	(0.0500)	(0.0518)
[5] Rule of Law(e)	0.178**	0.132**	0.158***	0.125***	0.150***	0.179***	0.173***	0.169***
	(0.0726)	(0.0619)	(0.0591)	(0.0477)	(0.0431)	(0.0422)	(0.0412)	(0.0451)
N	1069	1069	1069	1069	1069	1069	1069	1069

Treatment: EITI Compliance date (EITI3)	**Dep. var.: Log Non_resource_tax_revenues (% GDP)**							
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.175*	0.165**	0.144*	0.151***	0.156***	0.138***	0.134***	0.154***
	(0.0903)	(0.0779)	(0.0741)	(0.0554)	(0.0548)	(0.0478)	(0.0464)	(0.0497)
N	664	664	664	664	664	664	664	664
[2] Index Governance	0.130	0.146*	0.141*	0.101*	0.100*	0.155***	0.155***	0.162***
	(0.0938)	(0.0880)	(0.0773)	(0.0607)	(0.0577)	(0.0449)	(0.0477)	(0.0478)
[3] Corruption(e)	0.197**	0.158**	0.183**	0.186***	0.150***	0.136***	0.139***	0.156***
	(0.0891)	(0.0799)	(0.0775)	(0.0569)	(0.0528)	(0.0439)	(0.0449)	(0.0466)
[4] Gov. Effectiveness(e)	0.0800	0.151*	0.131*	0.123*	0.124**	0.159***	0.157***	0.162***
	(0.0951)	(0.0840)	(0.0758)	(0.0639)	(0.0545)	(0.0458)	(0.0443)	(0.0501)
[5] Rule of Law(e)	0.190**	0.137*	0.123*	0.118**	0.140***	0.130***	0.133***	0.154***
	(0.0938)	(0.0748)	(0.0745)	(0.0547)	(0.0516)	(0.0444)	(0.0440)	(0.0509)
N	557	557	557	557	557	557	557	557

Standard errors in parentheses   * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Bootstrap replications = 500

All the control variables estimating the propensity score are included beforehand, then we introduce the institutional variables one by one to test their influence. (e)= Estimate

Table 5: Matching estimates of treatment effect on the icome tax revenu

Treatment: EITI Commitment date (EITI1)	Dep. var.: Taxes on income, profits, and capital gains (% GDP)
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.321***	0.286***	0.296***	0.122**	0.141**	0.242***	0.260***	0.267***
	(0.0996)	(0.0888)	(0.0822)	(0.0619)	(0.0651)	(0.0651)	(0.0687)	(0.0723)
N	1096	1096	1096	1096	1096	1096	1096	1096
[2] Index Governance	0.447***	0.393***	0.345***	0.220***	0.256***	0.291***	0.293***	0.366***
	(0.108)	(0.100)	(0.0881)	(0.0624)	(0.0597)	(0.0692)	(0.0700)	(0.0836)
[3] Corruption(e)	0.373***	0.375***	0.368***	0.229***	0.230***	0.275***	0.278***	0.319***
	(0.104)	(0.0906)	(0.0819)	(0.0632)	(0.0593)	(0.0631)	(0.0631)	(0.0765)
[4] Gov. Effectiveness(e)	0.227*	0.295***	0.304***	0.141**	0.182***	0.324***	0.329***	0.393***
	(0.117)	(0.103)	(0.0969)	(0.0615)	(0.0619)	(0.0733)	(0.0799)	(0.0908)
[5] Rule of Law(e)	0.360***	0.303***	0.263***	0.170***	0.174***	0.248***	0.243***	0.310***
	(0.0965)	(0.0882)	(0.0850)	(0.0592)	(0.0570)	(0.0610)	(0.0639)	(0.0744)
N	910	910	910	910	910	910	910	910

Treatment: EITI Candidate date (EITI2)	Dep. var.: Taxes on income, profits, and capital gains (% GDP)
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.234**	0.243**	0.229**	0.170**	0.167**	0.183***	0.189***	0.258***
	(0.104)	(0.0992)	(0.0906)	(0.0680)	(0.0706)	(0.0642)	(0.0664)	(0.0759)
N	1096	1096	1096	1096	1096	1096	1096	1096
[2] Index Governance	0.262**	0.252**	0.250***	0.140**	0.168***	0.246***	0.248***	0.240***
	(0.107)	(0.100)	(0.0890)	(0.0668)	(0.0649)	(0.0703)	(0.0648)	(0.0730)
[3] Corruption(e)	0.252**	0.198**	0.188**	0.0642	0.122*	0.223***	0.224***	0.220***
	(0.108)	(0.0983)	(0.0910)	(0.0658)	(0.0637)	(0.0646)	(0.0664)	(0.0739)
[4] Gov. Effectiveness(e)	0.225*	0.232**	0.230**	0.171**	0.200***	0.308***	0.305***	0.284***
	(0.120)	(0.107)	(0.0899)	(0.0692)	(0.0633)	(0.0764)	(0.0828)	(0.0871)
[5] Rule of Law(e)	0.258**	0.241***	0.219**	0.0721	0.112*	0.228***	0.227***	0.226***
	(0.105)	(0.0890)	(0.0894)	(0.0672)	(0.0643)	(0.0670)	(0.0651)	(0.0715)
N	910	910	910	910	910	910	910	910

Treatment: EITI Compliance date (EITI3)	Dep. var.: Taxes on income, profits, and capital gains (% GDP)
	NNM	NNM	NNM	RM	RM	RM	KM	LLRM
	n=1	n=2	n=3	r=0.005	r=0.01	r=0.05		
[1] ATT	0.211*	0.186*	0.169*	0.234***	0.196***	0.173***	0.171***	0.167***
	(0.113)	(0.100)	(0.0909)	(0.0805)	(0.0700)	(0.0601)	(0.0570)	(0.0548)
N	596	596	596	596	596	596	596	596
[2] Index Governance	0.0673	0.165*	0.187**	0.210***	0.178**	0.132**	0.132*	0.134**
	(0.112)	(0.0963)	(0.0916)	(0.0800)	(0.0731)	(0.0598)	(0.0690)	(0.0620)
[3] Corruption(e)	0.0958	0.0667	0.0845	0.149*	0.111	0.129**	0.124**	0.136**
	(0.110)	(0.0993)	(0.0899)	(0.0785)	(0.0753)	(0.0611)	(0.0609)	(0.0612)
[4] Gov. Effectiveness(e)	0.115	0.152	0.157*	0.169**	0.148*	0.144**	0.141**	0.141**
	(0.117)	(0.106)	(0.0912)	(0.0777)	(0.0756)	(0.0575)	(0.0630)	(0.0593)
[5] Rule of Law(0-100)	0.277**	0.200*	0.207**	0.203**	0.168**	0.133**	0.135**	0.138**
	(0.110)	(0.103)	(0.0907)	(0.0826)	(0.0749)	(0.0630)	(0.0640)	(0.0574)
N	487	487	487	487	487	487	487	487

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Bootstrap replications = 500

All the control variables estimating the propensity score are included beforehand, then we introduce the institutional variables one by one to test their influence. (e)= Estimate

6 Exploring the heterogeneity in the treatment effects

Developing countries share many common characteristics, but structural factors such as economic and institutional contexts (Easterly, 2002) can magnify or mitigate the impact of EITI implementation on the tax revenues. We have shown through Propensity Scoring Matching that EITI Compliant countries perform better on tax revenues than non-compliant countries. In addition to that, we examine whether the length of time that has elapsed since a country joined the EITI primarily affects tax revenues. Next, we test influence of economic indicators in the ATT. Finally, we examine the impact of others institutional transparency indicators in the ATT. To assess the presence of potential sources heterogeneity in the ATT related to structural factors, we use a control function regression approach, following to Lin and Ye (2009) and Guerguil et al. (2017). The following OLS specification respecting the common support from matching, allows exploring non-linearity in the ATT:

$$TAX\_REV_{it} = \alpha + \beta EITI_{it} + \gamma Pscore_{it} + \phi X_{it} + \theta(EITI_{it} * X_{it}) + \mu_i + v_t + \varepsilon_{it} \qquad (5)$$

TAX_REV_{it} refers to the tax revenues (or alternatively the tax structure); $EITI_{it}$ to the EITI dummy variable; $Pscore_{it}$ which stands for the estimated Propensity Score through the probit model is included to correct for self-selection. The X_{it} vector includes the set of macroeconomic and institutional factors that could give rise to heterogeneity in the ATT; θ coefficient of the interactive term (between $EITI_{it}$ and X_{it}) characterizes the heterogeneity features of the treatment effect of EITI. μ_{it} and v_{it} refer to country fixed effects and time effects, respectively, while ε_{it} refers to stochastic disturbance term.

Tables A2, A3 and A4 below report the results of total tax revenue using EITI (commitement, Candidate and Compliant, respectively) as the treament variable. Column (2) shows the results of a simple OLS linking EITI implementation and total tax revenue while accounting for the previously estimated $pscore_{it}$. The estimated β coefficient (including country fixed and random effects) is the average difference in tax revenues between countries having implemented ITIE standard and those that have not. This coefficient is positive and significantly different from zero. The magnitudes are close to the ATTs from the matching algorithms in Table 3 above (0.096 for Commitment, 0.088 for Candidate, and 0.057 for Compliant). This shows that tax revenue growth is stronger in EITI countries than in other resource-dependent countries. The time elapsed since EITI Commitment or Candidate (column 3) has a positive and significantly different effect from zero on tax revenues. We can confirm that the time elapsed since EITI Commitment and Candidate contribute to the heterogeneity of ATT between EITI countries. The following columns show the heterogeneity of treatment effect related to a given structural factor.

