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How does implementing the Extractive Industries Transparency Initiative (EITI) affect economic growth? Evidence from developing countries

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Abstract

Although there is no consensus on the relationship between natural resource abundance and economic growth, much of the economic literature suggests that natural resource abundance negatively affects economic growth in developing countries, leading to the resource curse theory. This situation led the international community to create the Extractive Industries Transparency Initiative (EITI) in 2003 to promote the effective contribution of natural resources to economic growth through a process involving governments, extractive industries, and civil society. Considering 99 developing countries from 1995 to 2019 and applying recent heterogeneity-robust difference-in-differences (DID) estimators, we find a positive and statistically significant relationship between EITI implementation and economic growth. Several robustness checks support this result. Most interestingly, the analysis of EITI's dynamic effects reveals that these effects occur only in the short and medium terms. In addition, we tested several potential transmission channels and identified the increase in foreign direct investment and the rise in resource revenue as the main transmission channels. Moreover, we postulate and investigate four possible explanations behind the EITI's mixed results on long-term growth: the lack of evidence of a negative relationship between natural resource abundance and long-term economic growth over the study period, a possible increasing reliance on non-resource taxes, a possible signaling effect targeted by member countries, and the lack of effect of EITI implementation on reducing corruption. Finally, the document provides economic policy recommendations for better governance in the management of natural resources in order to increase their contribution to development financing. Furthermore, improving governance in managing critical minerals is vital to avoid a "new curse of critical minerals".

Keywords: Governance, Natural resources, Economic growth, Extractive industries transparency, Resource curse, Heterogeneous and dynamic treatment effects.

JEL Classification: G38, O13, O19, O43, Q32, Q38.

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1 Introduction

The extractive sector is essential for many developing countries. Some economies have relied heavily on extractive resources for years, while others have recently begun or increased their exploitation of extractive resources. Due to the importance of the extractive sector, a large part of the literature has analyzed the link between countries' natural resource endowment and economic growth. However, the literature does not reach a consensus on the efficiency of exploiting natural resources and their contribution to economic growth in countries with abundant natural resources ([Havranek et al., 2016](#)).

On the one hand, some authors have found that resource abundance has not always been a blessing for these countries ([Gylfason, 2000](#); [Van der Ploeg, 2011](#)). [Sachs and Warner \(1995\)](#), who represent the founding authors of this literature, have highlighted a negative and significant relationship between natural resource abundance and economic growth, which had been qualified as the "resource curse". Since their pioneering work, the economic literature has shown considerable interest in analyzing resource curse determinants. First, governance and institution quality are the main determinants of the resource curse identified in the literature. Institutional quality influences natural resource management ([Sala-i Martin and Subramanian, 2013](#)), and resource revenue can be used to enforce corruption ([Busse and Gröning, 2013](#)), specifically when the quality of democratic institutions is relatively low ([Bhattacharyya and Hodler, 2010](#); [Arezki and Brückner, 2011](#)). Poor institutional quality also favors the appropriation of natural resource revenues by political leaders through rent-seeking and patronage ([Mehlum et al., 2006](#); [Robinson et al., 2006](#)), leading to an inability of these countries to use these revenues as an engine for economic growth. Oil resources can also hinder democracy since autocratic leaders in oil-rich countries remain longer in power ([Crespo Cuaresma et al., 2011](#)). [Morrison \(2007\)](#) suggests that the simple existence of natural resources in non-democratic countries favors the political resource curse and reduces chances for democratization, while [Vasilyeva and Libman \(2020\)](#) find that beyond the difference between democracies and autocracies, regimes with fragmented elites underperform those with consolidated elites. Second, an economic explanation for the poor performance of resource-rich countries is the "Dutch disease", i.e., the appreciation of a country's exchange rate following a boom in foreign exchange earnings from its natural resource exports ([Corden and Neary, 1982](#)). This appreciation leads to a loss of competitiveness in the agricultural and industrial sectors, as exports from these two sectors are penalized in favor of the emerging extractive sector that attracts production factors ([Sachs and Warner, 1995](#)). Finally, the resource curse can be manifested

through conflicts (Collier and Hoeffler, 1998; Berman et al., 2017), mainly when natural resources are unequally distributed across a country's different ethnic groups since this induces rent-seeking behavior (Lessmann and Steinkraus, 2019). Nevertheless, transferring a large part of the oil wealth can mitigate this issue, mainly if these transfers are direct, meaning unconditional cash transfers to the population (Cordella and Onder, 2020).

On the other hand, other authors have provided evidence of a positive and statistically significant effect of natural resources on long-term economic growth. Indeed, Brunnschweiler (2008) has analyzed the effects of natural resource endowment on economic growth, using cross-countries data and new measures of natural resource abundance, namely total natural capital per capita and subsoil wealth per capita. The results reveal a positive direct and statistically significant relationship between natural resource endowment and economic growth. Similarly, Alexeev and Conrad (2009) examine the effects of natural resources on economic growth and find that extractive resources have enhanced rather than inhibited long-term growth. In the same line, Smith (2015) analyzes the impact of major natural resource discoveries since 1950 on GDP per capita and finds that resource exploitation positively affects economic growth, with effects that persist in the long run. A more recent cross-country study by Arin and Braunfels (2018) also fails to find empirical evidence for a "natural resource curse". However, it concludes contrary to a positive and statistically significant robust effect between oil rents and long-term economic growth. Furthermore, despite the positive effect of natural resources highlighted by this part of the literature, these authors emphasize the importance of institutions in the growth process, particularly in the long term (Brunnschweiler, 2008; Apergis and Payne, 2014; Arin and Braunfels, 2018). Therefore, countries with significant natural resources must manage their resources efficiently and responsibly.

Institutional quality is a major determinant of economic development (Acemoglu et al., 2001). The government's preference for the present explains the over-exploitation of natural resources, and institutions determine the effectiveness of extractive revenue booms in developing countries (Robinson et al., 2006). Mehlum et al. (2006) have shown that the resource curse only affects countries with low institutional quality, and improvement in institutional quality is a condition for the effective contribution of natural resources to economic growth. Policies that promote transparency and accountability increase the cost of corrupt episodes (Kolstad and Wiig, 2009) and the accountability of governments to their citizens in managing extractive industries' revenue (Mejía Acosta, 2013). Busse and Gröning (2013) conclude that greater transparency regarding how national governments and international investors spend money could help by implementing initiatives in this field, such as

the Extractive Industries Transparency Initiative (EITI).

The EITI was first publicly announced by the United Kingdom Prime Minister Tony Blair at the World Summit on Sustainable Development in Johannesburg in 2002 and formally launched in London in June 2003 (Lujala, 2018). The EITI is headquartered in Oslo (Norway), with national committees in each member country, and is considered the most broadly implemented and supported transparency initiative in natural resource governance. It has been endorsed and supported by the United Nations, African Union, G8 and G20 countries, as well as many international organizations such as the International Monetary Fund and the World Bank (Sovacool et al., 2016). The institution promotes better resource revenue collection and greater accountability in using these resources to finance productive public expenditures, aiming to enhance robust economic growth and reduce poverty. The EITI Standard requires member countries to publish annual reports with information on all the key stages of the extractive sector value chain, including disclosure of information about exploration activities, awarding of licenses and contracts, data on production and exports, disclosure of information about resource revenue collected and their allocation, as well as the resulting social and economic spending (EITI, 2019). The objective is to make natural resources an engine of sustainable economic growth in developing member countries.¹

Based on the literature, we have identified three main transmission channels through which EITI implementation may affect economic growth in developing countries: the improvement of investment climate, an increase in foreign direct investment attractiveness, and increasing resource revenue mobilization. Firstly, natural resource revenues tend to increase corruption (Arezki and Brückner, 2011), and this effect depends on the institutional quality (Mehlum et al., 2006; Bhattacharyya and Hodler, 2010). However, solid democratic institutions make politicians accountable to their citizens, increasing detour and extractive revenue' capture costs (Bhattacharyya and Hodler, 2010). The EITI, through its incentive and enforcement mechanism, could help to reduce the misappropriation of extractive rents and improve governance and accountability in public management, leading to a healthy investment climate for long-term foreign investment. Secondly, exploiting natural resources requires significant investments and specific advanced technologies (Lucke and Rehfeldt, 2023). However, developing countries do not have sufficient domestic revenue to make these investments and are incentivized to attract foreign direct investments (FDI). Aleksynska and Havrylchyk (2013) explain that large institutional distance discourages investment from the North, while natural resources constitute a factor in attracting FDI from emerging countries (the South) to developing countries with

¹Further details on the EITI implementation process are provided in Appendix A.1.

worse institutions. However, [Busse et al. \(2016\)](#) suggest that this resource-seeking FDI in African countries explains the insufficient FDI environment, which could diminish the positive effects of FDI on economic growth. The authors find that better institutions enable countries to benefit more from FDI, positively affecting economic growth. They recommend that developing countries develop a better environment for the private sector and a more transparent regulatory environment, which could lead to significant spillover effects, particularly from FDI from the South (such as FDI from China). By enhancing the mining investment climate and sending a signal to international investors about member countries' commitment to promoting transparency and combating corruption in the extractive sector ([Öge, 2016](#); [Lujala, 2018](#)), EITI implementation should enhance the attractiveness of foreign direct investment and boost economic growth. Thirdly, the need for domestic resources to finance Sustainable Development Goals (SDGs) in developing countries were highlighted at the International Conference on Financing for Development in June 2015. In these countries, domestic revenue positively contributes to economic growth ([Chauvet and Ferry, 2021](#)), and this effect depends on the allocation of these revenues to finance infrastructure spending, which in turn depends on levels of corruption and government accountability. Moreover, [Bornhorst et al. \(2009\)](#) and [Crivelli and Gupta \(2014\)](#) find that natural resource revenue decreases domestic (non-resource) revenue, highlighting the lower incentive of countries with resource endowments to mobilize non-resource domestic revenue. In the same line, [McGuirk \(2013\)](#) explains that in these countries, leaders lighten the burden of taxation on the population to reduce the demand for democratic accountability and make them more inclined to accept the current regime's policies. This makes it essential to manage natural resources better and collect more revenue from the sector. Thus, by increasing resource revenue and requiring governments to disclose extractive industries' payments and government revenue collected, the EITI implementation could positively affect economic growth in developing member countries. Furthermore, we also analyze three additional (indirect) potential transmission channels: corporate tax revenue, personal income tax revenue, and income inequality.

Although the literature on the analysis of the EITI's effects on institutional and development indicators has progressed, to the best of our knowledge, no study has evaluated its direct treatment effects on economic growth in developing countries. Moreover, no study has provided evidence of the dynamic effects of EITI and the main transmission channels through which EITI implementation affects economic growth. On the other hand, the EITI effectiveness analysis faces numerous analytical challenges. Indeed, a country's decision to join the EITI is voluntary and not exogenous, but rather influenced by the country's socio-political and economic characteristics. Therefore, countries

have started the implementation of EITI at different times. In addition, member countries can be suspended from the organization, leading to breakdowns during the EITI implementation process for some countries. For these reasons, it is legitimate to think that the treatment effects of EITI implementation are heterogeneous across countries and over the years. Previous studies have not considered the heterogeneous effects in EITI implementation due to the heterogeneity in EITI membership dates within member countries and, more importantly, the breakdowns in EITI implementation for some countries. This paper aims to fill these gaps in the literature

First, to identify the treatment effects of EITI implementation on economic growth, we consider EITI implementation as a treatment and the GDP per capita growth rate as the dependent variable. Our analysis exploits a difference-in-differences (DID) setup that compares countries implementing the EITI and those not implementing the EITI. As highlighted by several recent studies ([De Chaisemartin and d'Haultfoeuille \(2020; 2024\)](#); [Sun and Abraham, 2021](#); [Goodman-Bacon, 2021](#); [Callaway and Sant'Anna, 2021](#)), the ordinary difference-in-differences (ordinary DID) estimator could be biased if the treatment effects are heterogeneous across countries and years. To address these analytical challenges, we employ the heterogeneity-robust difference-in-differences (heterogeneity-robust DID) estimator of [De Chaisemartin and d'Haultfoeuille \(2020\)](#).² Using a sample of 99 developing countries from 1995 to 2019, we find that implementing the EITI has a positive and statistically significant effect on economic growth by increasing the GDP per capita growth rate in member developing countries. This result is robust to several robustness tests, such as excluding potential outliers, using alternative samples, adding additional control variables, exploiting the exogenous variation in the main resource world prices, conducting placebo tests, and employing alternative estimation methods.

Second, we analyze EITI's dynamic treatment effects using the recent dynamic heterogeneity-robust DID estimator (allowing dynamic effects) proposed by [De Chaisemartin and d'Haultfoeuille \(2024\)](#). The results reveal that EITI's annual positive and statistically significant effects occur at two distinct points during the implementation process: in the short term (during the second and third years of implementation) and the medium term (after the fifth and sixth years).

Third, to explain these results, we analyze the potential transmission channels through which EITI implementation may affect economic growth in member countries and provide evidence that the main transmission channels could be an increase in foreign direct investment and extractive resource revenue. While we find an improvement in the investment climate during EITI implementation, this result is not robust as past trends influence post trends.

²We also provide the ordinary DID estimation results and evaluate the bias attached to this result.

Finally, our results conclude that despite the benefits of EITI, it does not promote long-term economic growth. We postulate and explore that the lack of evidence of a negative relationship between natural resource abundance and long-term economic growth over the study period, a possible increasing reliance on non-resource taxes, the use of EITI membership by some member countries as a signaling mechanism to gain benefits from the international community, and the lack of effect on reducing corruption are the main possible explanations for this lack of long-term effects of EITI implementation on economic growth.

The rest of the paper proceeds as follows. In Section 2, we present data and descriptive statistics. Section 3 describes the methodology. The main results are presented in Section 4, followed by a robustness analysis in Section 5. Section 6 provides evidence of the EITI's dynamic treatment effects on economic growth and highlights transmission channels, and Section 7 discusses the results. Finally, section 8 concludes and offers some policy recommendations.

2 Data and descriptive statistics

2.1 Data

To evaluate the effect of implementing the EITI on economic growth, we use a panel of 99 developing countries from 1995 to 2019. The analysis sample and time horizon are mainly determined by data availability. We construct the treatment variable (EITI implementation) based on the information available on the EITI website³ and from Lujala (2018). The treatment variable *EITI* is defined as equal to 1 for each year t in which country i is a member of the EITI and 0 otherwise. Consequently, we take into account all stages of the EITI implementation process. The study sample includes 47 countries that joined the EITI during the study period and 52 non-members. The complete list of countries in the sample is available in Table B1 (in Appendix B). Details on important dates in the EITI implementation process of the treatment group countries are provided in Table B2.

The outcome variable in our study is economic growth. Referring to the literature (Barro, 1991; Sala-i Martin, 1997; Barro, 2000), we measure economic growth by the annual GDP per capita growth rate. Data comes from the World Bank's World Development Indicators (WDI) database.

