



## Ticking time bombs: The MENA and SSA regions' geopolitical risks

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### ABSTRACT

One of the major global challenges that most affect the world economies are geopolitical risks triggered by tensions arising from exploiting natural resources. This paper attempts to study the influences of global governance indicators (voice and accountability, political stability and absence of violence/terrorism, the rule of law, government effectiveness, regulatory quality, and control of corruption) on natural resource rents in Sub-Saharan Africa (SSA) and Middle East & North Africa (MENA). We apply a new panel quantile estimation technique to panel data from 62 countries from 1996 to 2021. The results show, in general, in both MENA and SSA economies, there is a negative perception of the quality of governance. This is due to several factors, such as the absence of popular participation and transparency in decision-making, political instability, violence and terrorism, low government efficacy, low-quality regulation, lack of the rule of law, and high corruption in these regions. Thus, governance quality could be the driver of geopolitical risks in resource-rich economies. This study adds to the literature on geopolitical risk by assessing the impact of the perceived quality of governance on natural resource income in the MENA and SSA regions. Furthermore, it is the first study to compare two regions, with many countries, regarding the effects of global governance indicators on natural resource rents. In addition, it has been empirically demonstrated that the deterioration of the quality of government is associated with increased revenues from the exploitation of natural resources, which increases the likelihood of geopolitical tensions. Higher quality and more effective governance require less complex, more transparent, and less contradictory regulations, reducing the likelihood of geopolitical tensions. Practical and policy implications are drawn from the findings to help the MENA and SSA economies overcome geopolitical risks.

### 1. Introduction

Globalization, driven by the desire for economic development, has led to global interdependence and, consequently, dependence among nations at the technological, political, cultural, and economic levels (Sweidan and Elbargathi, 2022). Natural resources, including oil, natural gas, mineral coal, metallic (such as gold, manganese, and copper) and non-metallic (such as sands and stones) minerals, are widely exploited in various countries, contributing to economic development and growth (Ben-Salha et al., 2021). The increasing natural resource demand is causing a “supercycle” in commodity prices, mainly from emerging countries (Dogan et al., 2021). However, countries and regions abundant in natural resources have also been subject to rising

political tensions and the deterioration of the quality of governance, contributing to more significant geopolitical risks. In this way, it becomes essential to assess how the quality of government perceived by its citizens and experts is influencing the increase in income from the exploitation of natural resources.

There is no doubt that natural resources are of utmost importance to this planet. Based on Li et al. (2022), natural resources are essential for the following reasons. First, they are fundamental for the growth of any country (e.g., the need for fossil fuels for energy production and mineral resources for industry growth). Second, natural resources are considered capital in the format of commodities that are essential inputs for developing the infrastructures of capital and maintaining their operations. Third, the production and manufacturing of medicines involve the

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use of a diverse range of plant and animal-based industrial and biological materials, both directly and indirectly. Fourth, nature plays a crucial role in maintaining ecological balance as well as in fully satisfying human needs. Finally, irrational consumption and abusive use of natural resources have generated problematic consequences in all social, economic, and environmental aspects. Exports of raw or processed resources or commodities are crucial for developing countries, representing in some countries (e.g., Countries in Africa or Asia) more than 90% of their exports, as the revenues produced from them significantly affect these countries' economy and living conditions (Li et al., 2022). However, commodity price volatility, with globalization and market liberalization, has generated negative consequences for the weaker developing economies of the world, such as increased poverty and inequality in income distribution (Combes and Guillaumont, 2002; Li et al., 2022).

Natural resource extraction depends on capital intensity, with annual international investments of around US\$1.58 trillion in 2021, representing a 64% increase over the amount invested in 2020 (WIR, 2022). The annual exploration and use of primary resources in the world have already exceeded 100 billion tons annually, and this figure is expected to reach 170 billion tons or even 184 billion tons by 2050 (Dogan et al., 2021; Schroder, 2020). The growth in population and economy is the main factor for the increasing demand for resources. Human needs are met by extracting, trading, and transforming natural resources (materials). The need for infrastructure and better living conditions in developing and transition economies (e.g., "Sub-Saharan Africa (SSA)" and "Middle East & North Africa (MENA)") is the source of the rising demand for natural resources (Dogan et al., 2021; Oberle et al., 2019). Africa is a continent rich in natural resources, but managing these resources has been challenging for many African countries. By 2020, SSA rents rose to 6.8%, and MENA was 12.9% of GDP (World Bank, 2023). Many developing countries with poor and weak economies still consider non-renewable resources relatively more important, which are deemed "resource-dependent" (Ploeg, 2011; Savoia and Sen, 2021). However, in resource-rich economies, the quality of governance and geopolitical risks can lead to the mismanagement of these resources, resulting in poor and disappointing economic performance.