In EITI Candidate countries for example, the time elapsed since the country's application date, total rents, GDP per capita, financial development, trade openness, ODA, FDI, coal rents, forest rents, HDI, industrial value added, governance quality index, influence positively or negatively and significantly the effect of the ATT, depending on the type of tax. Our findings suggest that developing countries could improve their tax revenues by applying EITI standard rigorously, and certainly strengthening the quality of governance.

7 Conclusion

The objective of this study was to assess the impact of EITI on the tax revenue mobilization from a panel of 83 developing countries over the period 1995-2017. The intuition was that EITI implementation would boost the quality of governance in resource-rich countries, and thus improve tax revenue mobilization. Our empirical strategy focuses on the propensity score matching method and the control function approach. We highlight a variety of matching methods, which allows us to control the self-selection of the choice to implement EITI. We find that the ATT is positive and is robust to various matching methods. In other words, there is a significant difference between EITI countries compared to non-EITI countries in terms of tax revenue mobilization. All else being equal, EITI membership improves the tax revenues by around 1.11 to 1.12 percentage points for a given country. The magnitude are more important if we account governance quality. Results are robust to non-resource and income tax revenues. In other words, EITI countries are more effective than non-EITI countries in mobilizing domestic revenues. Regarding heterogeneity in EITI Compliant countries, the time elapsed since the country's application date, trade openness, FDI, forest rents have a positive and significant influence on the ATT effect of total tax revenue. While financial development, HDI, governance quality index have a negative and significant influence on the ATT effect. Heterogeneity factors are more or less important depending on the stage of EITI implementation and the type of tax revenue. The stylized facts show that membership in the EITI mitigates the negative effects of dependence on extractive resources.

In terms of policy implications of this study, resource-rich countries could improve their tax revenue mobilization by implementing EITI in light of the requirements. Most importantly, the implementation of EITI reduces dependence on resources, and in turn the "resource curse". Countries already implementing the EITI need to build good institutions. However, it is important to keep in mind that simply EITI implementation is not enough to guarantee transparency and better tax revenues. It must be accompanied by a series of other measures, such as compliance and responsible use of revenues. Another suggestion for resource-rich countries that goes beyond the scope of this study would be the need for closer monitoring of international tax treaties.

References

Al-Kasim, F., Søreide, T., and Williams, A. (2013). Corruption and reduced oil production: An additional resource curse factor? *Energy Policy*, 54:137 – 147. Decades of Diesel.

Alexeev, M. and Conrad, R. (2011). The natural resource curse and economic transition. *Economic Systems*, 35(4):445–461.

Amiri, H., Samadian, F., Yahoo, M., and Jamali, S. J. (2019). Natural resource abundance, institutional quality and manufacturing development: Evidence from resource-rich countries. *Resources Policy*, 62:550–560.

Anwar, R. and Kannan, S. P. (2012). Implementing eiti for impact: A handbook for policy makers and stakeholders. *World Bank Publications*, (73831):1–190.

Arezki, R. and Brückner, M. (2011). Oil rents, corruption, and state stability: Evidence from panel data regressions. *European Economic Review*, 55(7):955 – 963.

Auty, R. M. (1994). Industrial policy reform in six large newly industrializing countries: The resource curse thesis. *World development*, 22(1):11–26.

Berman, N., Couttenier, M., Rohner, D., and Thoenig, M. (2017). This mine is mine! how minerals fuel conflicts in africa. *American Economic Review*, 107(6):1564–1610.

Bhattacharyya, S. and Hodler, R. (2010). Natural resources, democracy and corruption. *European Economic Review*, 54(4):608–621.

Bird, R. M., Martinez-Vazquez, J., Torgler, B., et al. (2014). Societal institutions and tax effort in developing countries. *Annals of Economics and Finance*, 15(1):185–230.

Boadway, R. and Keen, M. (2010). Theoretical perspectives on resource tax design. *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*, 24:13.

Bornhorst, F., Gupta, S., and Thornton, J. (2009). Natural resource endowments and the domestic revenue effort. *European Journal of Political Economy*, 25(4):439–446.

Botlhole, T., Asafu-Adjaye, J., and Carmignani, F. (2012). Natural resource abundance, institutions and tax revenue mobilisation in sub-sahara africa. *South African Journal of Economics*, 80(2):135–156.

Brunnschweiler, C. N. (2008). Cursing the blessings? natural resource abundance, institutions, and economic growth. *World development*, 36(3):399–419.

Brunnschweiler, C. N. and Bulte, E. H. (2008). The resource curse revisited and revised: A tale of paradoxes and red herrings. *Journal of environmental economics and management*, 55(3):248–264.

Bryson, A., Dorsett, R., Purdon, S., et al. (2002). The use of propensity score matching in the evaluation of active labour market policies. Technical report, London School of Economics and Political Science, LSE Library.

Bulte, E. H., Damania, R., and Deacon, R. T. (2005). Resource intensity, institutions, and development. *World development*, 33(7):1029–1044.

Caliendo, M. and Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of economic surveys*, 22(1):31–72.

Charlet, A., Laporte, B., and Rota-Graziosi, G. (2013). La fiscalité minière en Afrique de l'Ouest et du Centre. *Revue de droit fiscal*, 48:11–33.

Chohan, U. W. (2016). The panama papers and tax morality. *Available at SSRN 2759418*.

Cockx, L. and Francken, N. (2014). Extending the concept of the resource curse: Natural resources and public spending on health. *Ecological Economics*, 108:136–149.

Collier, P. (2003). Natural resources, development and conflict: Channels of causation and policy interventions. *World Bank*, 28.

Collier, P. and Hoeffler, A. (2005). Resource rents, governance, and conflict. *Journal of conflict resolution*, 49(4):625–633.

Corden, W. M. and Neary, J. P. (1982). Booming Sector and De-Industrialisation in a Small Open Economy. *The Economic Journal*, 92(368):825–848.

Corrigan, C. C. (2014). Breaking the resource curse: Transparency in the natural resource sector and the extractive industries transparency initiative. *Resources Policy*, 40:17–30.

Corrigan, C. C. (2017). The effects of increased revenue transparency in the extractives sector: The case of the extractive industries transparency initiative. *The Extractive Industries and Society*, 4(4):779–787.

Crivelli, E. and Gupta, S. (2014). Resource blessing, revenue curse? domestic revenue effort in resource-rich countries. *European Journal of Political Economy*, 35:88–101.

Daniel, P. and Goldsworthy, B. (2010). 7 evaluating fiscal regimes for resource projects: an example from oil development. In *The Taxation of Petroleum and Minerals*, pages 203–256. Routledge.

Daniel, P., Gupta, S., Mattina, T., and Segura-Ubiergo, A. (2013). Extracting resource revenue. *Finance & Development*, 50(3):19–22.

David-Barrett, E. and Okamura, K. (2016). Norm diffusion and reputation: the rise of the extractive industries transparency initiative. *Governance*, 29(2):227–246.

David-Barrett, L. and Okamura, K. (2013). The transparency paradox: Why do corrupt countries join eiti? european research centre for anti-corruption and state-building working paper no. 38.

de Medeiros Costa, H. K. and dos Santos, E. M. (2013). Institutional analysis and the "resource curse" in developing countries. *Energy Policy*, 63:788–795.

Dehejia, R. H. and Wahba, S. (1999). Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs. *Journal of the American statistical Association*, 94(448):1053–1062.

Dehejia, R. H. and Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and statistics*, 84(1):151–161.

Desai, D. and Jarvis, M. (2012). Governance and accountability in extractive industries: Theory and practice at the world bank. *Journal of Energy & Natural Resources Law*, 30(2):101–128.

Duru, O. (2011). The futility of the extractive industry transparency initiative.

Easterly, W. (2002). The cartel of good intentions: the problem of bureaucracy in foreign aid. *The Journal of Policy Reform*, 5(4):223–250.

EITI (2016). The eiti standard. the eiti international secretariat.

EITI (2018). Eiti in africa: disclosing data — strengthening governance — fighting corruption.

Ejiogu, A., Ejiogu, C., and Ambituuni, A. (2019). The dark side of transparency: Does the nigeria extractive industries transparency initiative help or hinder accountability and corruption control? *The British Accounting Review*, 51(5):100811.

Eregha, P. B. and Mesagan, E. P. (2016). Oil resource abundance, institutions and growth: Evidence from oil producing african countries. *Journal of Policy Modeling*, 38(3):603–619.

Gillies, A. (2010). Reputational concerns and the emergence of oil sector transparency as an international norm. *International Studies Quarterly*, 54(1):103–126.

Grigorian, M. D. A. and Davoodi, M. H. R. (2007). *Tax potential vs. tax effort: a cross-country analysis of Armenia's stubbornly low tax collection*. Number 7-106. International Monetary Fund.

Gruss, B. and Kebhaj, S. (2019). *Commodity terms of trade: a new database*. International Monetary Fund.

Guerguil, M., Mandon, P., and Tapsoba, R. (2017). Flexible fiscal rules and countercyclical fiscal policy. *Journal of Macroeconomics*, 52:189–220.

Gylfason, T. (2001). Natural resources, education, and economic development. *European economic review*, 45(4-6):847–859.

Gylfason, T., Herbertsson, T. T., and Zoega, G. (1999). A mixed blessing: natural resources and economic growth. *Macroeconomic dynamics*, 3(2):204–225.

Gylfason, T. and Zoega, G. (2006). Natural resources and economic growth: The role of investment. *World Economy*, 29(8):1091–1115.

Haglund, D. (2011). *Blessing or curse?: the rise of mineral dependence among low-and middle-income countries*. Oxford Policy Management.

Halland, H., Lokanc, M., and Nair, A. (2015). *The extractive industries sector: essentials for economists, public finance professionals, and policy makers*. The World Bank.