In line with the literature on economic growth and that on the determinants of EITI membership, we use the following control variables identified as EITI determinants and correlated with economic

³EITI website: <https://eiti.org/countries>.

growth: Initial GDP per capita (in logarithm), net official development assistance, natural resources rents, net foreign direct investment flows, control of corruption index, level of democratic accountability, political stability, commodity price index, inflation, and internal conflicts. Details on the choice of these control variables are available in Appendix A.2.

Following Lujala (2018), we transform the natural resources rents and official development assistance variables using natural logarithms due to their highly asymmetric values. To limit the influence of the extreme values in the foreign direct investment data, we transform this variable using the inverse hyperbolic sine function.⁴ In addition to the initial GDP per capita that we include to capture a convergence effect, we lag all the control variables considered in the analysis to limit the reverse causality problem and in line with the literature on the EITI determinants.

Tables B15 and B16 describe the data and their sources, and Table B6 provides descriptive statistics of the main variables used in the study.

2.2 Stylized facts

We present descriptive statistics on the correlation between the GDP per capita growth rate and EITI implementation. In Fig. 1, we compare the GDP per capita growth rate in EITI and non-EITI observations. Panel A compares the average GDP per capita growth rate in EITI and non-EITI observations in the whole sample, while panel B restricts the sample to EITI member countries and compares the average GDP per capita growth rate before and after EITI implementation. An analysis of this figure reveals a higher GDP per capita growth rate in EITI units (2.88%) compared to non-EITI units (2.52% for the entire sample and 2.14% for the member countries group). Furthermore, the difference between the two groups is statistically significant. However, these statistics are only correlations and not causal effects. This does not allow us to conclude a causal relationship between EITI implementation and the GDP per capita growth rate. To investigate the treatment effects of EITI implementation on economic growth, we rely on the identification strategy explained in the following section.

⁴The log transformation of the extractive rents and the transformation of the FDI variable using the inverse hyperbolic sine function is the best functional form for these variables (Lujala, 2018).

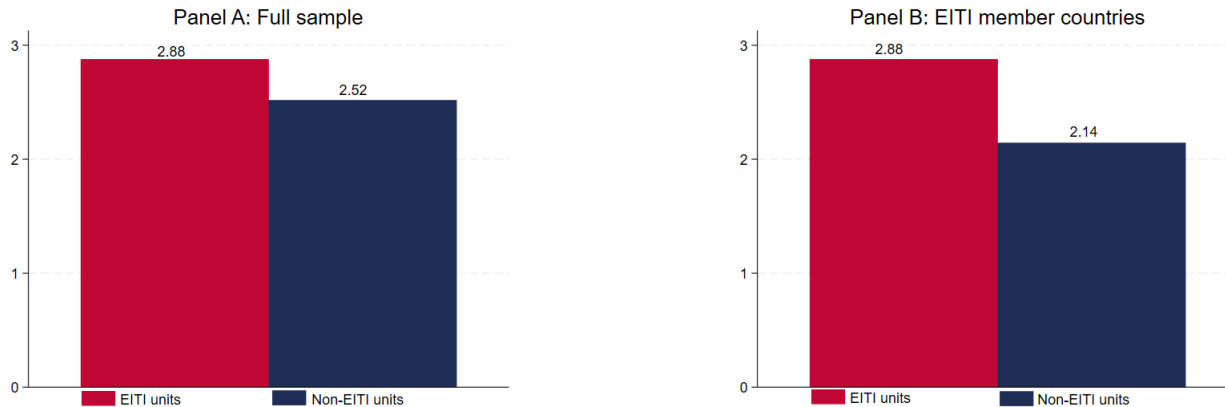


Fig. 1: This graph presents the average GDP per capita growth rate in EITI units (country-year with EITI implementation) and non-EITI units (country-year without EITI implementation) from 1995 to 2019.

3 Methodology

This study aims to evaluate the treatment effects of EITI implementation on economic growth in developing countries. We exploit variations in EITI membership and implementation timing across countries, resulting in the following equation:

$$GDPpc_{it} = \alpha_i + \beta EITI_{it} + \delta X_{it} + \mu_t + \epsilon_{it} \quad (1)$$

Where $GDPpc_{it}$ is the GDP per capita growth rate of country i in year t ; α_i represents country-fixed effects that capture time-invariant country-specific effects; μ_t represents year-fixed effects that capture time-specific factors affecting sample countries; $EITI_{it}$ is a dummy variable representing the treatment and indicates whether country i implements the EITI in year t (it is equal to 1) or not (it is then equal to 0). X_{it} is a set of control variables; ϵ_{it} is the random error term.

Equation 1 represents an ordinary difference-in-differences (ordinary DID) specification with additional controls. Due to the EITI implementation design, our analysis faces various methodological challenges that must be addressed to ensure the validity of the results. Indeed, the EITI is a global organization that any country can join voluntarily. Thus, the decision to implement the EITI standard is not exogenous. Therefore, countries do not adhere to the EITI on the same date. In addition, suspensions can occur when countries do not fully respect the EITI standard.⁵ For these reasons, the effects of EITI treatment could be heterogeneous over time and between countries. Several recent studies (De Chaisemartin and d’Haultfoeuille (2020; 2024); Sun and Abraham, 2021; Goodman-Bacon, 2021; Callaway and Sant’Anna, 2021) highlighted some limitations of linear regressions with period and group fixed effects (the ordinary DID estimation method)⁶, a widely used method in the

⁵Details on these suspension episodes are provided in Appendix A.1.

⁶The ordinary DID method relies on two major assumptions: the common trends assumption or parallel trends assumption

literature to estimate treatment effects. Indeed, it can produce biased estimations when treatment effects are heterogeneous since it could give negative weight to some of them. The assignment of these negative weights to treatment effects in estimating the average effect can lead to a bias in the estimated effect and, in extreme cases, to an inversion of the sign of the estimated effect. We first provide the ordinary DID estimation results and check their validity by applying the test proposed by [De Chaisemartin and d’Haultfoeuille \(2020\)](#), which consists of calculating the number of estimated ATTs attached to negative weights. The higher the percentage of ATTs attached to estimated negative weights in the total number of ATTs estimated by the ordinary DID method, the higher the probability of these results being biased.

To address these challenges and identify the effect of EITI implementation on economic growth, we consider EITI implementation as a treatment and the GDP per capita growth rate as the outcome variable, and we implement the heterogeneity-robust difference-in-differences (DID) estimator developed by [De Chaisemartin and d’Haultfoeuille \(2020\)](#), which is a method robust to heterogeneous treatment effects. Indeed, this estimator will be equal to a weighted average of two double differences: (a) a first one that compares the evolution of economic growth (outcome) in groups that go from non-treated to treated from $t-1$ to t and in groups untreated at both dates; (b) a second one that compares the evolution of economic growth in groups that move from treated to untreated from $t-1$ to t and in groups treated at both dates. More specifically, this method allows us to compare switchers to non-switchers, ensuring that the control used for a switcher had the same treatment as that switcher in $t-1$. That ensures that this estimator relies only on the identification assumption of parallel trends rather than the assumption of a constant treatment effect. In addition, the heterogeneity-robust DID estimator allows us to test the parallel trends assumption between the group of treated and untreated units by comparing the $t-2$ to $t-1$ outcome evolution of $t-1$ to t switchers and non-switchers. Intuitively, this placebo assesses if switchers and non-switchers were on parallel trends before the switch. Therefore, this estimator identifies the treatment effect of the switchers when they switch.⁷ We complement the heterogeneity-robust DID estimator with alternative estimation methods (in the robustness analysis). The dynamic heterogeneity-robust DID estimator (robust to heterogeneous and dynamic effects) developed by [De Chaisemartin and d’Haultfoeuille \(2024\)](#) is also employed to analyze the EITI’s dynamic effects on economic growth in Section 6.

(which states that in the absence of the treatment, the change in the outcome variable would have been identical in the treatment and control groups) and the assumption that the treatment effect is constant between groups and over time.

⁷See the original paper by [De Chaisemartin and d’Haultfoeuille \(2020\)](#) for more technical details.

4 Main results

First, we present the result of the ordinary DID estimation in column (1) of Table B11 (in Appendix B). This result indicates that implementing the EITI increases the GDP per capita growth rate by 1.02 percentage points, which is statistically significant at the 5% threshold. As explained previously, the results obtained using the ordinary DID method may not be robust to the heterogeneous effects of EITI implementation. Applying the validity test of ordinary DID estimation proposed by De Chaisemartin and d’Haultfoeuille (2020), the result indicates that, under the assumption of common trends, β estimates a weighted sum of 390 ATTs, 36 of which receive a negative weight, i.e., 9.23% of total estimated ATTs. This result means that the ordinary DID estimates are not entirely robust to the heterogeneous treatment effects of the EITI implementation.

Table 1: EITI and Economic Growth

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	Baseline	Excluding units	Excluding units	Applying filters	Resource-rich
GDP per capita growth rate	main result	<1% & >99%	<5% & >95%	to control units	countries sample
		percentiles	percentiles		
EITI	0.6947** (0.3212)	0.7456** (0.2988)	0.6869** (0.3491)	0.7069** (0.3152)	0.9394** (0.4679)
$DID_M^{pl,1}$	0.2495 (0.3537)	0.4562 (0.3392)	0.4550 (0.3387)	0.1967 (0.3572)	0.1012 (0.4926)
$DID_M^{pl,2}$	-0.4088 (0.4654)	-0.3986 (0.4393)	-0.7761 (0.4919)	0.4036 (0.5016)	-0.6009 (0.6208)
$DID_M^{pl,3}$	0.3676 (0.6158)	0.0774 (0.4505)	0.3272 (0.3715)	0.4403 (0.6308)	0.6030 (0.8308)
Control variables	Yes	Yes	Yes	Yes	Yes
Country & Year fixed effects	Yes	Yes	Yes	Yes	Yes

The results are obtained using the heterogeneity-robust DID estimator (De Chaisemartin and d’Haultfoeuille, 2020). 100 bootstrap replications were applied, and 7 placebo estimators were estimated. Robust standard errors are in parentheses. EITI is the treatment variable. Control variables: Initial real GDP per capita (log), official development assistance (log), natural resources rents (log), foreign direct investment (asinh), control of corruption, voice and accountability, political stability, commodity price index, inflation, and internal conflict. All control variables are lagged by one year. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Thus, Column (1) of Table 1 presents the results of the treatment effects of EITI implementation on economic growth, applying the heterogeneity-robust DID estimator developed in Section 3. In the regression, we include placebo estimators, which consider the past evolution of the outcome between treated and untreated units (we consider seven years before EITI membership for placebo effects estimations). The results indicate that implementing the EITI increases the GDP per capita growth rate by 0.69 percentage points, with a statistically significant effect at the 5% threshold. We also present three pre-treatment estimators ($DID_M^{pl,1}$, $DID_M^{pl,2}$, and $DID_M^{pl,3}$), corresponding respectively

to the second, third, and fourth years before the implementation of the EITI.⁸ The results show that all estimated placebo effects are not statistically significant.⁹ This means that before implementing the EITI, countries did not experience significant changes in their GDP per capita growth rate compared to those that never implemented the EITI. Thus, the result of the placebo analysis attests to the validity of the parallel trends assumption in our results (an assumption on which this estimator is based) and validates the non-anticipation assumption. In the next section, we check the robustness of our results by rigorously addressing potential additional identification threats that our analysis may face.

5 Robustness analysis

Our estimation results show that EITI implementation promotes economic growth in developing member countries compared to non-member countries. In this section, we perform several robustness tests. First, we check the robustness of our results by excluding potential outliers and considering alternative samples. Second, we control for additional control variables likely to influence the EITI membership and economic growth. Next, we test for robustness by focusing on the influence of the exogenous variation in world prices of extractive resources. In addition, we check robustness by conducting a placebo test. Finally, we estimate the effects of EITI implementation using alternative estimation methods such as instrumental variables and entropy balancing methods.

5.1 Alternative samples

We use alternative samples to ensure that a group of observations does not drive our results and that the control group is reasonably comparable to the treatment group. Firstly, we use samples that exclude potential outliers. Indeed, columns (2)–(3) of Table 1 show the estimation results considering samples that exclude observations below the 1st percentile and above the 99th percentile and observations below the 5th percentile and above the 95th percentile. These results are consistent with our baseline results and indicate a positive and statistically significant effect of EITI implementation on economic growth, with coefficients equal to 0.75 percentage points and 0.69 percentage points, respectively. Second, in column (4), we follow a similar process as in [Lin and Ye \(2009\)](#) by retaining

⁸Since [De Chaisemartin and d’Haultfoeuille \(2020\)](#) consider $t = -1$ as the reference period, $DID_M^{pl,1}$ compares the difference in the outcome between EITI and non-EITI countries in $t - 1$ with the difference between the two groups in $t - 2$, $DID_M^{pl,2}$ makes such a comparison between $t - 1$ and $t - 3$, while $DID_M^{pl,3}$ makes such a comparison between $t - 1$ and $t - 4$.

⁹We do not present the results for all placebo effect estimations in the table, but any placebo effect is significant.

in the control group only EITI non-members that have a real per capita GDP at least as large as those of the poorest EITI and with a population size at least as large as those of the smallest EITI member. Thirdly, in column (5), we retain only the sample of resource-rich countries. Following the literature (see, for example, Haglund, 2011; Dobbs et al., 2013; Coutinho et al., 2022), we define resource-dependent countries as those whose ratio of resource exports to total exports is equal to or greater than 20%, or whose ratio of extractive rents to GDP is equal to or greater than 10%, or whose ratio of resource revenue to total government revenue is equal to or greater than 20%. These two last results are consistent with our baseline results and indicate a positive and statistically significant effect of EITI implementation on economic growth, with coefficients equal to 0.71 percentage points and 0.94 percentage points, respectively. The relative stability of the coefficients in these specifications reflects the robustness of the analysis.¹⁰

5.2 Additional control variables

We test the robustness of our results using additional control variables likely to influence both the decision to implement the EITI and economic growth. This test will allow us to correct for potential estimation bias due to omitted variables. Referring to the literature on the determinants of EITI membership and the literature on economic growth, we have identified six main groups of additional control variables¹¹: A- Membership to other international organizations in natural resource management; B- Additional economic variables; C- Additional institutional and social variables; D- Major international events and reforms; E- Geographic variables; and F- Additional structural factors. We include each of these variables individually in the regression as an additional control variable. To avoid a potential bias due to reverse causality, these variables are lagged by one year (except for dummy variables). Table 2 presents these estimation results, and all results are consistent with our baseline results, i.e., adding additional control variables keeps our baseline results unchanged.

Finally, we augment our baseline specification by adding this set of control variables by group. These results, presented in Table 3, also confirm our baseline results. The different specifications performed in this subsection confirm the robustness of our results to the addition of control variables. Moreover, these specifications allow us to address concerns about potential estimation bias from omitting pertinent control variables.

¹⁰We note a higher effect for the sample of resource-rich countries.

¹¹The reasons for choosing these variables are discussed in Appendix A.3.