The definition of governance pertains to the customs and establishments that hold accountability for the exercise of power within a nation (Kaufmann et al., 2011). According to Kaufmann et al. (2011), the quality of governance can be assessed by six dimensions ("voice and accountability," "political stability and absence of violence/terrorism," "government effectiveness," "regulatory quality," "the rule of law," and "corruption and natural"). The "voice and accountability," "political stability," and "absence of violence/terrorism dimensions" focus on selecting, monitoring, and replacing governors. A government's ability to develop and enforce healthy policies is reflected in its "government effectiveness" and "regulatory quality." Finally, the "rule of law" and "control of corruption" denote the institutions that the state and citizens should have to regulate social relations and avoid unsustainable conflicts (Chambers and Munemo, 2019).

Geopolitical risks can be defined as the possibility of wars, conflicts, tensions, and terrorism between states, which can potentially affect the development of international relations (Caldara and Iacoviello, 2022). Geopolitical incidents are increasingly shaping local and global economic interactions. Increases in geopolitical risks arise due to a range of incidents, including terrorism, regional/local uncertainty, political conflicts, energy crunches, political hostility, and territorial disputes, among others, occurring worldwide. These risks affect human life directly and impact the global economic sphere (Dogan et al., 2021). These events propagate rapidly through the media and impact anticipations and governance. As a result, geopolitical risk negatively impacts business operations, projected investments, consumption levels of fiscal entities, employment prospects, and economic program implementation (Sweidan and Elbargathi, 2022). Hence, the geopolitical risks of the SSA and MENA regions may expose them to severe price fluctuations in their

resources (Alhassan et al., 2021; Dogan et al., 2021).

Geopolitical risk and its consequences have raised the interest of academia to comprehend the effects of geopolitical risks on different industrial sectors (Akadiri et al., 2020; Selmi and Bouoiyour, 2020; Sweidan, 2021; Sweidan and Elbargathi, 2022). However, the theoretical connections linking geopolitical risk and income from natural resources envisage different results (Dogan et al., 2021), and it is important to study them further. First, geopolitical instability is related to a reduction in consumption and the postponement of investment decisions due to increased precautionary savings (Adeosun et al., 2022; Cheng and Chiu, 2018; Moore, 2017). Hence, Cheng and Chiu (2018) and Cunado et al. (2020) point out that geopolitical risk adversely impacts natural resource rents. Moreover, prior studies indicate a positive correlation between natural resource rents and geopolitical risk. Geopolitical uncertainty can raise natural resource rents due to scarcity or excessive product demand (Li et al., 2020; Noguera-Santaella, 2016).

Currently, geopolitical risk causes concerns regarding other natural resources' supply and demand, such as coal, natural gas, minerals, and timber (Lei and Yang, 2022). Therefore, future geopolitical and economic instabilities may affect production and natural resource revenues (Samour and Pata, 2022; Shahzad et al., 2022). Fluctuations in demand and supply cause unpredictable variations in natural resource rents. Thus, more studies are needed that make the theoretical connection between natural resource rents and political risks (Khan et al., 2020; Lei and Yang, 2022). If properly channeled, natural resource rents can benefit developing economies and facilitate economic progress. However, if not effectively managed, these rents can also have adverse economic and political impacts (Dogan et al., 2021; Lei and Yang, 2022). Most studies attempt to understand the influences of natural resource rents on governance quality (Destek et al., 2023; Fagbemi and Omowumi Adeoye, 2020; Zallé, 2023). We consider that governance quality affects geopolitical risk by mitigating or emphasizing the possibility of political tensions between countries. But how can the quality of governance affect revenues from natural resources, and, as such, is it the quality of political institutions that triggers geopolitical conflicts? How does the quality of governance influence natural resource rents in African natural resource regions? Does the deterioration in the quality of governance favor higher natural resource rents in African regions, or does it constrain such rents?