Haufler, V. (2010). Disclosure as governance: The extractive industries transparency initiative and resource management in the developing world. *Global Environmental Politics*, 10(3):53–73.

Heckman, J. J., Ichimura, H., and Todd, P. (1998). Matching as an econometric evaluation estimator. *The review of economic studies*, 65(2):261–294.

Heckman, J. J., LaLonde, R. J., and Smith, J. A. (1999). The economics and econometrics of active labor market programs. In *Handbook of labor economics*, volume 3, pages 1865–2097. Elsevier.

Henisz, W. J. (2002). The institutional environment for infrastructure investment. *Industrial and corporate change*, 11(2):355–389.

Humphreys, M. (2005). Natural resources, conflict, and conflict resolution: Uncovering the mechanisms. *Journal of conflict resolution*, 49(4):508–537.

Kasekende, E., Abuka, C., and Sarr, M. (2016). Extractive industries and corruption: Investigating the effectiveness of eiti as a scrutiny mechanism. *Resources Policy*, 48:117–128.

Kaufmann, D., Kraay, A., and Mastruzzi, M. (2011). The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2):220–246.

Knack, S. (2009). Sovereign rents and quality of tax policy and administration. *Journal of Comparative Economics*, 37(3):359–371.

Knebelmann, J. (2017). Natural resources impact on government revenues. *UNU-WIDER*.

Knutsen, C. H., Kotsadam, A., Olsen, E. H., and Wig, T. (2017). Mining and local corruption in africa. *American Journal of Political Science*, 61(2):320–334.

Kolstad, I. (2009). The resource curse: Which institutions matter? *Applied Economics Letters*, 16(4):439–442.

Kolstad, I. and Wiig, A. (2009). Is transparency the key to reducing corruption in resource-rich countries? *World development*, 37(3):521–532.

LaLonde, R. J. (1986). Evaluating the econometric evaluations of training programs with experimental data. *The American economic review*, pages 604–620.

Laporte, B. and Rota-Graziosi, G. (2014). Principles and dilemmas in mining taxation. *Financing sustainable development by addressing vulnerabilities. FERDI, forthcoming*.

Leite, C. and Weidmann, J. (2002). Does mother nature corrupt? natural resources, corruption, and economic growth. *Governance, corruption, and economic performance*, pages 159–196.

Leuven, E. and Sianesi, B. (2018). Psmatch2: Stata module to perform full mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing.

Liebenthal, A., Michelitsch, R., and Tarazona, E. (2005). *Extractive Industries and Sustainable Development: An Evaluation of the World Bank Group's Experience*. The World Bank.

Lin, S. and Ye, H. (2007). Does inflation targeting really make a difference? evaluating the treatment effect of inflation targeting in seven industrial countries. *Journal of Monetary Economics*, 54(8):2521–2533.

Lin, S. and Ye, H. (2009). Does inflation targeting make a difference in developing countries? *Journal of Development economics*, 89(1):118–123.

Lucotte, Y. (2012). Adoption of inflation targeting and tax revenue performance in emerging market economies: An empirical investigation. *Economic Systems*, 36(4):609–628.

Lujala, P. (2018). An analysis of the extractive industry transparency initiative implementation process. *World Development*, 107:358–381.

Lujala, P., Gleditsch, N. P., and Gilmore, E. (2005). A diamond curse? civil war and a lootable resource. *Journal of Conflict Resolution*, 49(4):538–562.

Lujala, P. and Rustad, S. A. (2012). *High-value natural resources and post-conflict peacebuilding*. Routledge.

Magno, C. and Gatmaytan, D. (2017). Corruption and civic space: Contextual factors influencing eiti compliance. *The Extractive Industries and Society*, 4(4):806–815.

Manyika, J., Chui, M., Bughin, J., Dobbs, R., Bisson, P., and Marrs, A. (2013). Disruptive technologies: Advances that will transform life, business, and the global economy. 180.

Mavrotas, G., Murshed, S. M., and Torres, S. (2011). Natural resource dependence and economic performance in the 1970–2000 period. *Review of Development Economics*, 15(1):124–138.

Mawejje, J. (2019). Natural resources governance and tax revenue mobilization in sub saharan africa: The role of eiti. *Resources Policy*, 62:176–183.

McNabb, K. (2017). Toward closer cohesion of international tax statistics. *World Institute for Development Economic Research (UNU-WIDER). WIDER Working Paper*, (184):18.

Mohtadi, H., Ross, M., and Ruediger, S. (2016). Oil, taxation and transparency. Technical report, mimeo.

Ndikumana, L. and Abderrahim, K. (2010). Revenue mobilization in african countries: Does natural resource endowment matter? *African Development Review*, 22(3):351–365.

Ndikumana, L. and Boyce, J. K. (2003). Public debts and private assets: explaining capital flight from sub-saharan african countries. *World Development*, 31(1):107–130.

Norman, C. S. (2009). Rule of law and the resource curse: abundance versus intensity. *Environmental and Resource Economics*, 43(2):183.

Öge, K. (2016). To disclose or not to disclose: How global competition for foreign direct investment influences transparency reforms in extractive industries. *Energy Policy*, 98:133–141.

Öge, K. (2017). Transparent autocracies: The extractive industries transparency initiative (eiti) and civil society in authoritarian states. *The Extractive Industries and Society*, 4(4):816–824.

O'Neill, K., Balsiger, J., and VanDeveer, S. D. (2004). Actors, norms, and impact: Recent international cooperation theory and the influence of the agent-structure debate. *Annu. Rev. Polit. Sci.*, 7:149–175.

Ossowski, R. and Gonzáles, A. (2012). Manna from heaven: The impact of nonrenewable resource revenues on other revenues of resource exporters in latin america and the caribbean. Technical report, IDB Working Paper Series.

Ossowski, R. and Halland, H. (2019). Key aspects of fiscal management in resource-rich countries.

Papyrakis, E., Rieger, M., and Gilberthorpe, E. (2017). Corruption and the extractive industries transparency initiative. *The Journal of Development Studies*, 53(2):295–309.

Pitlik, H., Frank, B., and Firchow, M. (2010). The demand for transparency: An empirical note. *The Review of International Organizations*, 5(2):177–195.

Prichard, W., Cobham, A., and Goodall, A. (2014). The ictd government revenue dataset.

Robinson, J. A., Torvik, R., and Verdier, T. (2006). Political foundations of the resource curse. *Journal of development Economics*, 79(2):447–468.

Rosenbaum, P. R. and Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1):41–55.

Rostow, W. W. (1961). Guerrilla warfare in the underdeveloped areas. *Department of State Bulletin*, 45(1154):233–38.

Rota-Graziosi, G. (2019). The supermodularity of the tax competition game. *Journal of Mathematical Economics*, 83:25–35.

Rustad, S. A., Le Billon, P., and Lujala, P. (2017). Has the extractive industries transparency initiative been a success? identifying and evaluating eiti goals. *Resources Policy*, 51:151–162.

Sachs, J. D. and Warner, A. M. (1995). Natural resource abundance and economic growth. Technical report, National Bureau of Economic Research.

Sachs, J. D. and Warner, A. M. (2001). The curse of natural resources. *European economic review*, 45(4-6):827–838.

Saha, S. and Gounder, R. (2013). Corruption and economic development nexus: Variations across income levels in a non-linear framework. *Economic Modelling*, 31:70–79.

Simmons, B. A. (2001). The international politics of harmonization: The case of capital market regulation. *International Organization*, 55(3):589–620.

Smith, J. A. and Todd, P. E. (2005). Does matching overcome lalonde's critique of nonexperimental estimators? *Journal of econometrics*, 125(1-2):305–353.

Sovacool, B. K. and Andrews, N. (2015). Does transparency matter? evaluating the governance impacts of the extractive industries transparency initiative (eiti) in azerbaijan and liberia. *Resources Policy*, 45:183–192.

Sovacool, B. K., Walter, G., Van de Graaf, T., and 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.

Thomas, M. A. H. and Trevino, M. J. P. (2013). *Resource dependence and fiscal effort in Sub-Saharan Africa*. Number 13-188. International Monetary Fund.

Tornell, A. and Lane, P. R. (1999). The voracity effect. *American economic review*, 89(1):22–46.

Van der Ploeg, F. (2011). Natural resources: curse or blessing? *Journal of Economic Literature*, 49(2):366–420.

Venables, A. J. (2016). Using natural resources for development: why has it proven so difficult? *Journal of Economic Perspectives*, 30(1):161–84.

Villar, P. F. and Papyrakis, E. (2017). Evaluating the impact of the extractive industries transparency initiative (eiti) on corruption in zambia. *The Extractive Industries and Society*, 4(4):795–805.

Viner, J. (1952). America's aims and the progress of underdeveloped areas. *The Progress of Underdeveloped Areas, Chicago*, pages 195–6.

Walter, A. (2008). *Governing finance: East Asia's adoption of international standards*. Cornell University Press.