Table 2: EITI and Economic Growth
Additional control variables, estimations using heterogeneity-robust DID estimator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	Kimberly	ICGLR	OPEC	OPEC+	Public	Trade	Financial	Public
GDP per capita growth	Process membership	membership	membership	membership	Debt	openness	development	investments
EITI	0.7078** (0.3220)	0.7114** (0.3320)	0.6928** (0.3335)	0.7026** (0.3308)	0.7035** (0.3529)	0.8043* (0.4453)	0.7359** (0.3580)	0.6790** (0.3165)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dependent variable:	Private	General	Exchange	Rule of	Government	Religious	Ethnic	Global
GDP per capita growth	investments	government expenditures	rate	law	effectiveness	tensions	tensions	financial crisis
EITI	0.6889** (0.3240)	0.7181** (0.3156)	0.7253** (0.3671)	0.6908** (0.3200)	0.7035** (0.3270)	0.6860** (0.3213)	0.6983** (0.3176)	0.6947** (0.3212)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Dependent variable:	Commodity	Fiscal	IMF	Sub-Saharan	Latin-America	Population	Labor	Income
GDP per capita growth	prices super cycle period	rule	programs	region	region	growth	force	inequality
EITI	0.6947** (0.3212)	0.6862** (0.3215)	0.6947** (0.3214)	0.6947** (0.3212)	0.6947** (0.3212)	0.6889** (0.3196)	0.6731** (0.3178)	0.8587** (0.4371)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The results are obtained using the heterogeneity-robust DID estimator (De Chaisemartin and d’Haultfoeuille, 2020). Robust standard errors are in parentheses. EITI is the treatment variable. Control variables are included and are lagged by one year. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

5.3 Focus on the main resource world prices

The dynamic of world prices of the main resource (mineral or fuel) produced by countries is an essential factor in estimating the effects of EITI implementation on economic growth. Indeed, the evolution of world prices of the main resource produced is a factor that can affect both a country’s decision to join the EITI and its economic growth. Like Berman et al. (2017), we exploit exogenous changes in the world price of the main resource produced by the countries in the sample. We identify ten resources for which price data are available¹², and the main resource produced is defined as the resource with the highest production value over the entire study period.¹³ We thus replace the commodity price index variable (used in the main analysis as a control variable) with the logarithm of the main produced resource world prices.¹⁴ The results are presented in column (1) of Table B7. However, diamond prices can be problematic because they vary considerably depending on the quality and type of diamonds produced and the unstable evolution of the price series of the different

¹²These resources are bauxite (aluminum), coal, copper, diamond, gold, iron, oil, platinum, silver, and zinc.

¹³The list of the main resources identified for each country is available in Appendix B, Table B8.

¹⁴Details on data and their sources are provided in Appendix B, Table B16.

Table 3: EITI and Economic Growth
Additional control variables included by group

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: GDP per capita growth	Other organizations in natural resource management group	Economic variables group	Institutional and social variables group	Major international events and reforms group	Geographic variables group	Structural factors group
EITI	0.7252** (0.3422)	1.0291** (0.4385)	0.6956** (0.3216)	0.6865** (0.3213)	0.6947** (0.3212)	0.8317** (0.4199)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

The results are obtained using the heterogeneity-robust DID estimator (De Chaisemartin and d’Haultfoeuille, 2020). Robust standard errors are in parentheses. EITI is the treatment variable. Control variables are included. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

qualities (Berman et al., 2017). Thus, we exclude diamonds when identifying the main resource and present the results in column (2) of Table B7. The results are consistent with our primary results: implementing the EITI increases the GDP per capita growth rate in developing member countries compared to non-member countries.

5.4 Additional placebo test

Other reforms and policies can accompany the implementation of EITI. In addition to the robustness tests already achieved, we conducted an additional placebo test by performing a random falsification test considering placebo treatment dates in the treatment group. Specifically, we randomly shift the treatment dates of the treated units and re-estimate the effect of the EITI implementation on economic growth (columns (1) and (2) of Table B9, respectively, for the static and dynamic effects). The intuition is that if our baseline results are due to EITI implementation, using placebo dates should produce non-statistically significant estimated effects of EITI implementation. The results indicate non-statistically significant effects of EITI implementation on economic growth and support the robustness of our baseline results. This additional placebo test confirms that our results are not driven by confounding factors such as implementing other reforms or policies.

5.5 Alternative estimation methods

To verify that our results are not influenced by the analysis method, we use two alternative estimation methods: instrumental variables (IV) and entropy balancing estimation methods.

Instrumental variables method. To deal with the potential self-selection bias of EITI implementation (Lujala, 2018), some studies in the literature conducted an instrumental variables estimation. We have already controlled for factors influencing countries’ decision to join and implement the

EITI standard. Moreover, in our baseline analysis, we tested and validated the parallel trends assumption. Furthermore, following the literature (Villar, 2020; Okada and Shinkuma, 2022), we adopt an instrumental variables estimation approach by using the percentage of neighboring countries (with common borders) that are EITI members among the total number of neighboring countries as an instrumental variable. The use of this neighborhood variable as an instrumental variable comes from studies on the geographic diffusion of public policies. The intuition is that a country's participation in the EITI is influenced by its neighbors' (exogenous) participation because a country is more likely to participate if its neighboring countries join the EITI (Okada and Shinkuma, 2022). This choice can be explained by factors like competitive, coercive, and imitative motives (Villar, 2020). We construct our instrument as follows:

$$NeighboursEITI_{it} = \frac{1}{N_{it}} \sum_{j \neq i}^N \times EITI_{jt} \quad (2)$$

Where j indicates the country that borders country i in year t (its neighboring country). N_{it} is the total number of countries that border country i in year t . $EITI_{jt}$ is a dummy variable equal to 1 when the country j is an EITI member in year t . The variable " $NeighboursEITI_{it}$ " is our first instrument and indicates, for each country in the sample and each year, the percentage of its neighboring countries that are EITI members. In addition to this instrument, we use the lagged EITI as a second instrument. Indeed, in addition to the test of the relevance of the instruments, the use of two instruments allows us to test the exogeneity (exclusion condition) and instrument strength.

Column (2) in panel A of Table B11 presents the results of the first-stage equation, where we regress the treatment variable on instruments and all control variables of the baseline model and indicate that our two instruments are positively and significantly correlated to the treatment variable. Column (3) of panel B presents the second-stage result and indicates a positive and statistically significant effect of EITI implementation on GDP per capita growth.¹⁵

Entropy balancing method. As an alternative impact evaluation method, we use the entropy balancing method, which is a non-parametric impact evaluation method based on a matching procedure (for more details on this method and its two-step estimation procedure, see, e.g., Hainmueller, 2012; Neuenkirch and Neumeier, 2016; Sawadogo, 2020; Apeti and Edoh, 2023; Bambe et al., 2024; Kinda and Thiombiano, 2024). This method limits the selection bias problem in the adoption of EITI. Specifically, entropy balancing allows us to identify the effect of EITI implementation on eco-

¹⁵In addition, the Kleibergen-Paap F-statistic is significantly higher than the value of the Stock-Yogo test at the 10% critical threshold, and the Hansen p-value is greater than 0.10 (attesting the relevance and strength of instruments used and confirming the exclusion condition).

nomic growth by comparing EITI member and non-member countries that are similar on observable variables while controlling for country and year-fixed effects. The entropy balancing method is implemented in two main stages. First, weights are calculated and assigned to observation units that are not exposed to the treatment but have observable characteristics as similar as possible to the treated units. The computation of these weights satisfies defined balance constraints concerning the specified characteristics, ensuring that the synthetic control group consists, on average, of observation units not exposed to the treatment as similar as possible to the treated units. This method creates a counterfactual group whose difference from the treatment group will be the implementation of the EITI based on the defined observable characteristics. Following [Neuenkirch and Neumeier \(2016\)](#), we choose equilibrium constraints that impose equal covariate means between the treatment and control groups. In other words, we want to ensure that the control group, on average, has untreated units similar to treated ones. In the second step, to estimate the treatment effect on the treated (ATT) of EITI implementation on economic growth, we use the weights from the first stage in a regression analysis where the GDP per capita growth rate is our dependent variable, and the EITI implementation dummy is the main interest variable. We also control for year and country-specific effects and include the entropy balancing covariates (used in the first stage) to improve the estimation efficiency because it is equivalent to including control variables in a randomized experiment.

Firstly, we verify the effectiveness of entropy balancing in constructing the counterfactual group. Descriptive statistics on the control variables considered in the analysis are presented in panel A of [Table B10](#). This panel provides information on the sample means before weights for all control variables between country-year observations with EITI implemented, which represent the treatment group (column (1)), and country-year observations without EITI implemented, the potential synthetic control group (column (2)). Column (3) shows the differences in means between these two groups. The t-test values and corresponding p-values (columns (4) and (5)) indicate that the differences between the treatment and control groups are significant at the 1% level for most of the considered variables. From the first stage of the entropy balancing method, we construct a synthetic control group that is as comparable as possible to the treatment group concerning all control variables considered. This is achieved by reweighting the untreated observations using these control variables. Panel B of [Table B10](#) shows the results. Columns (1) and (2) summarize the results for the sample means of the control variables for the treated and untreated groups, respectively. Columns (4) and (5) indicate that entropy balancing eliminated differences between the means of variables for the treatment and control groups because no differences between the variables are significant.

Secondly, the estimation result performed in the second step is reported in column (4) of Table B11. Once again, the result remains consistent with our main findings and indicates a robust positive and statistically significant effect of EITI implementation on economic growth.

Based on the results of these different specifications, we can conclude that our baseline results are robust since the change in methods confirms our conclusions concerning the estimated effect of EITI implementation on economic growth. However, it is important to point out that our baseline results are more robust than those obtained using alternative estimation methods since the heterogeneity-robust DID estimator is a much more relevant method regarding key potential challenges posed by the EITI implementation design.

6 Dynamic effects of EITI implementation on economic growth and transmission channels

6.1 Dynamic effects of EITI implementation on economic growth

In this section, we analyze the dynamic effects of EITI implementation on economic growth. Indeed, beyond knowing whether EITI membership and the implementation of the standard affect economic growth, an even more interesting question is whether this effect persists over time. Moreover, countries can be suspended from the organization for some reasons (as explained in Appendix A.1), leading to these countries' breakdowns in the EITI implementation process. As a result, past treatments may thus influence the treatment outcome at time t . To ensure the validity of our analysis, we must use an estimator that allows us to estimate a difference-in-differences specification while considering heterogeneous and dynamic treatment effects. To analyze the dynamic effects of EITI implementation on economic growth while addressing these potential threats to identification, we implement the recent dynamic heterogeneity-robust difference-in-differences (dynamic heterogeneity-robust DID) estimator developed by [De Chaisemartin and d'Haultfoeuille \(2024\)](#). The intuition behind this estimator is that it compares the first-time switchers to the not-yet switchers. Specifically, it compares groups whose treatment changes for the first time at t to groups whose treatment has not yet changed at t (indeed, only these units can be considered valid controls according to [De Chaisemartin and d'Haultfoeuille \(2023\)](#)). Moreover, this estimator allows us to test the parallel trends assumption through placebo analysis and calculate treatment effects during some periods after the EITI membership. Specifically, we estimate the following equation:

$$GDPpc_{it} = \alpha_i + \mu_t + \sum_{t=-8}^{-2} \beta_e^{Lag} \times EITI_{it}^e + \sum_{t=0}^{16} \beta_e^{TE} \times EITI_{it}^e + \delta X_{it} + \epsilon_{it} \quad (3)$$

Where $GDPpc_{it}$ is the GDP per capita growth rate of country i in year t ; e is the event study time; α_i represents country-fixed effects that capture time-invariant country-specific effects; μ_t represents year-fixed effects that capture time-specific factors affecting sample countries; $EITI_{it}^e$ is an "event-study" dummy variable that takes value one if a unit i is e periods away from initial treatment at time t and zero otherwise. X_{it} is a set of control variables; ϵ_{it} is the random error term. The period $t = -1$ is considered the baseline year for the treatment effects computation. We, therefore, consider seven placebo estimators to be estimated and calculate the dynamic effects over 16 years after the introduction of the treatment.

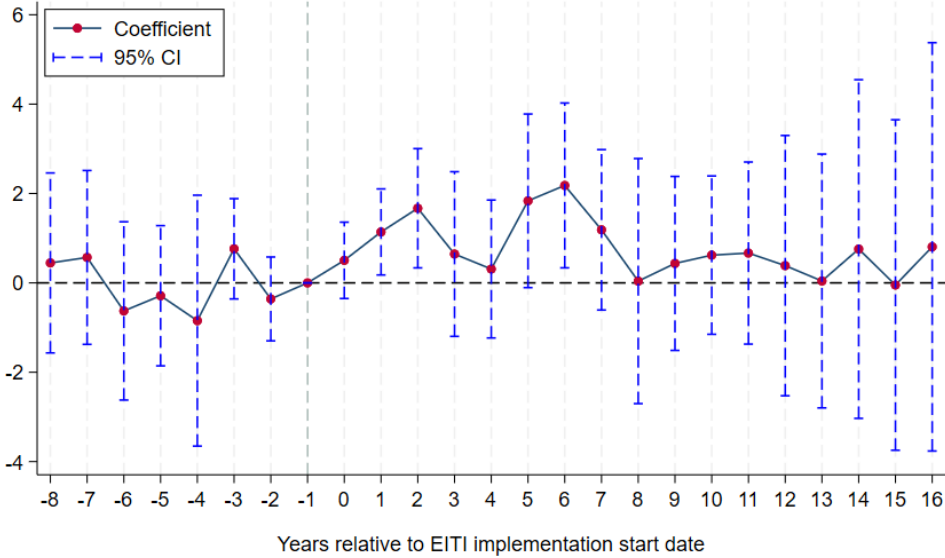


Fig. 2: EITI dynamic effects on GDP per capita growth applying the dynamic heterogeneity-robust DID estimator of De Chaisemartin and d’Haultfoeuille (2024). Bars represent 95% confidence intervals around the effects of long differences and placebo tests. 100 bootstrap replications were applied. All control variables are included.

Fig. 2 presents the estimation results of the dynamic effects of EITI implementation on GDP per capita growth. Firstly, we observe that pre-trends leading up to the EITI membership are not statistically different from zero, confirming the parallel trends assumption and the absence of anticipation effects. Next, this figure shows two distinct stages of positive and statistically significant effects of EITI implementation on economic growth. The first stage shows positive and statistically significant effects of EITI implementation on economic growth in the short term, one and two years after the EITI membership. However, these initial effects become insignificant after the third year of implementation. A second stage of positive and statistically significant effects occurs in the medium term, after the fifth and sixth years of implementation, and is even larger in magnitude than the first

stage.

More interestingly, we exploit the correlation between the different phases of EITI implementation (and, more precisely, their average duration in the sample) to indirectly assess a variation in the treatment effects of member countries according to these different phases. This analysis reveals that the first part of the positive and significant effects of the EITI corresponds to the period of countries' commitment, while the second part of the positive and significant effects corresponds to the period after the countries' candidacy has been validated and before the countries achieve compliance status.¹⁶ This suggests that the positive and significant annual effects of the EITI on economic growth are observed, on average, during the commitment periods and after country validation.

In the following subsection, we analyze the transmission channels before discussing the non-significance of the effects of EITI implementation in the long term to provide more explanations on the source of these effects.

6.2 Transmission channels

As identified and explained in Section 1, we assume that the improvement of investment climate and the increase in foreign direct investment and resource revenue are the main channels through which EITI implementation may affect economic growth. We test these main transmission channels by adopting a two-step approach.¹⁷

In the first step, we test the relationship between the potential channel and economic growth by performing panel fixed effects estimations, controlling for country and year fixed effects. In the second step, we analyze the treatment effects of EITI implementation on channels by applying the same methodologies as in our main analysis (the estimators of [De Chaisemartin and d'Haultfoeuille \(2020\)](#) and [De Chaisemartin and d'Haultfoeuille \(2024\)](#)). [Gutmann et al. \(2023\)](#) pointed out that evaluating the transmission channels based on a uniform empirical framework compared to those employed in the main analysis ensures a reasonable identification of causal effects, which are comparable and cannot result from carefully selected model specifications. Specifically, we estimate Equation 3 using investment climate, foreign direct investment, and resource revenue as dependent variables.¹⁸ Our

¹⁶The average commitment duration of countries (from commitment to join the EITI to candidate validation) in the sample is about one year and eleven months. The sample's average duration of the candidate validation period (from candidate validation to compliance status) is about four years and six months. The average duration of the compliance period (from compliance status to the end of the study period) in the sample is seven years and one month, while the average suspension time is two years and one month.

¹⁷[Gutmann et al. \(2023\)](#) and [Bambe et al. \(2024\)](#), for instance, have also implemented a similar approach.

¹⁸More details on these variables are available in Tables [B15](#) and [B16](#).

intuition is that if the potential channel positively (respectively negatively) and significantly affects economic growth, and EITI implementation has a positive (respectively negative) and significant effect on this channel, this channel can be considered as a valid channel through which transit EITI implementation effects on economic growth. However, it is important to note that the fact that EITI implementation affects a potential channel and that this channel affects economic growth is a necessary but not sufficient condition for establishing the channel’s validity.

Table 4: EITI and Economic Growth
Validity of transmission channels

Panel A: Relationship between the channel and economic growth			
	(1)	(2)	(3)
Investment climate	1.5067*** (0.5221)		
Foreign direct investment (asinh)		0.3122** (0.1557)	
Resource revenue (in % of GDP)			0.0739*** (0.0276)
Panel B: Effect of the EITI implementation on the channel			
	(1)	(2)	(3)
Panel B1: Static analysis results	Investment climate	Foreign direct investment	Resource revenue
EITI	0.0379** (0.0166)	0.1966** (0.0952)	0.5588** (0.2770)
Panel B2: Dynamic analysis results			
EITI	0.1399*** (0.0485)	0.3747** (0.1711)	1.3507*** (0.5471)

Panel A presents the relationship between the different potential channels and economic growth based on Fixed Effects regressions. Panels B1 and B2 report the effects of EITI implementation on the potential channels based on the heterogeneity-robust DID estimators of [De Chaisemartin and d’Haultfoeuille \(2020\)](#) and [De Chaisemartin and d’Haultfoeuille \(2024\)](#), respectively, applying 100 bootstrap replications. The equation specified is the same as in the main model, replacing the dependent variable with the potential channel. Country and year fixed effects are included. Robust standard errors are in parentheses. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

First, panel A of Table 4 shows the results of the analysis of the relationship between potential channels and economic growth. These results indicate that investment climate, foreign direct investment, and resource revenue are positively correlated with the GDP per capita growth rate.

Second, the analysis results of EITI implementation effects on potential channels are presented in Fig. 3, and the average effects are reported in Panel B of Table 4 (Panel B1 for the static effects and Panel B2 for the dynamic effects). These results indicate that, on average, EITI implementation improves the investment climate index and increases foreign direct investment and resource revenue. In addition, the analysis of foreign direct investment and resource revenue shows that all placebo effects are not statistically significant, meaning that before implementing the EITI, countries did not experience significant changes in their foreign direct investment and resource revenue mobilization

compared to those that never implemented the EITI. This attests to the validity of the parallel trends assumption. However, the analysis of climate investment is not as robust as those of other transmission channels. Indeed, the parallel trend assumption is not valid for this variable since there appears to be a positive trend throughout the study horizon, suggesting that the identification is wrong. Therefore, the increase in foreign direct investment and resource revenue represent the valid transmission channels through which EITI implementation affects economic growth.

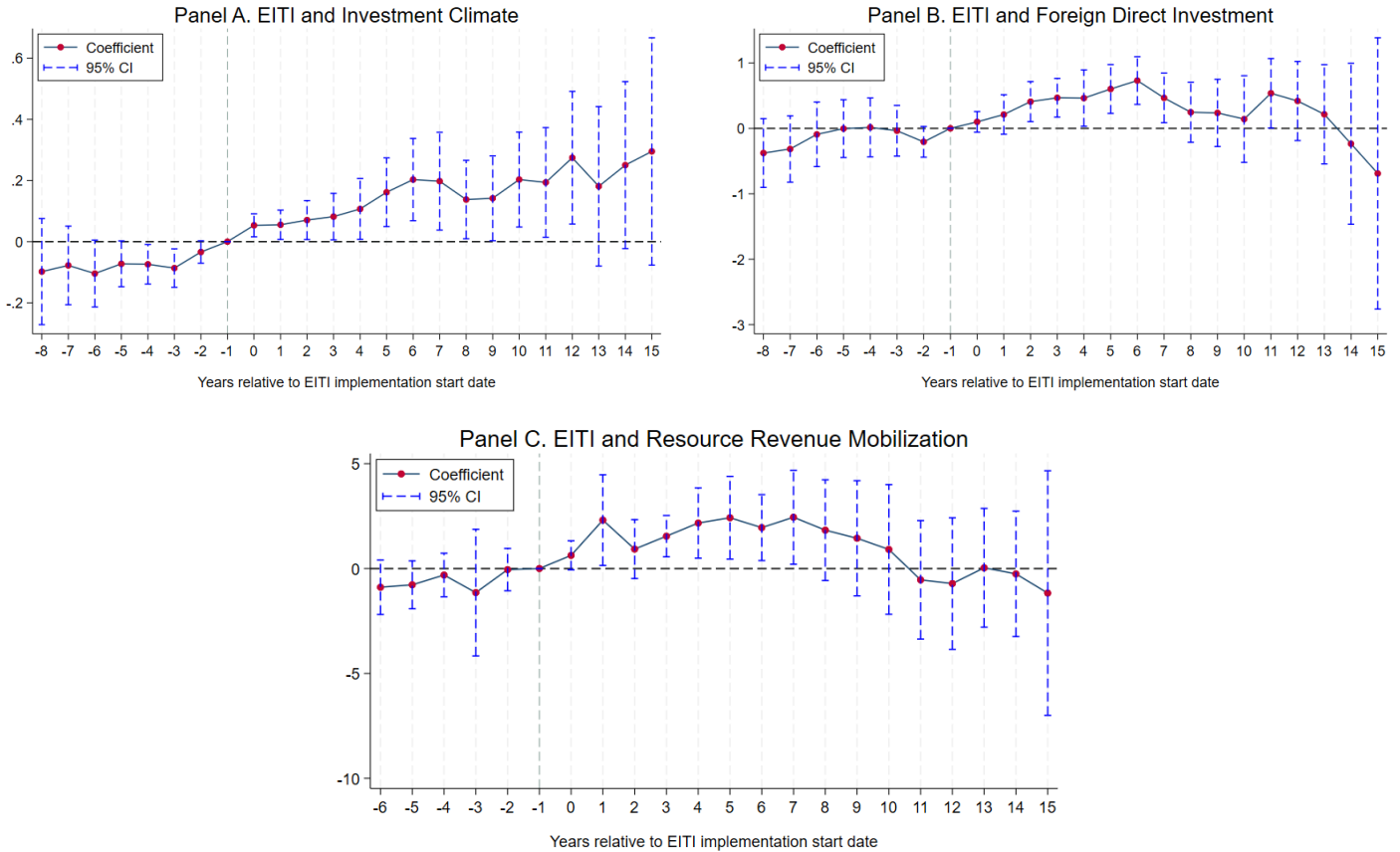


Fig. 3: Results are obtained using the dynamic heterogeneity-robust DID estimator (De Chaisemartin and d’Haultfoeuille, 2024), applying 100 bootstrap replications. 5 placebo estimators were estimated. Bars represent the 95% confidence intervals around long differences effects and placebo tests.

Third, we also investigate three additional potential transmission channels: corporate tax revenue, personal income tax revenue, and income inequality. Implementing the EITI could have a diffusion effect on other sectors. Indeed, some countries may complement the reforms implemented within the framework of the EITI with other reforms intended to increase tax revenue from other sectors of activity, which could influence economic growth. In addition, a possible effect of EITI implementation on income inequality could influence its effect on economic growth. Following the same two-step approach used previously, Table B12 presents the results of this additional transmission channel analysis. On the one hand, Panel A indicates a positive and statistically significant effect of corporate

tax revenue on economic growth¹⁹, a positive but non-statistically significant effect of personal income tax revenue on economic growth, and a negative and statistically significant effect of income inequality on economic growth.²⁰ On the other hand, Panels B1 and B2 show that EITI implementation has no statistically significant effects on corporate tax revenue, personal income tax revenue, and income inequality, concluding that these variables are not valid transmission channels of the effects of EITI implementation on economic growth.

7 Discussion on the non-significance of EITI implementation effects in the long-term

The analysis carried out in Sections 4 and 5 indicates positive and statistically significant average effects of EITI implementation on economic growth in member countries. Our more in-depth analysis of the EITI's dynamic effects in Section 6 highlights even more interesting results: the EITI's effects occur only in the short-term and medium-term but are no longer significant in the long-term. These last results are relevant and question the effectiveness of the EITI in fostering sustainable development in member countries. To explain the EITI's mitigated results in promoting long-term economic growth, we postulate and explore four possible reasons: (1) The lack of evidence of a negative relationship between natural resource abundance and long-term economic growth over the study period; (2) The possible influence of an increasing reliance on taxes; (3) The signal effect some countries are looking for during the EITI implementation process; and (4) The lack of effectiveness of the EITI in reducing levels of corruption in member countries.

¹⁹Our result on corporate tax revenue is opposite of those of Lee and Gordon (2005), who found a negative and statistically significant relationship between corporate tax rate and GDP per capita growth. To deal with possible endogeneity issues, we follow their methodology using, as instrumental variables, the weighted average personal and corporate tax revenue in other countries, weighting by the inverse of the distance between the two countries. Data on distance measures between two countries come from Centre D'Etudes Prospectives Et D'Informations Internationales (CEPII). The results using the instrumental variables method are similar to our baseline results and are available on request. Analyzing the relationship between tax structure and economic growth focusing only on developing countries remains an interesting question for future research.

²⁰Our results concerning the effect of income inequality on economic growth are in line with those of a significant part of the literature, such as Persson and Tabellini (1994), Alesina and Rodrik (1994), and Alesina and Perotti (1996). In addition, Barro (2000) found that the effect of income inequality on economic growth is negative in less developed countries.

7.1 Exploring the relationship between natural resource abundance and economic growth in the long-term

The relationship between natural resource abundance and economic growth, in the long run, could partly explain our results on the long-term effects of the EITI on economic growth. Indeed, implementing the EITI may not contribute to long-term growth if natural resources do not negatively affect economic growth in the long run over the study period. We thus investigate the effects of natural resources on economic growth in our dataset in the long run without controlling for EITI and compare results to previous studies that also focused on the long run.

First, we follow the same methodology as in [Brunnschweiler \(2008\)](#) using cross-section data and estimate the following equation:

$$G^i = \alpha_0 + \alpha_1 Y_{95}^i + \alpha_2 R^i + \alpha_3 INST^i + \alpha_4 Z_i + \epsilon^i \quad (4)$$

Where G^i is the logarithm of average economic growth between 1995 and 2019 in country i ; Y is the logarithm of GDP in 1995, R and $INST$ are the natural resource abundance and institutional quality variables, respectively; Z is a vector of other covariates, and ϵ is the random error term.

We use the same variables as in [Brunnschweiler \(2008\)](#). Specifically, we use three indicators for natural resource abundance: the share of primary exports in GDP, the logarithm of per capita total natural capital, and the logarithm of per capita subsoil wealth. For each variable, we use the average value from 1995 to 2019. The two variables used to measure institutional quality are the rule of law index and the government effectiveness index (the average values over the study period are also used). We also include regional effects. Details on these variables and their sources are provided in [Table B16](#). [Table 5](#) presents the results using standard cross-country Ordinary Least Squares (OLS) regressions. Columns (1)–(5) show the results using the rule of law index as the main institutional indicator, while columns (6)–(10) indicate the results using the government effectiveness index as the main institutional indicator. Firstly, while [Brunnschweiler \(2008\)](#) found a significant negative effect of the share of primary exports in GDP on economic growth, columns (1) and (6) of [Table 5](#) show a positive and statistically significant relationship of natural resource abundance on economic growth when using this indicator. Secondly, columns (2)–(3) and (7)–(8) show a positive and statistically significant effect between natural resource abundance and economic growth when using the logarithm of per capita total natural capital as the main natural resource abundance indicator. Moreover, our results remain significant when we control for regional effects. Thirdly, the results obtained using the logarithm of per capita subsoil wealth as the main natural resource abundance indicator are not

as robust as in [Brunnschweiler \(2008\)](#). Indeed, columns (4)–(5) show positive but not statistically significant coefficients (when we use the rule of law index), while columns (9)–(10) show positive and statistically significant effects at the 10% threshold. In all estimates, the institutional quality indicators are positive and highly significant, confirming the importance of institutional quality in the growth process. In line with the results of [Brunnschweiler \(2008\)](#), our results suggest that natural resource abundance enhances long-term growth and show no evidence of a negative and significant effect of natural resource abundance on economic growth.