APPENDIX

Table A1: Probit estimates of the propensity score

EITI compliance status

	(1)	(2)	(3)	(4)	(5)	(6)
Total_extract rentS	0.038***	0.039***	0.037***	0.049***	0.040***	0.050***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
LOG.GDP/CAPITA	0.045**	0.043**	0.047**	0.056**	0.046**	0.077***
	(0.022)	(0.022)	(0.022)	(0.023)	(0.022)	(0.024)
FINANCIAL DEV.	-3.309***	-3.355***	-3.191***	-4.202***	-3.488***	-4.368***
	(0.838)	(0.827)	(0.844)	(0.842)	(0.828)	(0.826)
Inflation	-0.036***	-0.036***	-0.035***	-0.034***	-0.036***	-0.034***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Commodity prices	0.025**	0.025**	0.024**	0.021**	0.024**	0.015
	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)
OPENESS (Trade)	-0.002	-0.002	-0.002	-0.003	-0.002	-0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
LOG.AID	0.465***	0.466***	0.463***	0.464***	0.463***	0.472***
	(0.067)	(0.067)	(0.067)	(0.069)	(0.067)	(0.070)
FDI	0.003	0.003	0.003	0.001	0.003	0.004
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Industry_VA	-0.018***	-0.018**	-0.018**	-0.019***	-0.019***	-0.023***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Coal_rents	0.149***	0.148***	0.146***	0.141***	0.150***	0.107**
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.043)
Forest_rents	0.028*	0.030*	0.025	0.042**	0.029*	0.033*
	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)	(0.017)
HDI	3.543***	3.493***	3.676***	3.291***	3.488***	3.764***
	(0.745)	(0.743)	(0.756)	(0.743)	(0.741)	(0.752)
Index Governance	-0.129					
	(0.095)					
Control of Corruption(e)		-0.211				
		(0.148)				
Gov. Effectiveness(e)			-0.276*			
			(0.163)			
Regulatory Quality(e)				0.461***		
				(0.146)		
Rule of Law(e)					-0.096	
					(0.145)	
Voice and Account.(e)						0.521***
						(0.108)
Constant	-14.697***	-14.716***	-14.719***	-13.791***	-14.425***	-13.669***
	(1.957)	(1.959)	(1.943)	(1.901)	(1.942)	(1.928)
N.Obs	1221	1221	1221	1221	1221	1221
Pseudo R2	0.177	0.177	0.178	0.188	0.175	0.207

Standard errors in parentheses $* \ p < 0.10$, $** \ p < 0.05$, $*** \ p < 0.01$

Table A2: Heterogeneity of the treatment effects (EITI1) on outcome (Log Total tax_revenues (% GDP))

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
EITI1	0.151***	0.096***	0.058**	0.093***	0.182***	0.251***	0.206	0.064*	0.328	0.089***	0.084***	0.100***	0.017	0.269***	0.223***	0.024
	(0.021)	(0.020)	(0.024)	(0.022)	(0.068)	(0.035)	(0.370)	(0.037)	(0.307)	(0.021)	(0.021)	(0.020)	(0.023)	(0.069)	(0.043)	(0.023)
pscore		0.108**	0.086*	0.021	0.157***	0.081*	0.202***	0.100**	0.039	0.101**	0.060	0.083*	0.160***	0.067	0.092**	0.136***
		(0.046)	(0.047)	(0.048)	(0.045)	(0.047)	(0.053)	(0.045)	(0.051)	(0.044)	(0.049)	(0.048)	(0.047)	(0.047)	(0.045)	(0.047)
Time1				0.011***												
				(0.004)												
Total_Extract.rents				0.008***												
				(0.001)												
EITI1xTotal_Extract.rents				-0.002												
				(0.002)												
LOG.GDP/CAPITA					0.365***											
					(0.039)											
EITI1xLOG.GDP/CAPITA					-0.008											
					(0.006)											
FINANCIAL DEV.						0.424**										
						(0.188)										
EITI1xFINANCIAL DEV.						-0.837***										
						(0.157)										
Commodity prices							-0.005***									
							(0.001)									
EITI1xCommodity prices							-0.001									
							(0.004)									
OPENESS								0.002***								
								(0.000)								
EITI1xOPENESS								0.000								
								(0.000)								
LOG.AID									0.041***							
									(0.012)							
EITI1xLOG.AID									-0.011							
									(0.015)							
Inflation										-0.001***						
										(0.000)						
EITI1xInflation										-0.000						
										(0.001)						
FDI											0.001					
											(0.002)					
EITI1xFDI											0.002					
											(0.002)					
Coal_rents												0.028*				
												(0.017)				
EITI1xCoal_rents												-0.016				
												(0.016)				
Forest_rents													-0.030***			
													(0.003)			
EITI1xForest_rents													0.014***			
													(0.003)			
HDI														1.490***		
														(0.396)		
EITI1xHDI														-0.300**		
														(0.117)		
Industry_VA															0.010***	
															(0.001)	
EITI1xIndustry_VA															-0.005***	
															(0.001)	
Index Governance																0.114***
																(0.019)
EITI2xIndex Governance																-0.086***
																(0.016)
Constant	1.585***	3.256***	3.260***	3.017***	-0.584	3.220***	3.657***	3.037***	2.476***	3.299***	3.258***	3.263***	3.296***	2.630***	2.713***	3.505***
	(0.066)	(0.052)	(0.052)	(0.068)	(0.411)	(0.054)	(0.119)	(0.057)	(0.239)	(0.050)	(0.052)	(0.052)	(0.050)	(0.174)	(0.084)	(0.064)
N	1697	1111	1111	1111	1111	1111	1111	1111	1111	1110	1111	1111	1111	1111	1111	1111
F	78.671	75.627	75.002	77.039	81.333	76.291	75.051	80.734	74.855	82.265	74.708	74.275	81.453	75.813	79.310	79.449
Adjusted R-squared	0.826	0.861	0.861	0.866	0.872	0.864	0.862	0.871	0.862	0.873	0.862	0.861	0.872	0.864	0.869	0.869

Standard errors in parentheses

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

Table A3: Heterogeneity of the treatment effects (EITI2) on outcome (Tax_revenues (% GDP))

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
EITI2	0.134***	0.088***	0.055**	0.090***	0.120*	0.234***	0.036	0.015	0.467	0.081***	0.078***	0.092***	0.005	0.238***	0.148***	-0.105***
	(0.022)	(0.020)	(0.025)	(0.023)	(0.068)	(0.035)	(0.432)	(0.040)	(0.321)	(0.022)	(0.021)	(0.020)	(0.023)	(0.070)	(0.043)	(0.035)
_pscore		0.147***	0.134***	0.068	0.190***	0.129***	0.253***	0.155***	0.087	0.132***	0.089	0.123**	0.177***	0.111**	0.135***	0.173***
		(0.049)	(0.049)	(0.050)	(0.047)	(0.049)	(0.056)	(0.048)	(0.053)	(0.047)	(0.054)	(0.051)	(0.049)	(0.049)	(0.048)	(0.048)
Time2				0.010**												
				(0.005)												
Total_extract_rents				0.008***												
				(0.001)												
EITI2xTotal_extract_rents				-0.003**												
				(0.002)												
LOG.GDP/CAPITA					0.351***											
					(0.039)											
EITI2xLOG.GDP/CAPITA					-0.004											
					(0.006)											
FINANCIAL DEV.						0.384**										
						(0.186)										
EITI2xFINANCIAL DEV.						-0.813***										
						(0.162)										
Commodity prices							-0.006***									
							(0.001)									
EITI2xCommodity prices							0.000									
							(0.004)									
OPENESS								0.002***								
								(0.000)								
EITI2xOPENESS								0.001*								
								(0.000)								
LOG.AID									0.039***							
									(0.011)							
EITI2xLOG.AID									-0.018							
									(0.016)							
Inflation										-0.001***						
										(0.000)						
EITI2xInflation										0.000						
										(0.001)						
FDI											0.001					
											(0.001)					
EITI2xFDI											0.002					
											(0.002)					
Coal_rents												0.024				
												(0.016)				
EITI2xCoal_rents												-0.014				
												(0.015)				
Forest_rents													-0.026***			
													(0.003)			
EITI2xForest_rents													0.014***			
													(0.003)			
HDI														1.371***		
														(0.396)		
EITI2xHDI														-0.267**		
														(0.119)		
Industry_VA															0.009***	
															(0.001)	
EITI2xIndustry_VA															-0.003**	
															(0.001)	
Index Governance																0.118***
																(0.019)
EITI2xIndex Governance																-0.152***
																(0.024)
Constant	1.585***	3.256***	3.267***	3.017***	-0.584	3.220***	3.657***	3.037***	2.476***	3.299***	3.258***	3.263***	3.296***	2.630***	2.713***	3.505***
	(0.066)	(0.052)	(0.052)	(0.068)	(0.411)	(0.054)	(0.119)	(0.057)	(0.239)	(0.050)	(0.052)	(0.052)	(0.050)	(0.174)	(0.084)	(0.064)
N	1697	1111	1111	1111	1111	1111	1111	1111	1111	1110	1111	1111	1111	1111	1111	1111
F	78.671	75.627	75.475	77.039	81.333	76.291	75.051	80.734	74.855	82.265	74.708	74.275	81.453	75.813	79.310	79.449
Adjusted R-squared	0.826	0.861	0.862	0.866	0.872	0.864	0.862	0.871	0.862	0.873	0.862	0.861	0.872	0.864	0.869	0.869

Standard errors in parentheses

$^*\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A4: Heterogeneity of the treatment effects (EITI3) on outcome (Tax_revenues (% GDP))

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
EITI3	0.095***	0.057**	0.031	0.003	0.084	0.205***	-1.223	-0.191***	0.159	0.058**	0.006	0.057**	-0.073**	0.285***	0.005	-0.056
	(0.031)	(0.026)	(0.044)	(0.037)	(0.111)	(0.050)	(0.855)	(0.065)	(0.549)	(0.028)	(0.029)	(0.026)	(0.034)	(0.106)	(0.060)	(0.050)
pscore		0.441***	0.445***	0.287***	0.492***	0.453***	0.528***	0.411***	0.350***	0.386***	0.330***	0.446***	0.467***	0.395***	0.446***	0.493***
		(0.090)	(0.090)	(0.092)	(0.087)	(0.092)	(0.096)	(0.087)	(0.101)	(0.088)	(0.093)	(0.105)	(0.088)	(0.090)	(0.089)	(0.090)
Time3			0.008													
			(0.011)													
Total_extractrentGDP				0.006***												
				(0.001)												
EITI3xTotal_extractrentGDP				0.004												
				(0.003)												
LGDPCAPITA					0.353***											
					(0.039)											
EITI3xLGDPCAPITA					-0.004											
					(0.009)											
FD						0.305										
						(0.188)										
EITI3xFD						-0.933***										
						(0.268)										
xm_gdpf							-0.004***									
							(0.001)									
EITI3xxm_gdpf							0.013									
							(0.008)									
OPENESS_Trade								0.002***								
								(0.000)								
EITI3xOPENESS_Trade								0.003***								
								(0.001)								
LAID									0.023**							
									(0.011)							
EITI3xLAID									-0.005							
									(0.027)							
Inflation										-0.001***						
										(0.000)						
EITI3xInflation										-0.000						
										(0.002)						
FDI											0.002*					
											(0.001)					
EITI3xFDI											0.007***					
											(0.002)					
Coal_rents												-0.000				
												(0.011)				
EITI3xCoal_rents												-0.001				
												(0.010)				
Forest_rents													-0.027***			
													(0.003)			
EITI3xForest_rents													0.026***			
													(0.005)			
HDI														1.284***		
														(0.402)		
EITI3xHDI														-0.435**		
														(0.184)		
Industry_VA															0.008***	
															(0.001)	
EITI3xIndustry_VA															0.002	
															(0.002)	
Index Governance																0.109***
																(0.019)
EITI3xIndex Governance																-0.093**
																(0.036)
_cons	1.632***	3.226***	3.226***	3.043***	-0.483	3.196***	3.587***	3.017***	2.779***	3.272***	3.227***	3.226***	3.271***	2.684***	2.817***	3.458***
	(0.067)	(0.052)	(0.052)	(0.060)	(0.411)	(0.054)	(0.113)	(0.056)	(0.222)	(0.050)	(0.051)	(0.052)	(0.050)	(0.177)	(0.077)	(0.064)
N	1697	1111	1111	1111	1111	1111	1111	1111	1111	1110	1111	1111	1111	1111	1111	1111
F	76.162	75.392	74.551	76.755	80.538	74.696	74.945	80.933	74.001	81.799	75.212	73.644	81.264	74.972	78.191	76.901
Adjusted R-squared	0.822	0.860	0.860	0.865	0.871	0.862	0.862	0.871	0.861	0.873	0.863	0.860	0.872	0.862	0.867	0.865

Standard errors in parentheses

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

Table A5: Heterogeneity of the treatment effects (EITI1) on outcome (LOG.Non-Resource tax)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI1	0.104***	0.077***	0.027	0.062***	0.151**	0.227***	0.247	0.030	-0.208	0.074***	0.074***	0.079***	-0.004	0.263***	0.045	0.238***	0.274***	0.271***
	(0.023)	(0.021)	(0.025)	(0.023)	(0.072)	(0.037)	(0.348)	(0.038)	(0.311)	(0.021)	(0.022)	(0.021)	(0.023)	(0.074)	(0.044)	(0.037)	(0.035)	(0.036)
Pscore		-0.128***	-0.156***	-0.136***	-0.099**	-0.179***	0.037	-0.126***	-0.223***	-0.135***	-0.189***	-0.149***	-0.116***	-0.173***	-0.125***	-0.122***	-0.178***	-0.145***
		(0.047)	(0.047)	(0.050)	(0.046)	(0.048)	(0.054)	(0.045)	(0.051)	(0.044)	(0.048)	(0.047)	(0.048)	(0.048)	(0.047)	(0.047)	(0.048)	(0.046)
Time1			0.014***															
			(0.004)															
Total_extract_rents				-0.001														
				(0.001)														
EITI1xTotal_extract_rents				0.002														
				(0.002)														
LOGGDP/CAPITA					0.215***													
					(0.039)													
EITI1xLOGGDP/CAPITA					-0.007													
					(0.006)													
FINANCIAL DEV.						0.050												
						(0.185)												
EITI1xFINANCIAL DEV.						-0.798***												
						(0.161)												
Commodity prices_							-0.007***											
							(0.001)											
EITI1xCommodity prices_							-0.002											
							(0.003)											
OPENESS_								0.002***										
								(0.000)										
EITI1xOPENESS_								0.001										
								(0.000)										
LOG_AID									0.041***									
									(0.012)									
EITI1xLOG_AID									0.015									
									(0.016)									
Inflation										-0.001***								
										(0.000)								
EITI1xInflation										-0.001								
										(0.001)								
FDI											0.006***							
											(0.001)							
EITI1xFDI											-0.001							
											(0.002)							
Coal_rents												0.046***						
												(0.017)						
EITI1xCoal_rents												-0.010						
												(0.022)						
Forest_rents													-0.024***					
													(0.003)					
EITI1xForest_rents													0.016***					
													(0.003)					
HDI														1.501***				
														(0.391)				
EITI1xHDI														-0.315**				
														(0.123)				
Industry_VA															0.003**			
															(0.001)			
EITI1xIndustry_VA															0.001			
															(0.002)			
Control of Corruption (0-100)																0.004***		
																(0.001)		
EITI1xControl of Corruption (0-100)																-0.006***		
																(0.001)		
Gov. Effectiveness (0-100)																	0.003***	
																	(0.001)	
EITI1xGov. Effectiveness (0-100)																	-0.006***	
																	(0.001)	
Rule of Law (Estimate)																		0.003***
																		(0.001)
EITI1x Rule of Law (Estimate)																		-0.007***
																		(0.001)
_Constant	1.679***	1.727***	1.738***	1.745***	-0.542	1.726***	2.294***	1.529***	0.943***	1.773***	1.726***	1.736***	1.760***	1.097***	1.589***	1.702***	1.690***	1.706***
	(0.057)	(0.049)	(0.049)	(0.066)	(0.413)	(0.052)	(0.107)	(0.055)	(0.238)	(0.047)	(0.049)	(0.049)	(0.048)	(0.171)	(0.083)	(0.049)	(0.049)	(0.049)
N	1621	1069	1069	1069	1069	1069	1069	1069	1069	1068	1069	1069	1069	1069	1069	1069	1069	1069
F	81.016	100.217	100.431	98.109	101.364	100.692	101.899	105.749	99.909	112.926	101.899	98.782	105.976	100.574	98.819	102.641	104.013	103.093
Adjusted R-squared	0.834	0.894	0.895	0.894	0.897	0.897	0.898	0.901	0.896	0.907	0.898	0.895	0.901	0.897	0.895	0.898	0.900	0.899

Standard errors in parentheses

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

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A6: Heterogeneity of the treatment effects (EITI2) on outcome (LOG.Non-Resource tax)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI2	0.095***	0.079***	0.024	0.058**	0.095	0.245***	0.124	-0.036	0.075	0.075***	0.073***	0.080***	-0.007	0.298***	0.031	0.222***	0.256***	0.261***
	(0.024)	(0.021)	(0.027)	(0.024)	(0.073)	(0.037)	(0.409)	(0.042)	(0.328)	(0.022)	(0.022)	(0.021)	(0.024)	(0.074)	(0.043)	(0.036)	(0.035)	(0.036)
Pscore		-0.087*	-0.110**	-0.083	-0.059	-0.134***	0.100*	-0.075	-0.158***	-0.104**	-0.189***	-0.108**	-0.093*	-0.133***	-0.082*	-0.071	-0.116**	-0.094*
		(0.049)	(0.050)	(0.052)	(0.049)	(0.050)	(0.057)	(0.049)	(0.053)	(0.047)	(0.053)	(0.050)	(0.050)	(0.050)	(0.050)	(0.049)	(0.050)	(0.049)
Time2				0.016***														
				(0.005)														
Total_extract_rents				-0.001														
				(0.001)														
EITI2xTotal_extract_rents				0.003*														
				(0.002)														
LOGGDP/CAPITA					0.211***													
					(0.039)													
EITI2xLOGGDP/CAPITA					-0.002													
					(0.006)													
FINANCIAL DEV.						0.071												
						(0.183)												
EITI2xFINANCIAL DEV.						-0.909***												
						(0.167)												
Commodity prices_							-0.008***											
							(0.001)											
EITI2xCommodity prices_							-0.001											
							(0.004)											
OPENESS_								0.002***										
								(0.000)										
EITI2xOPENESS_								0.001***										
								(0.000)										
LOG_AID									0.039***									
									(0.011)									
EITI2xLOG_AID									0.001									
									(0.016)									
Inflation										-0.001***								
										(0.000)								
EITI2xInflation										-0.000								
										(0.002)								
FDI											0.006***							
											(0.001)							
EITI2xFDI											-0.001							
											(0.002)							
Coal_rents												0.040**						
												(0.016)						
EITI2xCoal_rents												0.001						
												(0.024)						
Forest_rents													-0.022***					
													(0.003)					
EITI2xForest_rents													0.017***					
													(0.003)					
HDI														1.385***				
														(0.390)				
EITI2xHDI														-0.381***				
														(0.124)				
Industry_VA															0.002*			
															(0.001)			
EITI2xIndustry_VA															0.002			
															(0.001)			
Control of Corruption (0-100)																0.004***		
																(0.001)		
EITI2xControl of Corruption (0-100)																-0.005***		
																(0.001)		
Gov. Effectiveness (0-100)																	0.003***	
																	(0.001)	
EITI2xGov. Effectiveness (0-100)																	-0.006***	
																	(0.001)	
Rule of Law (Estimate)																		0.003***
																		(0.001)
EITI2x Rule of Law (Estimate)																		-0.007***
																		(0.001)
_Constant	1.673***	1.719***	1.726***	1.764***	-0.509	1.713***	2.361***	1.528***	0.975***	1.766***	1.716***	1.726***	1.747***	1.135***	1.600***	1.692***	1.677***	1.694***
	(0.057)	(0.049)	(0.049)	(0.064)	(0.414)	(0.051)	(0.107)	(0.055)	(0.225)	(0.046)	(0.048)	(0.049)	(0.048)	(0.171)	(0.081)	(0.049)	(0.049)	(0.049)
N	1621	1069	1069	1069	1069	1069	1069	1069	1069	1068	1069	1069	1069	1069	1069	1069	1069	1069
F	80.669	100.020	100.015	98.073	100.931	101.019	102.708	105.371	99.111	112.679	101.709	98.468	105.528	100.438	98.563	102.053	103.236	102.649
Adjusted R-squared	0.834	0.894	0.895	0.894	0.897	0.897	0.899	0.901	0.895	0.907	0.898	0.895	0.901	0.896	0.895	0.898	0.899	0.898