Table 5: Natural resources and economic growth. OLS regressions
Dependent variable: Log of GDP per capita growth, average 1995-2019

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Primary exports (in GDP)	0.0115* (0.0067)					0.0156** (0.0071)				
Total natural capital (logarithm)		0.3554*** (0.1241)	0.2450** (0.0946)				0.3742*** (0.1255)	0.2673*** (0.0959)		
Subsoil wealth (logarithm)				0.0604 (0.0367)	0.0474 (0.0291)				0.0683* (0.0382)	0.0503* (0.0279)
Rule of law	0.5975** (0.2538)	0.4161** (0.2020)	0.5916*** (0.1853)	0.3733* (0.2049)	0.5793*** (0.2026)					
Government effectiveness						1.0991*** (0.3036)	0.8059*** (0.2086)	0.8092*** (0.2104)	0.7473*** (0.2567)	0.7504*** (0.2369)
Initial GDP per capita (logarithm)	-0.2213** (0.0930)	-0.3861*** (0.1035)	-0.4392*** (0.0941)	-0.2837** (0.1140)	-0.4117*** (0.0942)	-0.4524*** (0.1007)	-0.5568*** (0.1021)	-0.5937*** (0.1075)	-0.4522*** (0.0921)	-0.5309*** (0.1120)
Africa & Middle East			-1.2540*** (0.1666)		-1.2326*** (0.1736)			-1.1475*** (0.1695)		-1.1297*** (0.1757)
Asia & Ocean			-0.4086** (0.1885)		-0.4313** (0.1875)			-0.4675** (0.1883)		-0.4776** (0.1930)
North America			-0.6831 (0.4630)		-0.5585 (0.5164)			-0.4855 (0.5207)		-0.5642 (0.6384)
Central & South America			-0.8306*** (0.1585)		-0.7417*** (0.1678)			-0.7186*** (0.1675)		-0.6665*** (0.1716)
Observations	87	79	79	74	74	87	79	79	74	74
R^2	0.0853	0.1281	0.4368	0.0926	0.4466	0.1976	0.2258	0.4756	0.1789	0.4696

The dependent variable is log of economic growth, average 1995-2019. Robust standard errors are in parentheses. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Furthermore, panel A of Table [B13](#) (in [Appendix B](#)) shows the results when we use alternative natural resource abundance indicators, namely natural resource rents, fuel rents, and mineral rents. This follows the same analysis as [Arin and Braunfels \(2018\)](#), who use oil rents as the main natural resource abundance indicator. The results indicate positive and statistically significant effects of natural resource total rents and oil rents on economic growth, while the effect of mineral rents is not statistically significant (in line with the findings of [Arin and Braunfels \(2018\)](#)). These additional results show no evidence of a negative growth effect of natural resource abundance in the long run.

Second, we follow the same methodology as [Alexeev and Conrad \(2009\)](#)²¹. These authors measure long-term growth by GDP per capita levels (especially in the last year of the study period) rather than using growth rates over the study period. In addition, they suggested that one of the main

²¹Their methodology differs from the methodology used in [Brunnschweiler \(2008\)](#).

reasons for the positive evidence of a resource curse in the literature is the inclusion of initial GDP per capita in the regression.²² Using cross-section data, we estimate the following equation:

$$Y_{i,2019} = \beta_0 + \sum \beta_i X_i + \gamma N_i + \epsilon_i \quad (5)$$

Where $Y_{i,2019}$ is the logarithm of per capita GDP in year $T=2019$ in country i ; N represents a measure of oil endowment; X_i is a vector of other covariates, and ϵ_i is the random error term.

We also use the same variables as [Alexeev and Conrad \(2009\)](#). Specifically, we use five indicators for natural resource abundance: the share of primary exports in GDP, the value of per capita oil production (in logarithm), the share of oil production in GDP, the value of per capita mineral production (in logarithm), and the share of mineral production in GDP. For each variable, we use the value in the last year of the study period (year=2019). The rule of law index (the value in 2019) is the variable used to measure institutional quality. We also include regional effects as in the authors' original paper. Details on these variables and their sources are provided in [Table B16](#). [Table 6](#) presents the estimation results using standard cross-country Ordinary Least Squares (OLS) regressions. Columns (1)–(5) show the results without controlling the institutional indicator, while columns (6)–(10) indicate the results when controlling the rule of law index. Firstly, columns (1) and (6) show a positive and statistically significant effect of the share of primary exports in GDP on economic growth. Secondly, columns (2)–(3) and (7)–(8) show a positive and statistically significant effect between the measures of oil endowment and economic growth. Considering the effect of mineral endowment on economic growth, columns (4) and (9) show a positive and statistically significant relationship, while columns (5) and (10) show positive but not significant coefficients. Thus, in line with the work of [Alexeev and Conrad \(2009\)](#), our results suggest no evidence of a negative and significant effect of natural resource abundance on economic growth.

Furthermore, panel B of [Table B13](#) shows the results using natural resources, fuel, and mineral rents as resource abundance indicators. The results also indicate positive and statistically significant effects of natural resource total rents and oil rents on economic growth, while the effect of mineral rents is not statistically significant. These additional results also show no evidence of a negative and significant effect of natural resource abundance on economic growth.

In conclusion, we investigated whether natural resource abundance negatively affects economic growth in our dataset in the long run. Indeed, EITI implementation may not contribute to long-term growth if there is no negative relationship between natural resource abundance and economic growth in the long run. We follow different methodologies, such as [Brunnschweiler \(2008\)](#), [Alexeev and](#)

²²See [Alexeev and Conrad \(2009\)](#) for more details.

Table 6: Natural resources and economic growth. OLS regressions
 Dependent variable: Log of per capita GDP in 2019

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Primary exports (logarithm)	0.1511** (0.0732)					0.1884*** (0.0647)				
Oil production, per capita (logarithm)		0.1462*** (0.0264)					0.1610*** (0.0194)			
Oil production (in GDP)			0.2707*** (0.0655)					0.3406*** (0.0513)		
Mining production, per capita (logarithm)				0.0467** (0.0231)					0.0359* (0.0196)	
Mining production (in GDP)					0.0059 (0.0377)					0.0090 (0.0326)
Rule of law						0.7543*** (0.1269)	0.7943*** (0.1032)	0.8506*** (0.1142)	0.6909*** (0.1372)	0.7138*** (0.1411)
Latitude	2.7034*** (0.5143)	2.3936*** (0.4461)	2.6078*** (0.4623)	2.4868*** (0.5529)	2.7043*** (0.5356)	2.6167*** (0.4466)	2.2738*** (0.3106)	2.4858*** (0.3442)	2.4654*** (0.5061)	2.6178*** (0.4970)
Latin America	1.2955*** (0.1687)	1.0649*** (0.1639)	1.2171*** (0.1608)	1.1250*** (0.1877)	1.2248*** (0.1904)	1.2213*** (0.1306)	0.9535*** (0.1179)	1.1120*** (0.1131)	1.0676*** (0.1399)	1.1359*** (0.1462)
East Asia	0.5806 (0.6271)	0.3001 (0.4610)	0.5687 (0.5220)	0.4262 (0.4706)	0.5861 (0.4557)	0.3180 (0.7544)	-0.0021 (0.5476)	0.2698 (0.6326)	0.2289 (0.5347)	0.3356 (0.5293)
Observations	96	96	96	96	96	96	96	96	96	96
R ²	0.4064	0.5344	0.4758	0.4028	0.3796	0.5569	0.7015	0.6628	0.5291	0.5158

The dependent variable is per capita GDP in 2019. Robust standard errors are in parentheses. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Conrad (2009), and Arin and Braunfels (2018). Comparing our results to those of these previous studies, we conclude that there is no evidence of a negative relationship between natural resource abundance and economic growth in the long run in our dataset.

7.2 A possible influence from an increasing reliance on taxes?

A second explanation for the mitigated effects of EITI implementation on long-term growth could be a possible increase in the reliance of EITI members on non-resource taxes. Indeed, if developing member countries increasingly shift towards generating revenue through non-resource taxation rather than relying on extractive industries revenue, this could mitigate the positive effects of EITI implementation on economic growth. To investigate whether increasing reliance on taxes matters, we considered two additional control variables: personal and corporate tax revenue (both in percentage of GDP).²³ Panels A and B of Figure B1 plot the dynamic effects of EITI implementation on economic growth, controlling corporate tax revenue and personal income tax revenue, respectively. Including these additional control variables does not change our main results since these results indicate an average positive and statistically significant effect of EITI implementation on economic growth. In addition, controlling for these additional variables does not change the conclusion on the effects of EITI implementation on long-run economic growth: the positive effects are observed in the short-term and medium-term.

²³Details on the source of these variables are provided in Table B16.

7.3 A possible signal effect targeting

Some countries may also see EITI membership as a mechanism to signal to the international community their potential intention to fight corruption and improve transparency and accountability in the extractive sector to gain certain benefits. In this case, these countries will not consider the EITI implementation as a real opportunity to achieve the effective contribution of the extractive sector to development financing. They will not provide sufficient effort to enable structural change in managing natural resources. There is some evidence in the literature suggesting this signal effect. Indeed, countries see EITI membership as a way to improve their reputation in the international community (Pitlik et al., 2010; David-Barrett and Okamura, 2016). This signal effect could serve to attract more foreign investments through the commitment expressed by countries on their willingness to improve transparency and accountability in the management of natural resources (Öge, 2016). Our results of the analysis of the effects of EITI implementation on foreign direct investment confirm that EITI member countries attract more foreign investment during the implementation process. Considering these factors, if countries join the EITI to benefit from a signal effect, they will have no long-term incentives to make the necessary efforts in the implementation process, mainly once they achieve compliance status.

7.4 Exploring the trend in corruption levels

The lack of EITI's effects on long-run growth could be explained by the lack of effects on reducing corruption levels in member countries. This hypothesis is supported by the results of Kolstad and Wiig (2009), who conclude that transparency alone is insufficient to improve leaders' behavior and is, therefore, not the ideal solution for tackling corruption and enhancing government accountability. Previous studies have also provided evidence suggesting that the EITI has not been effective in reducing corruption (Sovacool et al., 2016; Kasekende et al., 2016).

To test this hypothesis, we explore the effect of EITI implementation on corruption levels using three different indicators of corruption: the World Governance Indicators (WGI) control of corruption index used in the main analysis, the International Country Risk Guide (ICRG) corruption index, and the Bayesian corruption index. Panels A and B of Table B14 (in Appendix B) show the results of EITI implementation effects on these corruption indicators (respectively for the static and dynamic effects) and indicate that the EITI has not been effective in reducing corruption at the national level in member countries. Our results are similar to those previously found in the literature. However, it is

essential to note that one limitation of this analysis is that the indicators used to measure corruption are not exclusive to the extractive sector.

8 Concluding remarks and policy implications

This study analyzes the treatment effects of EITI implementation on economic growth, using a sample of 99 developing countries from 1995 to 2019. Relying on recent heterogeneity-robust DID estimators, we show that, on average, EITI implementation increases the GDP per capita growth rate in member developing countries. This result is robust to several robustness checks. Most interestingly, we analyze the dynamic treatment effects of EITI implementation and highlight that the positive and significant effects of EITI implementation on economic growth occur in the short term and medium term. We explore and provide some possible explanations for the lack of EITI's effects on long-term growth: the lack of evidence of a negative relationship between natural resource abundance and long-term economic growth over the study period, a possible influence of an increasing reliance on taxes, the signal effect some countries are looking for during the EITI implementation process, and the lack of effectiveness of the EITI in reducing levels of corruption in member countries. Moreover, an analysis of the transmission channels shows that valid transmission channels include an increase in foreign direct investment and resource revenue. Our conclusions can be summarized as follows: Contrary to growing skepticism about the possible benefits of the EITI, implementing the EITI stimulates economic growth in member countries compared to non-member countries, at least in the short and medium term. However, regarding the EITI's effectiveness in fostering long-term growth, it must be recognized that the EITI appears ineffective in achieving this objective. The positive effects of EITI implementation on short- and medium-term growth seem to mitigate potentially adverse effects of the arrival of substantial extractive rents on institutions and, therefore, enable member countries to benefit more quickly from the favorable long-term effects of natural resources (attraction of foreign direct investment and higher resource revenue).

The present study contributes primarily to two strands of literature. The first is the literature on the EITI's impact evaluation and the methodological challenges in the EITI literature. First, we analyze the relationship between EITI implementation and economic growth, addressing a gap in the literature. Second, we apply recent and robust econometric methods to address the challenges arising from the heterogeneous treatment effects over the EITI implementation process and between countries faced by previous empirical analyses. Third, we document the dynamic effects of EITI

implementation on economic growth while highlighting the main potential transmission channels. The second strand of the literature to which this paper contributes is the resource curse literature. Indeed, we contribute to this literature by revisiting the effects of natural resource abundance on long-term economic growth, using various natural resource abundance indicators.

This paper has important economic policy implications for developing countries and the EITI board. First, the EITI norm is an instrument that can be used by developing countries to drive reforms in public management in general and in extractive sector management in particular. Our results suggest that improving transparency and governance in natural resource management increases resource revenue mobilization. Moreover, the effects of EITI implementation are not limited to the extractive sector alone. By joining the EITI, the positive signal sent to the international community is reflected in the attractiveness of foreign direct investment that can spread throughout the economy. Second, regarding the EITI Board, the non-significance of the EITI's effects on long-term growth calls for better control over the implementation of the requirements. In addition to the incentives provided to convince countries to join, the EITI should be able to provide more incentives to members after they have achieved compliance status. The EITI board should also increase requirements for disclosure of resource revenue allocated to the national budget and promote better disclosure of quasi-fiscal expenditures resulting from these revenues since these expenditures could benefit economic growth in developing countries. Furthermore, the EITI should step up its efforts to promote transparency and governance in the management of extractive resources in general and critical minerals in particular, the latter being essential in the clean energy transition. Indeed, promoting and improving governance in managing critical minerals is vital to avoid a "new curse of critical minerals", as international demand for these resources is expected to grow strongly.

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Appendix A EITI implementation process and justification of the selection of variables

A.1 EITI implementation process

The process for countries seeking to join the EITI and implement the EITI standard is as follows (EITI, 2019). Firstly, the government of a country seeking to implement the EITI standard must publicly announce its commitment to joining the organization. It must appoint a government official to lead the membership process, establish a national EITI secretariat, and form an independent and active multi-stakeholder group (MSG). The MSG must be composed of representatives from government, civil society, and extractive companies, with the mission to monitor the implementation of the standard and develop a work plan detailing the country's objectives linked to national reforms and development priorities. Then comes the candidate stage, during which the country submits a formal application to the EITI Board. If the EITI Board determines that the standard's implementation requirements have been satisfied, the country's application is validated. Finally, the country will have to publish its first annual report and meet all other requirements, after which it will be declared Compliant. To become a fully compliant country, the EITI multi-stakeholder group and national secretariat must prepare the required documents and data on the extractive sector. After this, an independent consultant prepares a validation report, which is submitted to the EITI board within two and a half years. The EITI board, after reviewing the documents, decides whether the country is compliant or not. When the country is declared compliant, it will have to publish regular reports according to the deadlines fixed by the EITI Board. In practice, however, the deadline for achieving compliance status is not always met. Most countries achieve compliance later in the engagement process but publish their EITI reports annually and comply with the standard's requirements.²⁴ Sanctions can be taken against countries that can be suspended from the organization for four main reasons. First, when the country does not meet the deadline for the publication of EITI reports (This was the case for Gabon in 2013). Second, when the country does not demonstrate significant progress, as Niger left the organization in October 2017 following its suspension. Third, when the country does not comply with the EITI principles (like Afghanistan, suspended since January 2019). Fourth, when the country faces political instability that prevents it from implementing the EITI standard (this was the case for the Central African Republic after the "Coup d'état" in March 2013). However, the suspension can be lifted when the conditions for lifting the suspension are met, depending on the suspension type.