Standard errors in parentheses

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

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A7: Heterogeneity of the treatment effects (EITI3) on outcome (LOG.Non-Resource tax)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI3	0.056	0.042	0.052	-0.032	-0.275*	0.201***	-0.083	-0.272***	0.059	0.052	-0.052	0.015	-0.108**	0.380***	0.033	0.186***	0.209***	0.249***
	(0.036)	(0.035)	(0.057)	(0.048)	(0.147)	(0.066)	(0.863)	(0.080)	(0.630)	(0.037)	(0.042)	(0.036)	(0.045)	(0.123)	(0.067)	(0.061)	(0.060)	(0.061)
Pscore		-0.037	-0.036	-0.130	-0.031	-0.096	0.279**	-0.047	-0.361***	-0.113	-0.049	-0.051	-0.110	-0.109	-0.094	-0.033	-0.045	-0.037
		(0.104)	(0.104)	(0.119)	(0.097)	(0.104)	(0.110)	(0.098)	(0.122)	(0.094)	(0.101)	(0.103)	(0.099)	(0.103)	(0.101)	(0.102)	(0.103)	(0.101)
Time3				-0.004														
				(0.016)														
Total_extract_rents					0.003*													
					(0.002)													
EITI3xTotal_extract_rents					0.008**													
					(0.003)													
LOGGDP/CAPITA						0.444***												
						(0.053)												
EITI3xLOGGDP/CAPITA						0.025**												
						(0.012)												
FINANCIAL DEV.							-0.447											
							(0.314)											
EITI3xFINANCIAL DEV.							-1.109***											
							(0.391)											
Commodity prices_								-0.013***										
								(0.002)										
EITI3xCommodity prices_								0.001										
								(0.009)										
OPENESS_									0.002***									
									(0.000)									
EITI3xOPENESS_									0.003***									
									(0.001)									
LOG_AID										0.081***								
										(0.016)								
EITI3xLOG_AID										-0.001								
										(0.031)								
Inflation											-0.001***							
											(0.000)							
EITI3xInflation											-0.004							
											(0.004)							
FDI												0.003***						
												(0.001)						
EITI3xFDI												0.011***						
												(0.003)						
Coal_rents													0.002					
													(0.024)					
EITI3xCoal_rents													0.122***					
													(0.044)					
Forest_rents														-0.025***				
														(0.004)				
EITI3xForest_rents														0.029***				
														(0.006)				
HDI															2.362***			
															(0.691)			
EITI3xHDI															-0.689***			
															(0.215)			
Industry_VA																0.009***		
																(0.001)		
EITI3xIndustry_VA																0.000		
																(0.002)		
Control of Corruption (0-100)																	0.004***	
																	(0.001)	
EITI3xControl of Corruption (0-100)																	-0.006***	
																	(0.002)	
Gov. Effectiveness (0-100)																	0.003***	
																	(0.001)	
EITI3xGov. Effectiveness (0-100)																	-0.007***	
																	(0.002)	
Rule of Law (Estimate)																		0.005***
																		(0.001)
EITI3x Rule of Law (Estimate)																		-0.008***
																		(0.002)
_Constant	2.552***	2.665***	2.664***	2.692***	-2.908***	2.754***	3.922***	2.525***	1.133***	2.689***	2.654***	2.673***	2.735***	1.156**	2.471***	2.541***	2.580***	2.508***
	(0.055)	(0.057)	(0.057)	(0.057)	(0.670)	(0.073)	(0.183)	(0.058)	(0.314)	(0.051)	(0.055)	(0.057)	(0.054)	(0.457)	(0.062)	(0.066)	(0.075)	(0.074)
N	813	557	557	557	557	557	557	557	557	556	557	557	557	557	557	557	557	557
F	66.282	45.485	44.630	44.782	51.381	45.218	49.288	50.440	46.406	56.335	46.711	44.952	50.506	46.342	48.526	46.241	45.645	46.895
Adjusted R-squared	0.835	0.823	0.822	0.825	0.845	0.827	0.839	0.842	0.831	0.857	0.831	0.826	0.842	0.830	0.837	0.830	0.828	0.832

Standard errors in parentheses

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

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A8: Heterogeneity of the treatment effects (EITI1) on outcome (Income-profits-capital tax (% GDP))

.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI1	0.189***	0.062**	0.007	0.083**	0.516***	0.252***	-0.384	0.007	-2.098***	0.046	0.020	0.066**	-0.039	0.366***	0.221***	0.188***	0.216***	0.223***
	(0.035)	(0.030)	(0.036)	(0.035)	(0.116)	(0.055)	(0.627)	(0.058)	(0.466)	(0.033)	(0.032)	(0.031)	(0.035)	(0.107)	(0.083)	(0.060)	(0.058)	(0.059)
Pscore		0.311***	0.279***	0.254***	0.313***	0.278***	0.366***	0.286***	0.204**	0.270***	0.175**	0.283***	0.275***	0.224***	0.259***	0.351***	0.278***	0.332***
		(0.075)	(0.075)	(0.085)	(0.074)	(0.076)	(0.083)	(0.074)	(0.080)	(0.075)	(0.081)	(0.079)	(0.075)	(0.076)	(0.076)	(0.075)	(0.078)	(0.074)
Time1				0.016***														
				(0.006)														
Total_extract_rents				0.006**														
				(0.003)														
EITI1xTotal_extract_rents				-0.005														
				(0.003)														
LOGGDP/CAPITA					0.223***													
					(0.068)													
EITI1xLOGGDP/CAPITA					-0.039***													
					(0.010)													
FINANCIAL DEV.						0.586**												
						(0.267)												
EITI1xFINANCIAL DEV.						-0.997***												
						(0.246)												
Commodity prices_							-0.004*											
							(0.002)											
EITI1xCommodity prices_							0.004											
							(0.006)											
OPENESS_								0.003***										
								(0.000)										
EITI1xOPENESS_								0.001										
								(0.001)										
LOG_AID									0.005									
									(0.019)									
EITI1xLOG_AID									0.108***									
									(0.023)									
Inflation										-0.000***								
										(0.000)								
EITI1xInflation										0.001								
										(0.002)								
FDI											-0.002							
											(0.002)							
EITI1xFDI											0.009***							
											(0.003)							
Coal_rents												0.026						
												(0.025)						
EITI1xCoal_rents												-0.016						
												(0.023)						
Forest_rents													-0.021***					
													(0.006)					
EITI1xForest_rents													0.021***					
													(0.004)					
HDI														1.864***				
														(0.570)				
EITI1xHDI														-0.519***				
														(0.179)				
Industry_VA															0.007***			
															(0.002)			
EITI1xIndustry_VA															-0.006**			
															(0.003)			
Control of Corruption (0-100)																0.005***		
																(0.001)		
EITI1xControl of Corruption (0-100)																-0.004**		
																(0.002)		
Gov. Effectiveness (0-100)																	0.003**	
																	(0.001)	
EITI1xGov. Effectiveness (0-100)																	-0.005***	
																	(0.002)	
Rule of Law (Estimate)																		0.004***
																		(0.001)
EITI1x Rule of Law (Estimate)																		-0.005***
																		(0.002)
_Constant	-0.096	0.420***	0.420***	0.195	-1.915***	0.367***	0.712***	0.147	0.333	0.480***	0.439***	0.424***	0.467***	-0.306	0.015	0.373***	0.394***	0.391***
	(0.100)	(0.102)	(0.102)	(0.146)	(0.715)	(0.105)	(0.198)	(0.111)	(0.400)	(0.102)	(0.102)	(0.103)	(0.101)	(0.245)	(0.171)	(0.102)	(0.102)	(0.102)
N	1447	910	910	910	910	910	910	910	910	909	910	910	910	910	910	910	910	910
F	42.739	62.129	62.027	61.002	62.707	62.126	60.889	64.079	62.912	62.156	62.628	60.742	63.729	62.452	61.415	62.555	61.780	62.228
Adjusted R-squared	0.743	0.855	0.857	0.856	0.859	0.858	0.856	0.862	0.860	0.858	0.859	0.855	0.861	0.859	0.857	0.859	0.858	0.858

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A9: Heterogeneity of the treatment effects (EITI2) on outcome (Income-profits-capital tax (% GDP))