²⁴While the wealth of information published in EITI reports is essential to analyze the extractive sector in developing countries (concerning, for example, value-added, production, and employment), one limit is the lack of comparability between countries. Indeed, member countries do not adopt the same calculation methodology, do not have the same definition of the extractive sector (mining, oil, gas, agriculture, fish farming, forestry), and do not consider both industrial and artisanal sectors. Therefore, this lack of harmonization in the available information limits the exploitation of data published in EITI reports (Bouterige and Pafadnam, 2024).

A.2 Control variables in the main analysis (in subsection 2.1)

The initial GDP per capita is included to capture the country's development level. Indeed, countries with a low level of development are more likely to join the EITI because they are most exposed to external pressures due to their high dependence on aid from the international community, and they are also considered to benefit most from the EITI (Pitlik et al., 2010; David-Barrett and Okamura, 2016; Öge, 2016; Kasekende et al., 2016; Lujala, 2018). Consistent with the convergence hypothesis in a neo-classical growth model, constant initial GDP per capita is negatively correlated with economic growth (Barro, 1991; Barro, 1997; Sala-i Martin, 1997). Theoretically, the initial GDP per capita should negatively and significantly impact economic growth (developing countries tend to grow faster than developed countries).

Official Development Assistance (ODA) measures a country's dependence on international aid and technical assistance. Countries that are more dependent on ODA are more likely to implement the EITI (David-Barrett and Okamura, 2016; Kasekende et al., 2016; Lujala, 2018). Indeed, ODA operates as an external pressure instrument for these countries, and international organizations see EITI membership as a signal of a country's commitment to improving governance in the extractive sector. No consensus has emerged in the literature concerning the analysis of the effects of aid on economic growth. Some authors have found that official development assistance has positive effects on economic growth (Galiani et al., 2017), while others found a mixed effect of aid (Easterly et al., 2004).

Natural resource dependence is an internal motivation for countries to join the EITI (Lujala, 2018) and thus favors the implementation of the EITI (Pitlik et al., 2010; Öge, 2016; David-Barrett and Okamura, 2016; Kasekende et al., 2016; Lujala, 2018). Countries heavily dependent on natural resources are considered to be those that should benefit the most from the public benefits of membership due to the importance of extractive revenue in their national income (Pitlik et al., 2010; Öge, 2016; Lujala, 2018). No consensus exists on a resource curse (Havranek et al., 2016). The resource curse theory has highlighted the adverse effects of natural resource dependence on economic growth (Sachs and Warner, 1995), while Mehlum et al. (2006) argue that these adverse effects are conditioned by institutional quality. However, other authors found a positive and significant effect of natural resources on economic growth (Brunnschweiler, 2008; Alexeev and Conrad, 2009).

Foreign investors prefer to invest in a healthy environment with minimal risk, where they have access to all information (Öge, 2016). Foreign direct investment (FDI) inflows positively influence the likelihood of implementation of the EITI standard (Öge, 2016; Kasekende et al., 2016; Lujala, 2018). Countries for which FDI flows are an important source of revenue are most likely to implement the EITI to demonstrate their commitment to promoting transparency in the management of the extractive sector to maintain and increase their FDI inflows (Öge, 2016; Lujala, 2018). Moreover, despite the debate in the literature about the effects of foreign direct investment (Li and Liu, 2005), studies suggest that FDI promotes economic growth (Balasubramanyam et al., 1996; Borensztein et al., 1998).

The political environment and institutional quality are important determinants of EITI implementation. Membership in the international organization is an opportunity for countries perceived to be the most corrupt

to send a signal about their commitment to promoting transparency and good governance in resource management and combating corruption, and thus improve their reputation within the international community (David-Barrett and Okamura, 2016; Öge, 2016; Kasekende et al., 2016; Lujala, 2018). Implementing the EITI lends important credibility to reforms to fight corruption and promote good governance (Pitlik et al., 2010). Therefore, the most corrupt countries are the most likely to implement the EITI. The level of democratic accountability is positively correlated with the likelihood of joining the EITI (Pitlik et al., 2010; Öge, 2016; Lujala, 2018), and governments with popular support are more likely to initiate reforms toward greater transparency (Lujala, 2018). Furthermore, the adverse effects of corruption on economic growth have been widely documented in the literature. Mauro (1995) and Mo (2001) find that corruption reduces economic growth.

A country's experience of conflicts is a crucial determinant of EITI implementation (Lujala, 2018), mainly when these conflicts are centered around natural resources. Political instability is negatively correlated with economic growth (Barro, 1991), and there is also a significant negative relationship between conflicts and economic growth (Sala-i Martin, 1997). Conflict-affected countries can be encouraged to undertake reforms in the extractive sector through the presence and influence of international organizations that provide development assistance (Lujala, 2018). Some studies also suggest that implementing the EITI helps to mitigate the negative effect of rising mineral prices on the occurrence of conflict (Berman et al., 2017).

We include two other control variables: the commodity price index (particularly export price index) and the inflation level. The commodity price index accounts for global changes in commodity world prices. Since the sample is composed of developing countries, the export price index is more relevant in this study because these countries are commodity exporters due to their low industrialization. Deaton (1999) shows that downturns in international commodity prices generate lower economic growth in sub-Saharan African exporting countries. World commodity prices are important for economic growth in resource-rich countries. Indeed, studies have highlighted commodity prices' positive and significant effects on economic growth (Collier and Goderis, 2012). The inflation level is also included to capture macroeconomic stability, which is a precondition for the successful implementation of reforms. Macroeconomic stability is also an important factor for economic growth. High inflation negatively affects economic growth (Barro, 1995), while growth is reinforced by lower inflation (Barro, 1997).

A.3 Additional control variables in the robustness analysis

Membership in another global organization promoting better governance could influence the decision to join the EITI and, thus, the effects of its implementation. We control four other organizations promoting transparency in the extractive sector at the state level. These are the Kimberly Process (KP), the International Conference on the Great Lakes Region (ICGLR), and the Organization of Petroleum Exporting Countries (OPEC and OPEC+). The KP, created in 2003, is a major initiative for better global governance in the diamond sector. The ICGLR comprises 12 African countries and aims to promote peace, security, democracy, and development in the Great Lakes Region. OPEC brings together the world's major oil producers, while

OPEC+ is an alliance between OPEC member countries and ten other oil-producing countries, formed in 2016. These countries are traditionally associated with the resource curse (Sovacool et al., 2016). The lists of Kimberley Process, ICGLR, OPEC, and OPEC+ member countries are in the Appendix (Tables B3, B4, and B5).

External public debt can influence a country's decision to join the EITI. Countries with high levels of external debt are likely to face external pressure from their creditors to implement reforms in order to improve governance (Lujala, 2018).

The economic literature has provided evidence of the influence of trade openness as a mechanism of the natural resource curse. A positive association exists between trade openness and economic growth (Harrison, 1996). Countries with low trade openness experience greater negative consequences of natural resources on economic growth and this negative impact can be reduced by implementing policies that promote greater trade openness (Arezki and van der Ploeg, 2007).

If there is a positive and significant link between financial development and economic growth (Christopoulos and Tsionas, 2004), financial development also influences different components of economic development. Strong financial institutions could facilitate achieving a transparent economic system by promoting better governance and information availability. Moreover, Van der Ploeg and Poelhekke (2009) showed that the resource curse is less pronounced in a well-developed financial sector.

The relationship between the size of the government and economic growth appears ambiguous in the economic literature. Indeed, analyses using the level of government spending as a variable of interest find a negative relationship between this variable and economic growth, while studies using the growth rate of government spending as a variable of interest find a positive correlation between this variable and economic growth (Lindauer and Velenchik, 1992).

The relationship between monetary policy and economic growth has received considerable attention in the literature. Rodrik (2008) showed that exchange rate appreciation affects economic growth. Since our sample consists of commodity-exporting developing countries, we control the exchange rate.

The rule of law and government effectiveness indicators are determinants of economic growth (Barro, 1997) that also affect the decision to join the EITI. Ethnic tensions have also been documented as a determinant of EITI membership (Pitlik et al., 2010).

Transparency and accountability in the extractive sector have received increasing international attention and have been identified as a mechanism to mitigate the negative effects of the global financial crises (Mejía Acosta, 2013). Some countries made significant progress in implementing the EITI during the economic crisis between 2008 and 2009. The period 2003–2008 was also marked by a generalized rise in world commodity prices, qualified as a "commodity super-cycle". Resource-rich developing countries have shown strong growth rates in this period mainly due to rising world commodity prices (Amra et al., 2019). Most of the countries in the sample have joined the EITI during this period. Thus, controlling for a dummy variable characteristic of this period is important. Other country-level policies can also influence economic growth, such as fiscal rules

and IMF programs in place in countries. [Castro \(2011\)](#) provides evidence that fiscal rules promote economic growth in countries that implement them. Also, the policies implemented under IMF arrangements are aimed at promoting economic growth ([Oberdabernig, 2013](#)). For all these reasons, we control these different policies in our analysis.

A geographic diffusion mechanism for the EITI appears to exist in sub-Saharan Africa. Indeed, the fact that a country is located in sub-Saharan Africa positively influences the decision to join the EITI ([Öge, 2016](#)), which could be explained by the high dependence of these countries on foreign direct investment and international aid. Being part of sub-Saharan Africa and Latin America has also been documented as a major determinant that negatively affects economic growth ([Barro, 1991](#); [Sala-i Martin, 1997](#)). To avoid a threat that the estimated effect is mainly attributable to some characteristics of the countries in these regions (although we include country and year fixed effects in the analysis), we control with two binary variables, one equal to 1 for each sub-Saharan African country, and the other equal to 1 for each Latin American country.

We also control by total population growth, labor force, and income inequality, which can affect economic growth ([Barro, 1997](#); [Alesina and Perotti, 1996](#); [Sala-i Martin, 1997](#); [Barro, 2000](#)). The size of the population and the share of the labor force can influence a country’s decision to join the EITI in the sense that a larger and youngest population is more likely to hold leaders accountable and, therefore, to call for implementing anti-corruption and governance improvement policies. In addition, a high level of income inequality may raise questions about the efficient management of natural resources and call for policies to promote better governance in the sector.

Appendix B Study samples, robustness, and data sources

Table B1: List of countries in the study sample

Afghanistan	Cameroon	Guyana	Myanmar	El Salvador
Angola	Congo, Dem. Rep.	Honduras	Mongolia	Sao Tome and Principe
Albania	Congo, Rep.	Haiti	Mozambique	Suriname
Argentina	Colombia	Indonesia	Mauritania	Eswatini
Armenia	Cabo Verde	India	Malawi	Chad
Azerbaijan	Costa Rica	Iran, Islamic Rep.	Malaysia	Togo
Burundi	Djibouti	Jamaica	Namibia	Thailand
Benin	Dominican Republic	Jordan	Niger	Tajikistan
Burkina Faso	Algeria	Kazakhstan	Nigeria	Turkmenistan
Bangladesh	Ecuador	Kenya	Nepal	Timor-Leste
Bulgaria	Egypt, Arab Rep.	Kyrgyz Republic	Pakistan	Tunisia
Bosnia and Herzegovina	Eritrea	Cambodia	Peru	Tanzania
Belarus	Ethiopia	Lao PDR	Philippines	Uganda
Belize	Gabon	Lebanon	Papua New Guinea	Uzbekistan
Bolivia	Georgia	Liberia	Paraguay	Venezuela, RB
Brazil	Ghana	Lesotho	Russian Federation	Vietnam
Botswana	Guinea	Morocco	Rwanda	South Africa
Central African Republic	Gambia, The	Madagascar	Sudan	Zambia
China	Guinea-Bissau	Mexico	Senegal	Zimbabwe
Cote d’Ivoire	Guatemala	Mali	Sierra Leone	

Table B2: EITI members with important dates and their status at the end of the study period

EITI Country	Commitment	Creation of the multi-stakeholder group	Candidate validation	Compliance	Suspension/withdrawal period	Status at 31/12/2019
Afghanistan	March 2009	November 2009	February 10, 2010	-	January 2019-	Suspended
Albania	January 2009	December 2008	May 15, 2009	May 2013	-	Compliant
Argentina	December 2017	December 2018	February 2019	-	-	Candidate validated
Armenia	January 2017	November 2016	September 03, 2017	-	-	Candidate validated
Azerbaijan	June 2003	November 2005	September 2007	February 2009	March 2017-	Suspended
Burkina Faso	July 2007	December 2008	May 15, 2009	February 2013	-	Compliant
Central African Republic	August 2007	July 2008	November 21, 2008	March 2011	2013-2021	Suspended
Cote d'Ivoire	May 2007	February 2008	May 12, 2008	May 2013	-	Compliant
Cameroon	March 2005	June 2005	September 27, 2007	October 2013	-	Compliant
Congo, Dem. Rep.	January 2005	November 2005	September 2007	July 2014	April 18, 2013-July 2, 2014	Compliant
Congo, Rep.	June 2004	October 2006	September 27, 2007	February 2013	-	Compliant
Colombia	May 2013	February 2014	October 15, 2014	-	-	Candidate validated
Dominican Republic	July 2015	December 2015	February 23, 2016	-	-	Candidate validated
Ethiopia	August 2009	July 2009	March 19, 2014	-	-	Candidate validated
Gabon	May 2004	July 2005	September 2007	-	February 2013-October 2021	Suspended
Ghana	June 2003	February 2005	September 27, 2007	October 2010	-	Compliant
Guinea	April 2005	April 2005	September 27, 2007	July 2014	December 2009-March 2011	Compliant
Guatemala	June 2010	May 2012	March 2011	March 2014	-	Compliant
Guyana	May 2010	February 2017	October 25, 2017	-	-	Candidate validated
Honduras	January 2013	February 2013	May 22, 2013	-	February-June 2018 & April 2019-	Suspended
Indonesia	December 2008	June 2010	November 24, 2010	October 2014	February-December 2015	Compliant
Kazakhstan	June 2005	October 2005	September 27, 2007	October 2013	-	Compliant
Kyrgyz Republic	May 2004	July 2008	September 27, 2007	March 2011	-	Compliant
Liberia	May 2007	April 2007	September 27, 2008	October 2009	2018-March 2020	Compliant
Madagascar	January 2006	January 2008	February 22, 2008	-	October 25, 2011-June 6, 2014	Candidate validated
Mexico	April 2015	November 2016	October 25, 2017	-	-	Candidate validated
Mali	August 2006	June 2007	September 22, 2007	August 2011	-	Compliant
Myanmar	December 2012	February 2014	July 02, 2014	-	-	Candidate validated
Mongolia	April 2006	January 2006	September 2007	October 2010	-	Compliant
Mozambique	May 2008	April 2009	May 15, 2009	October 2012	-	Compliant
Mauritania	September 2005	December 2006	September 27, 2007	February 2012	-	Compliant
Malawi	June 2014	March 2015	October 22, 2015	-	-	Candidate validated
Niger	March 2005	July 2005	September 2007	March 2011	October 2017-January 2019	Re-commitment
Nigeria	November 2003	February 2004	September 27, 2007	March 2011	-	Compliant
Peru	May 2005	May 2006	September 27, 2007	February 2012	-	Compliant
Philippines	July 2012	January 2013	May 22, 2013	-	-	Candidate validated
Papua New Guinea	April 2013	November 2013	March 19, 2014	-	-	Candidate validated
Senegal	February 2012	January 2013	October 17, 2013	-	-	Candidate validated
Sierra Leone	October 2007	June 2007	February 2008	April 2014	-	Compliant
Sao Tome and Principe	December 2004	December 2007	February 22, 2008	-	2010-2011	Candidate validated
Suriname	February 2016	December 2016	May 24, 2017	-	February-June 2019	Candidate validated
Chad	September 2007	February 2010	April 16, 2010	October 2014	-	Compliant
Togo	December 2009	March 2010	October 10, 2010	May 2013	-	Compliant
Tajikistan	August 2012	August 2012	February 26, 2013	-	-	Candidate validated
Timor-Leste	May 2007	May 2007	February 22, 2008	July 2010	March-June 2017	Compliant
Tanzania	November 2008	November 2009	February 16, 2009	December 2012	September-December 2015	Compliant
Zambia	July 2008	September 2008	May 15, 2009	September 2012	-	Compliant

Source: Author's construction from <https://eiti.org/countries>.

Table B3: List of Kimberley Process (KP) members

Country	Membership date	Country	Membership date
Angola	2003	Kazakhstan	2012
Armenia	2003	Lao PDR	2003
Belarus	2003	Lebanon	2003
Brazil	2003	Liberia	2007
Botswana	2003	Lesotho	2003
Central African Republic**	2003	Mexico	2008
China	2003	Mali	2013
Cote d'Ivoire	2003	Malaysia	2003
Cameroon	2012	Namibia	2003
Congo, Dem. Rep.	2003	Russian Federation	2003
Congo, Rep.*	2003	Sierra Leone	2003
Gabon	2018	Eswatini	2011
Ghana	2003	Togo	2003
Guinea	2003	Tanzania	2003
Guyana	2003	South Africa	2003
Indonesia	2005	Zimbabwe	2003
India	2003		

Source: Author's construction from Kimberley Process information: <https://www.kimberleyprocess.com/en/kp-participants-and-observers>.

* Suspended in 2003 and rejoined in 2007. ** Suspended for the period 2013-2015.

Table B4: List of International Conference on the Great Lakes Region (ICGLR) members

Angola	Congo, Rep.	Tanzania
Burundi	Kenya	Uganda
Central African Republic	Rwanda	Zambia
Congo, Dem. Rep.	Sudan	

Source: Author's construction from ICGLR information: <https://www.icglr.org/index.php/fr/>.

Note: The ICGLR was created in 2008, which is considered the beginning of membership for the 11 member countries in our sample.

Table B5: List of countries in the sample that are members of OPEC and OPEC⁺

Country	Membership date	Withdrawal date	Status in 2019
Angola	2007	-	Member
Congo, Rep	2018	-	Member
Algeria	1969	-	Member
Ecuador	1973 and 2007	1992 and 2020	Member
Gabon	1975 and 2016	1995	Member
Indonesia	1962 and 2016	2008 and 2016	Retired
Iran, Islamic Rep.	1960	-	Member
Kazakhstan ⁺	2016	-	Member
Malaysia ⁺	2016	-	Member
Mexico ⁺	2016	-	Member
Nigeria	1971	-	Member
Russian Federation ⁺	2016	-	Member
Sudan ⁺	2016	-	Member

Source: Author's construction from information available on: <https://geoconfluences.ens-lyon.fr/glossaire/opec> and <https://bpsuperfioul.fr/quest-ce-que-l-opec-petrole/>. ⁺ Country only member of OPEC⁺

Table B6: Descriptive statistics for the entire sample

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
GDP per capita growth rate	2416	2.594	4.855	-36.557	92.202
Constant GDP per capita (log)	2401	7.526	0.975	5.390	9.561
Official development assistance (log)	2333	0.771	1.838	-7.663	4.404
Extractive rents (log)	2428	1.438	1.550	-6.852	4.472
Foreign direct investment (asinh)	2428	1.591	1.072	-4.309	5.331
Control of corruption	2076	-0.629	0.525	-1.673	1.245
Voice and accountability	2079	-0.525	0.732	-2.259	1.152
Political stability	2077	-0.562	0.780	-2.848	1.224
Commodity price index	2429	95.990	7.570	41.466	106.769
Inflation	2437	12.194	43.010	-72.729	992.389
Internal conflicts	1835	8.615	1.1.627	1.25	12

Table B7: EITI and Economic Growth
Focus on the main resource world prices

Dependent variable:	Main Mineral world price	
	Included diamond	Excluded diamond
GDP per capita growth	(1)	(2)
EITI	0.6825* (0.3710)	0.6883* (0.3689)
Control variables	Yes	Yes
Country & Year fixed effects	Yes	Yes

The results are obtained using the heterogeneity-robust DID estimator (De Chaisemartin and d'Haultfoeuille, 2020). EITI is the treatment variable. Control variables are included. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Table B8: Main resource of sample countries

Country	Main resource 1*	Main resource 2**	Country	Main resource 1*	Main resource 2**	Country	Main resource 1*	Main resource 2**
Afghanistan	coal	coal	Angola	oil	oil	Albania	oil	oil
Argentina	silver	silver	Armenia	silver	silver	Azerbaijan	oil	oil
Burundi	gold	gold	Benin	oil	oil	Burkina Faso	gold	gold
Bangladesh	oil	oil	Bulgaria	silver	silver	Bosnia and Herzegovina	bauxite	bauxite
Belarus	oil	oil	Belize	oil	oil	Bolivia	silver	silver
Brazil	bauxite	bauxite	Botswana	diamond	copper	Central African Republic	diamond	gold
China	silver	silver	Cote d'Ivoire	oil	oil	Cameroon	oil	oil
Congo, Dem. Rep.	copper	copper	Congo, Rep.	oil	oil	Colombia	oil	oil
Cabo Verde	-	-	Costa Rica	-	-	Djibouti	-	-
Dominican Republic	silver	silver	Algeria	oil	oil	Ecuador	oil	oil
Egypt, Arab Rep.	oil	oil	Eritrea	silver	silver	Ethiopia	gold	gold
Gabon	oil	oil	Georgia	gold	gold	Ghana	gold	gold
Guinea	bauxite	bauxite	Gambia, The	-	-	Guinea-Bissau	-	-
Guatemala	silver	silver	Guyana	bauxite	bauxite	Honduras	silver	silver
Haiti	-	-	Indonesia	silver	silver	India	silver	silver
Iran, Islamic Rep.	oil	oil	Jamaica	bauxite	bauxite	Jordan	oil	oil
Kazakhstan	oil	oil	Kenya	gold	gold	Kyrgyz Republic	silver	silver
Cambodia	-	-	Lao PDR	silver	silver	Lebanon	-	-
Liberia	gold	gold	Lesotho	diamond	-	Morocco	silver	silver
Madagascar	gold	gold	Mexico	silver	silver	Mali	gold	gold
Myanmar	oil	oil	Mongolia	silver	silver	Mozambique	coal	coal
Mauritania	iron	iron	Malawi	coal	coal	Malaysia	oil	oil
Namibia	diamond	silver	Niger	oil	oil	Nigeria	oil	oil
Nepal	coal	coal	Pakistan	oil	oil	Peru	silver	silver
Philippines	silver	silver	Papua New Guinea	silver	silver	Paraguay	-	-
Russian Federation	oil	oil	Rwanda	gold	gold	Sudan	oil	oil
Senegal	gold	gold	Sierra Leone	bauxite	bauxite	El Salvador	-	-
Sao Tome and Principe	-	-	Suriname	bauxite	bauxite	Eswatini	coal	coal
Chad	oil	oil	Togo	gold	gold	Thailand	oil	oil
Tajikistan	silver	silver	Turkmenistan	oil	oil	Timor-Leste	-	-
Tunisia	oil	oil	Tanzania	gold	gold	Uganda	gold	gold
Uzbekistan	silver	silver	Venezuela, RB	oil	oil	Vietnam	oil	oil
South Africa	coal	coal	Zambia	copper	copper	Zimbabwe	gold	gold

Source: Author's construction based on data from "The Global Economy": <https://www.theglobaleconomy.com/download-data.php>, and World Bank Commodity Price Data: <https://www.worldbank.org/en/research/commodity-markets>. * Including diamonds among resources. **Excluding diamonds among resources.

Table B9: EITI and Economic Growth
Additional placebo tests

Dependent variable:	Static framework	Dynamic framework
GDP per capita growth	(1)	(2)
EITI (false)	0.1047 (0.3882)	0.8972 (0.6062)
Placebo joint-test p-value	-	0.0516
Control variables	Yes	Yes
Country & Year fixed effects	Yes	Yes

Results are obtained using the estimators of De Chaisemartin and d'Haultfoeuille (2020) and De Chaisemartin and d'Haultfoeuille (2024). Robust standard errors are in parentheses. EITI (false) is the placebo treatment variable (random falsification treatment). Control variables are included. Unreported constant included. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Table B10: Entropy balancing method: descriptive statistics before and after weighting

	[1]	[2]	[3] = [2] - [1]	[4]	[5]
	EITI	Non-EITI	Difference	T-test	p-value
	mean	mean			
Panel A: Descriptive statistics					
Initial real GDP per capita (log)	7.42	7.75	0.33	5.77	0.00
Lag official development assistance (log)	0.83	0.21	-0.62	-5.94	0.00
Lag extractive rents (log)	2.20	1.19	-1.01	-13.60	0.00
Lag foreign direct investment (asinh)	2.05	1.47	-0.58	-9.14	0.00
Lag control of corruption	-0.71	-0.58	0.13	5.64	0.00
Lag voice and accountability	-0.40	-0.44	-0.04	-1.10	0.27
Lag political stability	-0.53	-0.54	-0.01	-0.27	0.78
Lag commodity price index	97.38	96.29	-1.09	-2.88	0.00
Lag inflation	6.78	8.61	1.83	2.94	0.00
Lag internal conflicts	8.59	8.57	-0.02	-0.26	0.80
Observations	390	968			
	[1]	[2]	[3] = [2] - [1]	[4]	[5]
	EITI	Non-EITI	Difference	T-test	p-value
	mean	mean			
Panel B: Covariate balancing					
Initial real GDP per capita (log)	7.42	7.42	0.00	-0.02	0.98
Lag official development assistance (log)	0.83	0.83	0.00	-0.00	1.00
Lag extractive rents (log)	2.20	2.20	0.00	-0.01	0.99
Lag foreign direct investment (asinh)	2.05	2.05	0.00	-0.00	1.00
Lag control of corruption	-0.71	-0.71	0.00	0.01	0.99
Lag voice and accountability	-0.40	-0.40	0.00	0.00	1.00
Lag political stability	-0.53	-0.53	0.00	0.00	1.00
Lag commodity price index	97.34	97.38	0.04	-0.05	0.96
Lag inflation	6.77	6.77	0.00	-0.01	1.00
Lag internal conflicts	8.58	8.59	0.01	-0.02	0.98
Observations	390	968			
Total of weights	390	390			

Table B11: EITI and Economic Growth
Alternative estimation methods

	Ordinary DID estimation results	Panel Instrumental variables results		Entropy balancing method results
	(1)	(2)	(3)	(4)
Panel A: first-stage (Instruments)				
NeighbourEITI		0.0783*** (0.0270)		
Lagged EITI		0.7692*** (0.0316)		
Panel B: Second-stage regression results				
Dependent variable: GDP per capita growth	(1)	(2)	(3)	(4)
EITI (Treatment)	1.0164** (0.4775)		1.4244*** (0.4005)	1.0252*** (0.3836)
Initial GDP per capita (log)	-5.9130*** (1.5915)		-4.9048*** (0.9247)	-10.5077*** (2.7420)
Official development assistance (log)	0.4619* (0.2391)		0.5091** (0.2052)	0.2130 (0.2906)
Extractive rents (log)	-0.3009 (0.3031)		-0.1906 (0.2086)	0.4590 (0.3239)
Foreign direct investment (asinh)	0.1328 (0.1984)		0.2216 (0.1617)	0.5235*** (0.1894)
Control of corruption	1.1460 (0.7038)		0.6057 (0.5586)	1.4265 (0.9595)
Voice and accountability	1.4405* (0.7931)		1.1245* (0.5986)	3.4327*** (0.8216)
Political stability	0.1443 (0.4212)		-0.0770 (0.3390)	-1.6057*** (0.5143)
Commodity price index	0.0700** (0.0303)		0.0967*** (0.0294)	0.1757*** (0.0439)
Inflation	0.0110 (0.0159)		0.0000 (0.0144)	-0.0252 (0.0339)
Internal conflicts	-0.0479 (0.2093)		0.1541 (0.1352)	0.3913 (0.2507)
Control variables	Yes		Yes	Yes
Country and Year fixed effects	Yes		Yes	Yes
Observations	1358		1358	1358
ATTs with negative weights	9.2308%	-	-	-
Kleibergen-Paap F-stat	-		420.122	-
Stock-Yogo critical values (10%)	-		19.93	-
Hansen test (p-value)	-		0.1580	-
R ²	0.3642		0.0883	0.5398

Robust standard errors are in parentheses. Column (2) of Panel A presents the first-stage results (with NeighbourEITI and lagged EITI used as instruments). Column (1) of Panel B presents the estimation results using ordinary TWFE-DID, and Column (3) of Panel B presents the second-stage results of the instrumental variables method (with EITI as the treatment variable). Column (4) shows the results of the entropy balancing method. All control variables are lagged by one year. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Table B12: EITI and Economic Growth
Additional transmission channel analysis

Panel A: Relationship between the channel and economic growth			
	(1)	(2)	(3)
Corporate tax	0.4611*** (0.1297)		
Personal income tax		0.0165 (0.0653)	
Income inequality			-0.1459* (0.0779)
Panel B: Effect of the EITI implementation on the channel			
	(1)	(2)	(3)
Panel B1: Static analysis results			
	Corporate tax	Personal income tax	Income inequality
EITI	0.1191 (0.0752)	0.2909 (0.1781)	0.0357 (0.0350)
Panel B2: Dynamic analysis results			
EITI	0.1743 (0.1207)	0.3988 (0.2955)	0.3610 (0.2503)
Placebo joint-test p-value	0.3249	0.5648	0.1229