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI2	0.188***	0.077**	-0.000	0.105***	0.514***	0.325***	-0.963	-0.031	-1.961***	0.054	0.040	0.084***	-0.033	0.495***	0.222***	0.187***	0.234***	0.242***
	(0.038)	(0.031)	(0.041)	(0.037)	(0.119)	(0.058)	(0.812)	(0.067)	(0.495)	(0.036)	(0.033)	(0.032)	(0.036)	(0.112)	(0.083)	(0.062)	(0.060)	(0.061)
Pscore		0.346***	0.325***	0.308***	0.341***	0.301***	0.405***	0.340***	0.259***	0.297***	0.189**	0.327***	0.264***	0.248***	0.295***	0.377***	0.311***	0.356***
		(0.077)	(0.077)	(0.085)	(0.076)	(0.077)	(0.086)	(0.077)	(0.081)	(0.077)	(0.089)	(0.082)	(0.077)	(0.078)	(0.078)	(0.077)	(0.079)	(0.076)
Time2				0.022***														
				(0.007)														
Total_extract_rents				0.005**														
				(0.003)														
EITI2xTotal_extract_rents				-0.006*														
				(0.003)														
LOGGDP/CAPITA					0.209***													
					(0.067)													
EITI2xLOGGDP/CAPITA					-0.038***													
					(0.010)													
FINANCIAL DEV.						0.645**												
						(0.262)												
EITI2xFINANCIAL DEV.						-1.308***												
						(0.258)												
Commodity prices_							-0.005*											
							(0.002)											
EITI2xCommodity prices_							0.010											
							(0.008)											
OPENESS_								0.003***										
								(0.000)										
EITI2xOPENESS_								0.001										
								(0.001)										
LOG_AID									0.019									
									(0.018)									
EITI2xLOG_AID									0.102***									
									(0.025)									
Inflation										-0.000***								
										(0.000)								
EITI2xInflation										0.003								
										(0.002)								
FDI											-0.002							
											(0.002)							
EITI2xFDI											0.008***							
											(0.003)							
Coal_rents												0.045*						
												(0.024)						
EITI2xCoal_rents												-0.038*						
												(0.022)						
Forest_rents													-0.017***					
													(0.006)					
EITI2xForest_rents													0.025***					
													(0.005)					
HDI														1.710***				
														(0.563)				
EITI2xHDI														-0.721***				
														(0.186)				
Industry_VA															0.006***			
															(0.002)			
EITI2xIndustry_VA															-0.006*			
															(0.003)			
Control of Corruption (0-100)																0.005***		
																(0.001)		
EITI2xControl of Corruption (0-100)																-0.004**		
																(0.002)		
Gov. Effectiveness (0-100)																	0.003**	
																	(0.001)	
EITI2xGov. Effectiveness (0-100)																	-0.005***	
																	(0.002)	
Rule of Law (Estimate)																		0.004***
																		(0.001)
EITI2x Rule of Law (Estimate)																		-0.005***
																		(0.002)
_Constant	-0.097	0.425***	0.425***	0.236*	-1.768**	0.361***	0.759***	0.138	0.040	0.483***	0.437***	0.430***	0.460***	-0.246	0.070	0.383***	0.399***	0.397***
	(0.100)	(0.102)	(0.101)	(0.139)	(0.712)	(0.104)	(0.199)	(0.109)	(0.377)	(0.102)	(0.102)	(0.102)	(0.101)	(0.243)	(0.166)	(0.101)	(0.102)	(0.101)
N	1447	910	910	910	910	910	910	910	910	909	910	910	910	910	910	910	910	910
F	42.555	62.794	62.772	61.659	63.154	63.595	61.731	65.040	63.222	62.930	62.684	61.558	64.570	63.553	61.970	62.969	62.386	62.801
Adjusted R-squared	0.742	0.857	0.858	0.857	0.860	0.861	0.857	0.864	0.860	0.860	0.859	0.857	0.863	0.861	0.858	0.860	0.859	0.860

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A10: Heterogeneity of the treatment effects (EITI3) on outcome (Income-profits-capital tax (% GDP))

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
EITI3	0.101*	0.097**	0.150**	0.290***	0.918***	0.514***	-0.547	0.012	-5.414***	0.061	0.024	0.124***	-0.134***	0.966***	0.515***	0.243***	0.323***	0.372***
	(0.052)	(0.044)	(0.067)	(0.064)	(0.161)	(0.075)	(1.440)	(0.098)	(0.739)	(0.050)	(0.049)	(0.045)	(0.051)	(0.148)	(0.112)	(0.081)	(0.082)	(0.083)
Pscore		0.795***	0.784***	1.018***	0.818***	0.711***	0.893***	0.710***	0.435***	0.678***	0.597***	0.793***	0.685***	0.683***	0.716***	0.782***	0.713***	0.795***
		(0.141)	(0.141)	(0.177)	(0.137)	(0.135)	(0.155)	(0.137)	(0.152)	(0.141)	(0.142)	(0.156)	(0.133)	(0.138)	(0.142)	(0.141)	(0.141)	(0.138)
Time3			-0.018															
			(0.017)															
Total_extract_rents				-0.002														
				(0.003)														
EITI3xTotal_extract_rents				-0.022***														
				(0.005)														
LOGGDP/CAPITA					0.167													
					(0.105)													
EITI3xLOGGDP/CAPITA					-0.071***													
					(0.013)													
FINANCIAL DEV.						0.968**												
						(0.440)												
EITI3xFINANCIAL DEV.						-2.564***												
						(0.388)												
Commodity prices_							-0.006*											
							(0.004)											
EITI3xCommodity prices_							0.006											
							(0.014)											
OPENESS_								0.003***										
								(0.000)										
EITI3xOPENESS_								0.001										
								(0.001)										
LOG_AID									0.065***									
									(0.022)									
EITI3xLOG_AID									0.272***									
									(0.036)									
Inflation										-0.000***								
										(0.000)								
EITI3xInflation										0.005								
										(0.003)								
FDI											0.004**							
											(0.002)							
EITI3xFDI											0.009***							
											(0.003)							
Coal_rents												0.040**						
												(0.016)						
EITI3xCoal_rents												-0.049***						
												(0.015)						
Forest_rents													-0.009					
													(0.006)					
EITI3xForest_rents													0.054***					
													(0.007)					
HDI														1.571*				
														(0.886)				
EITI3xHDI														-1.572***				
														(0.247)				
Industry_VA															0.007**			
															(0.003)			
EITI3xIndustry_VA															-0.017***			
															(0.004)			
Control of Corruption (0-100)																0.001		
																(0.001)		
EITI3xControl of Corruption (0-100)																-0.005**		
																(0.002)		
Gov. Effectiveness (0-100)																	-0.002	
																	(0.002)	
EITI3xGov. Effectiveness (0-100)																	-0.007***	
																	(0.002)	
Rule of Law (Estimate)																		0.002
																		(0.002)
EITI3x Rule of Law (Estimate)																		-0.009***
																		(0.002)
_Constant	-0.084	0.737***	0.735***	0.669***	-1.344	0.614***	1.373***	0.546***	-0.415	0.765***	0.747***	0.739***	0.820***	-0.203	0.578***	0.702***	0.872***	0.680***
	(0.094)	(0.074)	(0.074)	(0.077)	(1.314)	(0.099)	(0.376)	(0.078)	(0.432)	(0.073)	(0.073)	(0.075)	(0.072)	(0.583)	(0.097)	(0.089)	(0.105)	(0.101)
N	735	487	487	487	487	487	487	487	487	486	487	487	487	487	487	487	487	487
F	37.682	38.396	37.749	38.781	40.155	41.551	37.248	41.098	43.986	38.746	39.538	38.047	43.365	41.492	38.730	37.437	38.233	38.539
Adjusted R-squared	0.756	0.812	0.812	0.818	0.824	0.829	0.812	0.827	0.837	0.819	0.821	0.816	0.835	0.829	0.818	0.813	0.816	0.818

Standard errors in parentheses

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

The F-test refers to the global significance test (1 %) of the interaction term and the variable X.

Table A11: Descriptive statistics

Variable	Total of Sample					Group of treated					Group of controls				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Total tax_revenue	1,697	15.097	7.428	0.301	56.916	913	13.012	4.704	0.301	26.082	784	17.525	9.097	1.193	56.916
non-resource_tax	1,621	13.859	6.957	0.301	56.916	813	12.549	4.804	0.301	25.819	808	15.176	8.395	0.846	56.916
Income tax	1,449	5.044	3.083	0.000	24.074	735	4.298	2.459	0.166	15.867	714	5.811	3.453	0.000	24.074
EITI1	1,909	0.219	0.414	0.000	1.000	1,012	0.414	0.493	0.000	1.000	897	0.000	0.000	0.000	0.000
Total rents	1,849	8.516	12.452	0.000	78.623	969	7.377	11.354	0.000	74.033	880	9.771	13.454	0.000	78.623
L.GDPCAPITA	1,872	11.109	2.719	5.453	18.304	989	11.533	2.579	5.453	17.439	883	10.633	2.794	5.899	18.304
Financial Dev.	1,817	0.191	0.123	0.000	0.679	966	0.159	0.091	0.000	0.418	851	0.226	0.143	0.002	0.679
Inflation	1,867	19.873	141.080	-36.565	4800.532	985	15.980	90.314	-36.565	2630.123	882	24.220	181.688	-31.566	4800.532
Commodity prices	1,870	98.001	10.130	44.630	125.776	1,007	99.288	8.649	44.630	122.847	863	96.499	11.446	45.423	125.776
Trade Openness	1,754	75.577	37.119	0.021	311.354	920	74.322	37.210	0.021	311.354	834	76.961	36.991	14.772	220.407
L.ODA	1,817	19.607	1.289	9.903	23.924	992	19.839	1.195	9.903	23.924	825	19.328	1.343	12.346	23.135
FDI	1,821	4.221	8.295	-37.155	161.824	973	4.274	7.790	-37.155	103.337	848	4.160	8.843	-8.589	161.824
Industry_Value Added	1,799	29.115	13.150	2.073	87.797	951	26.997	12.379	3.243	85.659	848	31.490	13.583	2.073	87.797
Coal_rents	1,840	0.232	1.059	0.000	25.316	965	0.257	1.344	0.000	25.316	875	0.205	0.607	0.000	7.850
Forest_rents	1,859	3.337	5.044	0.000	36.068	975	4.515	5.683	0.000	36.068	884	2.038	3.834	0.000	31.963
HDI	1,796	0.572	0.137	0.228	0.832	966	0.537	0.136	0.235	0.832	830	0.612	0.127	0.228	0.822
Governance Index	1,574	-1.106	0.918	-3.312	1.585	833	-1.292	0.730	-3.312	0.181	741	-0.898	1.053	-3.135	1.585
Control of corruption	1,574	-0.630	0.554	-1.826	1.568	833	-0.739	0.409	-1.723	0.478	741	-0.508	0.660	-1.826	1.568
Gov. Effectiveness	1,574	-0.594	0.570	-2.232	1.267	833	-0.708	0.491	-2.232	0.376	741	-0.466	0.623	-1.915	1.267
Regulatory Quality	1,574	-0.608	0.626	-2.344	1.053	833	-0.602	0.544	-2.344	0.615	741	-0.615	0.707	-2.274	1.053
Rule of Law	1,577	-0.692	0.561	-2.255	0.731	836	-0.791	0.468	-2.130	0.292	741	-0.582	0.633	-2.255	0.731
Voice and accountability	1,577	-0.595	0.724	-2.124	0.976	836	-0.467	0.621	-2.233	0.606	741	-0.740	0.801	-2.124	0.976