Results of the additional potential transmission channels analysis. Panel A presents the relationship between the different potential channels and economic growth based on panel Fixed Effects estimations. Panels B1 and B2 report the effects of EITI implementation on the potential channels, respectively, based on the heterogeneity-robust DID estimator of [De Chaisemartin and d'Haultfoeuille \(2020\)](#) and the dynamic heterogeneity-robust DID estimator of [De Chaisemartin and d'Haultfoeuille \(2024\)](#). The equation specified is the same as in the main model, replacing the dependent variable with the potential channel. Country and year effects are included. Robust standard errors are in parentheses. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Table B13: Natural resources and economic growth. OLS regressions
Additional robustness analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Extractive rents	0.0245** (0.0111)			0.0262** (0.0117)		
Fuel rents		0.0523*** (0.0157)			0.0487*** (0.0144)	
Mineral rents			-0.0062 (0.0342)			0.0100 (0.0336)
Initial GDP per capita	-0.3436*** (0.0995)	-0.4838*** (0.1219)	-0.2952*** (0.1065)	-0.5377*** (0.1244)	-0.6647*** (0.1483)	-0.4621*** (0.1299)
Rule of law	0.8802*** (0.2601)	1.0136*** (0.2913)	0.7078*** (0.2484)			
Government effectiveness				1.1467*** (0.3291)	1.2248*** (0.3360)	0.9515*** (0.3048)
Africa & Middle-East	-1.5361*** (0.2225)	-1.5001*** (0.2126)	-1.4804*** (0.2301)	-1.3627*** (0.2036)	-1.2978*** (0.2004)	-1.3447*** (0.2192)
Asia & Ocean	-0.4228** (0.2047)	-0.4046** (0.1942)	-0.4652** (0.1918)	-0.4856** (0.2179)	-0.4668** (0.2122)	-0.5401** (0.2151)
North America	-0.7889* (0.4348)	-0.6598 (0.4459)	-1.0385** (0.4377)	-0.5413 (0.5271)	-0.4480 (0.5336)	-0.8286* (0.4786)
Central & South America	-0.8144*** (0.1643)	-0.6603*** (0.1818)	-0.9324*** (0.1782)	-0.6472*** (0.1802)	-0.5094** (0.2036)	-0.8096*** (0.1901)
Observations	87	87	87	87	87	87
R ²	0.3912	0.4297	0.3617	0.4277	0.4566	0.3938
Panel B						
Extractive rents	0.0276*** (0.0086)			0.0316*** (0.0076)		
Fuel rents		0.0452*** (0.0109)			0.0428*** (0.0099)	
Mineral rents			-0.0479 (0.0464)			-0.0234 (0.0387)
Rule of law	0.8397*** (0.1408)	0.8378*** (0.1304)	0.6949*** (0.1422)			
Government effectiveness				1.1268*** (0.0974)	1.0677*** (0.0972)	0.9766*** (0.1123)
Latitude	2.7968*** (0.4359)	2.6498*** (0.4116)	2.7031*** (0.4828)	2.2418*** (0.4011)	2.1042*** (0.3915)	2.1674*** (0.4616)
Latin America	1.2713*** (0.1339)	1.2139*** (0.1247)	1.1371*** (0.1831)	1.0379*** (0.1188)	0.9740*** (0.1122)	0.9198*** (0.1277)
East Asia	0.2435 (0.6794)	0.3934 (0.5528)	0.4646 (0.5160)	0.1296 (0.3851)	0.3046 (0.2535)	0.3090 (0.2291)
Observations	96	96	96	96	96	96
R ²	0.5542	0.6057	0.5211	0.6813	0.7124	0.6310

Robust standard errors are in parentheses. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

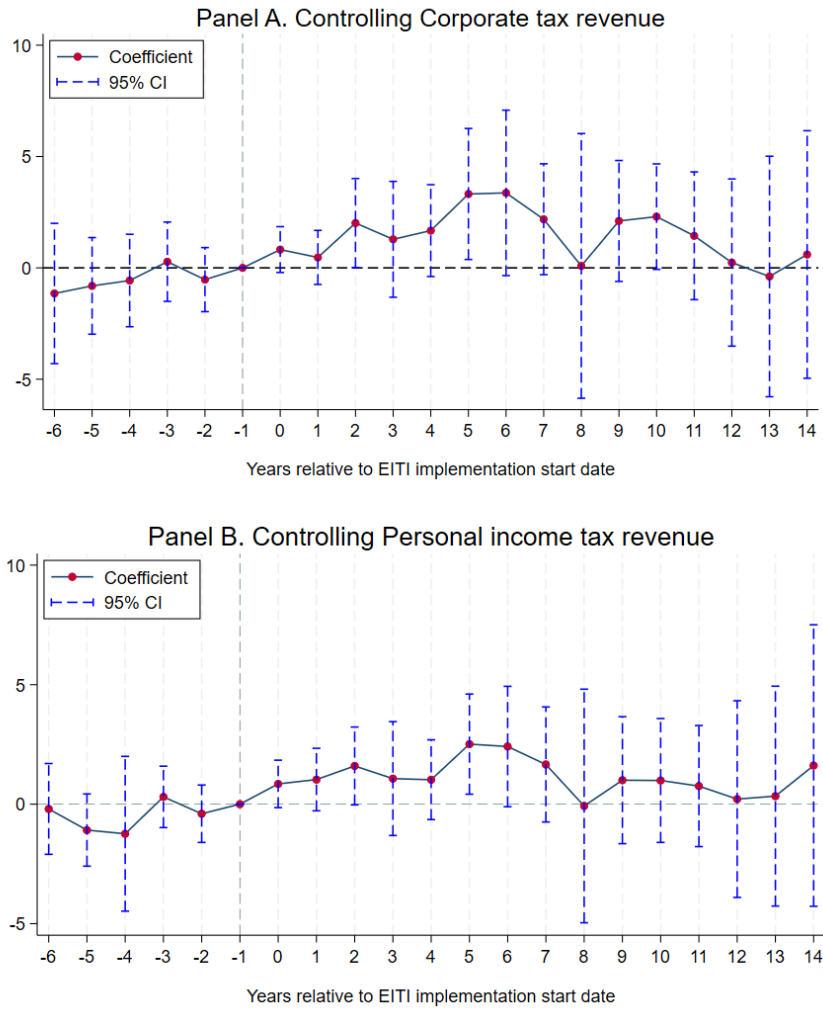


Figure B1: Results are obtained using the dynamic heterogeneity-robust DID estimator (De Chaisemartin and d’Haultfoeuille, 2024). Bars represent the 95% confidence intervals around long differences effects and placebo tests.

Table B14: EITI and Economic Growth
Exploring the EITI effects on corruption

Dependent variable:	WGI control of corruption (1)	ICRG control of corruption (2)	Bayesian corruption index (3)
Panel A: Static effects			
EITI	0.0209 (0.0137)	0.0344 (0.0221)	-0.0834 (0.0759)
Panel B: Dynamic effects			
EITI	0.0070 (0.0482)	-0.0352 (0.1046)	-0.0718 (0.4644)
Placebo joint-test p-value	0.4955	0.5205	0.2319
Control variables	Yes	Yes	Yes
Country & Year fixed effects	Yes	Yes	Yes

Results are obtained using the estimators of De Chaisemartin and d’Haultfoeuille (2020) and (De Chaisemartin and d’Haultfoeuille, 2024). Robust standard errors are in parentheses. EITI is the treatment variable. Control variables are included. Unreported constant included. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Table B15: Sources and definition of data

Variables	Description	Sources
Dependent variable		
Economic growth (%)	Annual percentage growth rate of GDP per capita.	World Development Indicators (WDI).
Treatment variable		
<i>EITI</i>	Dummy variable equals 1 if the country <i>i</i> implements the EITI in year <i>t</i> and 0 otherwise.	Author's construction based on information available at https://eiti.org/countries and Lujala (2018).
Control variables		
Initial GDP per capita	Real GDP per capita at the beginning of the period.	Author's construction (from WDI).
ODA	All Official development assistance (ODA), expressed as a percentage of GDP.	World Development Indicators (WDI).
Natural resources rents	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. It is expressed as a percentage of GDP.	World Development Indicators (WDI).
FDI	Foreign direct investment (net inflows), expressed as a percentage of GDP.	World Development Indicators (WDI).
Control of Corruption	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	World Governance Indicators (WGI).
Voice and Accountability	Voice and Accountability captures 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. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	World Governance Indicators (WGI).
Political stability	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	World Governance Indicators (WGI).
Commodity Price Index	The commodity export price index is an index for a commodity export bundle of 45 commodities (12 are energy and metal commodities). Individual commodities are weighted by the ratio of exports to GDP. Time-invariant weights based on average trade flows and output over 1980-2015 are used. For every country, every commodity, and for each year, the weights are expressed as the export value of the commodity by the country in the year, divided by the country's nominal GDP in this year.	Gruss and Kebhaj (2019).
Inflation	Inflation, average consumer prices (Percent change).	World Economic Outlook (WEO) - IMF.
Internal conflicts index	This is an assessment of political violence in the country and its actual or potential impact on governance. A score of 4 points equates to Very Low Risk, and a score of 0 points to Very High Risk.	International Country Risk Guide (ICRG).
Additional control variables robustness, transmission channels analysis		
Kimberley Process	Dummy variable equals 1 if the country <i>i</i> is member of Kimberley Process in year <i>t</i> .	Author's construction based on information available at https://www.kimberleyprocess.com/en .
ICGLR	Dummy variable equals 1 if the country <i>i</i> is member of the International Conference on the Great Lakes Region in year <i>t</i> and 0 otherwise.	Author's construction based on information available at https://www.icglr.org/index.php/fr/ .
OPEC	Dummy variable equals 1 if the country <i>i</i> is member of the Organization of the Petroleum Exporting Countries in year <i>t</i> and 0 otherwise.	Author's construction based on information available at https://www.opec.org/opec_web/en/about_us/25.htm .
OPEC+	Dummy variable equals 1 if the country <i>i</i> is member of the Organization of the Petroleum Exporting Countries and its allies in year <i>t</i> and 0 otherwise.	Author's construction based on information available at https://www.opec.org/opec_web/en/about_us/25.htm .
Public debt (% GDP)	General government gross debt as a percentage of GDP.	International Monetary Fund (IMF).
Trade openness (% of GDP)	Trade is measured as a share of GDP.	World Development Indicators (WDI).
Financial development	Degree of development of financial institutions and financial markets in terms of depth, access, and efficiency.	International Monetary Fund (IMF). https://data.world/imf/financial-development-fd .
Resource revenue	Total resource revenue in percentage of GDP.	Government Revenue Dataset. https://doi.org/10.35188/UNU-WIDER/GRD-2022 .
Public investments	General government domestic, expressed as a percentage of GDP.	IMF Investment and Capital Stock dataset.
Private investments	Private domestic investment, expressed as a percentage of GDP.	IMF Investment and Capital Stock dataset.
General government expenditures	General government total expenditure as a percentage of GDP. Total expenditure consists of total expense and the net acquisition of nonfinancial assets.	World Economic Outlook (WEO) - IMF.
Exchange rate	Exchange rate, national currency/USD (market + estimated).	Penn World Table, version 10.0.

Table B16: Sources and definition of data

Variables	Description	Sources
Rule of law	Rule of law captures 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. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution i.e., ranging from approximately -2.5 to 2.5 .	World Governance Indicators (WGI).
Government effectiveness	Government effectiveness captures 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. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5 .	World Governance Indicators (WGI).
Regulatory quality	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5 .	World Governance Indicators (WGI).
ICRG corruption index	Assessment of corruption within the political system. Index ranges from 0 to 6 (lower scores represent higher levels of corruption).	International Country Risk Guide (ICRG).
Bayesian corruption index	The Bayesian Corruption Indicator (BCI) is a composite index of the perceived level of public corruption in a given country. Index Range: 0 – 100 (with higher scores given to countries with higher levels of corruption).	https://users.ugent.be/~sastanda/BCI/BCI.html .
Religious tensions	Religious tensions may stem from the domination of society and/or governance by a single religious group that seeks to replace civil law by religious law and to exclude other religions from the political and/or social process.	International Country Risk Guide (ICRG).
Ethnic tensions	This component is an assessment of the degree of tension within a country attributable to racial, nationality, or language divisions.	International Country Risk Guide (ICRG).
Global financial crisis	Dummy variable equals 1 during the period of the financial crisis (years 2007, 2008, and 2009).	Author's construction.
Commodities super-cycle period	Dummy variable equals 1 for commodity super-cycle years (2003 to 2008).	Author's construction.
Fiscal rule	Dummy variable equals 1 if the country i applies a fiscal rule in year t . A fiscal rule is a long-lasting constraint on fiscal policy through numerical limits on budgetary aggregates. Fiscal rules typically aim to correct distorted incentives and contain pressures to overspend, particularly in good times, so as to ensure fiscal responsibility and debt sustainability.	International Monetary Fund (IMF).
IMF programs	Dummy variable equals 1 if the country i benefits from an IMF program in year t .	International Monetary Fund (IMF).
Sub-Saharan region	Dummy variable equals 1 for each sub-Saharan African country.	Author's construction.
Latin-America region	Dummy variable equals 1 for each Latin American country.	Author's construction.
Population growth	Annual population growth rate for year t is the exponential rate of growth of midyear population from year $t-1$ to t , expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	World Development Indicators (WDI).
Labor force	Total population between the ages 15 to 64 as a percentage of total population. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	World Development Indicators (WDI).
Extractive resource production	This is the production value of the main extractive resources produced by the country.	'The Global Economy': https://www.theglobaleconomy.com/download-data.php .
Main Mineral world price	This is the world price (in logarithm) of the country's main commodity (energy or metal). The main commodity is defined as the one for which the value of production is the highest over the entire study period (1995-2019). The world price of oil is 'Brent oil prices'.	'The Global Economy' and World Bank Commodity Price Data https://www.theglobaleconomy.com/download-data.php https://www.worldbank.org/en/research/commodity-markets
Income inequality	Income inequality is approximated by GINI index.	Standardized World Income Inequality Database (SWIID)
Resources abundance indicators used in Subsection 7.1		
Primary exports	Primary exports over GDP in 1995.	Author's construction based on data from UNCTADstat: https://unctadstat.unctad.org/datacentre/ Changing Wealth of Nations (World Bank)
Total natural capital	Log of the average total natural capital over the period 1995-2019, estimated in USD per capita. The measure includes subsoil assets, timber resources, non-timber forest resources, cropland, and pastureland.	Changing Wealth of Nations (World Bank)
Subsoil wealth	Log of the average subsoil assets over the period 1995-2019, estimated in USD per capita.	Changing Wealth of Nations (World Bank)
Oil production, per capita	The measure includes wealth stemming from oil, natural gas, coal, and minerals. Logarithm of one plus oil total production in 2019.	'The Global Economy' and World Bank Commodity Price Data https://www.theglobaleconomy.com/download-data.php https://www.worldbank.org/en/research/commodity-markets
Oil production (in GDP)	Logarithm of one plus the share of total oil production in the country's GDP in 2019.	'The Global Economy' and World Bank Commodity Price Data https://www.theglobaleconomy.com/download-data.php https://www.worldbank.org/en/research/commodity-markets
Mining production, per capita	Logarithm of one plus mining total production in 2019.	'The Global Economy' and World Bank Commodity Price Data https://www.theglobaleconomy.com/download-data.php https://www.worldbank.org/en/research/commodity-markets
Mining production (in GDP)	Logarithm of one plus the share of total mining production in the country's GDP in 2019.	'The Global Economy' and World Bank Commodity Price Data https://www.theglobaleconomy.com/download-data.php https://www.worldbank.org/en/research/commodity-markets