Table A12: Definitions and Data Sources

Indicateurs	Définitions	Sources
Rentes totales (% du PIB)	The sum of oil, mining and gas rents, including the extractive industries. They correspond to the difference between the value of gross production at world prices and the total cost of production (specifically for each type of rent).	World Development Indicators. https://databank.worldbank.org/
Coal rents (% of GDP)	Coal rents are the difference between the value of both hard and soft coal production at world prices and their total costs of production.	
Forest rents (% of GDP)	Forest rents are roundwood harvest times the product of average prices and a region-specific rental rate.	
Inflation, GDP deflator (% annual)	It is measured by the annual growth rate of the implicit deflator (ratio of GDP in current local currency to GDP in constant local currency) of GDP and indicates the rate of price change in the economy as a whole.	
Trade openness (% of GDP)	It is the sum of exports and imports of goods and services relative to GDP.	
Net Official Development Assistance (ODA) received per capita (US$)	It includes loan disbursements with a grant element of at least 25% (calculated using a discount rate of 10%) and grants paid by official bodies (current US $).	
GDP per capita ($ US)	GDP per capita is the gross domestic product divided by the population at mid-year. ($ US constants 2010).	
Foreign Direct Investment (% GDP)	These are the net inflows of investments to acquire a sustainable management interest. It is the difference between new investment inflows and disinvestment divided by GDP.	
Industry value added (% of GDP)	It comprises value added in mining, manufacturing, construction, electricity, water, and gas.	
Voice and Accountability (VA)	capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	Kaufmann et al. (2011). Worldwide Governance Indicators: . Estimate of governance in standard normal units ranging from approximately -2.5 (weak) to 2.5 (strong) governance performance; . Percentile rank among all countries, ranging from 0 (lowest) to 100 (highest) rank. www.govindicators.org
Government Effectiveness (GE)	"capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."	
Control of Corruption (CC)	"capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms ofcorruption, as well as "capture" of the state by elites and private interests."	
Rule of Law (RL)	"capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence."	
Regulatory Quality (RQ)	capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	
Financial Development Index	The dataset contains nine indices that summarize how developed financial institutions and financial markets are in terms of their depth, access, and efficiency.	International Monetary Fund https://data.imf.org/
Commodity Terms of Trade	Commodity-price fluctuations on countries that both export and import primary commodities, using a country-specific measure of thecommodity terms of trade	Gruss and Kebhaj (2019) International Monetary Fund https://data.imf.org/
Total tax revenue (% GDP)	It is the sum of the sub-components of Tax Revenue, i.e. stamp duties and taxes on the one hand, and upstream profits from extractive resource (oil, gas, and mining), royalties and revenue from rentsharing agreements paid to the consolidated fund on the other hand, and excluding social contributions.	ICTD Government Revenue Dataset www.ictd. ac/dataset/grd
Human Development Index (HDI)	The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.	UNITED NATIONS DEVELOPMENT PROGRAMME http://hdr.undp.org/en/data

Table A13: List of EITI countries (Group of treated), the original event dates, and status in February 2018, and Non-EITI countries (Group of control)

	EITI Countries	Commitment	MSG	Candidate	First Report	Valid. Report	Compliant	Suspended	Status Feb. 2018	Non-EITI Countries
1	Afghanistan	march-09	oct-09	Feb-2010	Aug-2012	Feb-2013		January 2019 -	Candidate	Algeria
2	Albania	jan-09	march-09	May-2009	march-11	Aug-2011	May-2013		Compliant	Angola
3	Argentina	Dec 2017	Dec 2018	march-19					Committed	Azerbaijan
4	Armenia	jan-17		march-17					Candidate	Belarus
5	Burkina Faso	june-07	Dec-2008	May-2009	Apr-2011	sept-11	Feb-2013		Compliant	Belize
6	Cameroon	Feb-2005	May-2005	sept-07	oct-06	july-10	oct-13		Compliant	Bhutan
7	Central African Republic	sept-07	july-08	nov-08	Feb-2009	nov-10	march-11	April 2013	Suspended	Bosnia and Herzegovina
8	Chad	sept-07	Feb-2010	Apr-2010	oct-12	May-2013	oct-14		Compliant	Botswana
9	Colombia	May-2013	Feb-2014	oct-14					Candidate	Brazil
10	Côte d'Ivoire	May-2007	Feb-2008	May-2008	jan-10	nov-10	May-2013		Compliant	Bulgaria
11	Ethiopia	july-09	june-09	march-14	May-2015				Candidate	Cuba
12	Ghana	May-2003	jan-05	sept-07	sept-07	june-10	oct-10		Compliant	Ecuador
13	Guatemala	june-10	May-2012	march-11	Apr-2013	nov-13	march-14	feb - may 2015	Compliant	Egypt
14	Guinea	march-05	Apr-2005	sept-07	july-07	Aug-2012	july-14	jan-nov 2011	Compliant	Equatorial Guinea
15	Guyana	May-2010	Apr 2010	oct-17					Candidate	Gabon
16	Honduras	nov-12	Dec-2012	May-2013	May-2015				Candidate	Gambia
17	Indonesia	Dec-2008	june-10	oct-10	May-2013	july-13	oct-14	feb - Dec 2015	Compliant	Georgia
18	Iraq	march-09	Aug-2010	Feb-2010	nov-11	Aug-2012	Dec-2012		Compliant	Guinea-Bissau
19	Kazakhstan	june-05	Apr-2005	sept-07	nov-07	Aug-2010	oct-13		Compliant	India
20	Kyrgyzstan	Apr-2004	june-08	sept-07	nov-09	Apr-2010	march-11	Oct 2017 -	Compliant	Iran
21	Liberia	May-2007	Apr-2007	sept-08	jan-09	july-09			Candidate	Jordan
22	Madagascar	march-07	jan-08	Feb-2008	May-2011	sept-11		Oct 2012- jan 2014	Candidate	Lao PDR
23	Malawi	june-14	march-15	oct-15					Candidate	Lesotho
24	Mali	Aug-2006	june-07	sept-07	nov-09	sept-10	Aug-2011		Compliant	Libya
25	Mauritania	oct-05	Dec-2006	sept-07	Feb-2007	sept-10	Feb-2012	march - may 2013	Compliant	Malaysia
26	Mexico	jan-15	nov-17	oct-18	Dec 2019				Candidate	Morocco
27	Mongolia	march-06	jan-06	sept-07	Dec-2007	Feb-2010	oct-10		Compliant	Namibia
28	Mozambique	May-2008	Apr-2009	May-2009	jan-11	May-2011	oct-12		Compliant	Niger
29	Myanmar	Dec-2012	jan-14	july-14	Dec-2015				Candidate	Russian Federation
30	Nigeria	nov-03	Dec-2003	sept-07	oct-06	june-10	march-11		Compliant	Rwanda
31	Papua New Guinea	Apr-2013	nov-13	march-14	Feb-2016				Candidate	South Africa
32	Peru	Apr-2005	May-2006	sept-07	oct-09	sept-10	Feb-2012		Compliant	Sudan
33	Philippines	july-12	jan-13	May-2013	Dec-2014				Candidate	Syrian Arab Republic
34	Republic of the Congo	june-04	sept-06	sept-07	Aug-2008	sept-10	Feb-2013		Compliant	Tunisia
35	Sao Tome and Principe	Dec 2005	Dec 2007	Feb 2008	july-14	june-16		feb - march 2010	Candidate	Uzbekistan
36	Senegal	Feb-2012	Feb-2013	oct-13	Dec-2015				Candidate	Venezuela
37	Sierra Leone	May-2006	june-07	Feb-2008	Feb-2010	july-10	Apr-2014		Compliant	Vietnam
38	Suriname	feb 2016	nov-17	Apr-2018				feb 2019	Committed	Yemen
39	Tajikistan	Aug-2012	Aug-2012	Feb-2013	oct-15				Candidate	Zimbabwe
40	Tanzania	nov-08	Feb-2009	nov-09	jan-11	May-2011	Dec-2012	Nov - Dec 2015	Compliant	
41	Timor-Leste	Apr-2007	Apr-2007	Feb-2008	oct-09	march-10	july-10	march - june 2017	Compliant	
42	Togo	Dec-2009	Apr-2010	oct-10	Feb-2012	Apr-2013	May-2013		Compliant	
43	Ukraine	oct-09	oct-12	oct-13	nov-15				Candidate	
44	Zambia	july-08	july-08	May-2009	jan-11	May-2011	sept-12		Compliant	