This study examines the effects of global governance indicators ("Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Rule of Law; Government Effectiveness; Regulatory Quality; Control of Corruption") on natural resource rents in the SSA and MENA regions. We apply a new quantitative panel estimation method to panel data composed of 58 countries from 1996 to 2021. Global governance indicators and data on natural resource rents were collected from the World Bank database.

This study makes four main contributions. First, this study adds to the existing literature on geopolitical risk, quality of governance, and the impact of natural resource rents. Previous studies have considered the quality of governance as a dependent variable of natural resource rents (e.g., Dogan et al., 2021; Fagbemi and Omowumi Adeoye, 2020; Zallé, 2023). In contrast, this study shows that natural resource revenues can be related to the quality of governance, which creates a favourable environment for high returns in natural resource-rich economies. However, such revenues are often not distributed to the general population, benefiting only the private sector that engages in this activity. Second, different from previous studies that emphasize one region or one country (e.g., Afolabi, 2023; Assa, 2018; Rjoub et al., 2021), we explore the effects of global governance indicators on natural resource rents in SSA and MENA economies between 1996 and 2021. Our findings show that increasing the voice and accountability of authorities can prevent the diversion of natural resource rents. Quality governance can be achieved by eliminating corruption and tax-efficient taxation of natural resources. Institution-centred management can prevent rent-seeking and channel incentives to the right actors. Less complex,

more transparent and less contradictory regulations can improve the effectiveness of governance. Renegotiation with private companies can benefit the empowerment of government institutions. Political stability and the implementation of the rule of law are essential for the sustainability of government institutions, and promoting human rights and improving the quality of education can contribute to more effective governance. Third, this paper uses the new quantile regression recommended by Powell (2022). One of the advantages of this approach is that parameters can vary as a function based on a constant effect and as a disturbance term specific to observations (Powell, 2022). Finally, it was found that there is a skewed relationship in which increased deterioration in the quality of governance is associated with increased revenues from natural resource exploitation, which raises the likelihood of geopolitical tensions.

## 2. Literature review

### 2.1. Voice and accountability and natural resources rents

Voice and accountability are critical for effectively managing natural resource rents. In turn, the effective management of natural resource rents is fundamental to sustainable economic development and ecological sustainability (Arslan et al., 2022; Bonilla et al., 2020). However, mismanagement of natural resource rents can lead to corruption, political instability, and social unrest (Vesco et al., 2020). Countries with strong democratic institutions tend to have higher levels of voice and accountability than those with weak democratic institutions (Bonilla et al., 2020; Waldner and Lust, 2018). In addition, studies have shown that countries with high degrees of voice and accountability tend to manage their natural resource rents more effectively than those with low levels of voice and accountability (Aljarallah, 2020; Mlambo, 2022). Several factors influence voice and accountability in countries with natural resource rents, including political infrastructures, civil society institutions, press freedom, and transparency in government operations (Arslan et al., 2022). Lack of transparency and accountability in the regulations of natural resource rents leads to poor wealth distribution and corruption (Okada and Shinkuma, 2022; Zallé, 2019). Therefore, the effective management of natural resource rents requires a high level of voice and accountability. States must ensure that citizens can participate in decision-making processes that affect their lives, while simultaneously holding those in power accountable for their actions. This will help prevent corruption, political instability and social unrest associated with the mismanagement of natural resource revenues.

### 2.2. Political stability and absence of violence/terrorism and natural resources rents

Political stability and absence of violence/terrorism evaluate the perceived potential for politically motivated violence, including political instability and/or terrorism, crucial to a country's development, especially in resource-rich countries (Feng, 1997; Henri, 2019; Stewart, 2002). The roots of violent disputes in developing economies are often attributed to their economic and social structures, such as conflicts for political authority, regional and racial issues, injustice, and poverty (Hegre, 2014; Vestby et al., 2021). Addressing the root causes of conflict is key to preventing future conflicts. Domestic actors must take responsibility for reducing the horizontal inequalities that can fuel conflict (Stewart, 2002).

Natural resources can exacerbate societal conflicts over political, economic, cultural, or religious issues (Schellens and Diemer, 2020; Stewart, 2002), i.e., enhance geopolitical risks. For example, the dependence of some African populations on resources (e.g., oil, gold, diamonds), and when these resources are used as a source of income, can lead to conflicts. Specifically, crude oil mining in the Niger Delta area of Nigeria threatens the lives of aquatic animals and destroys the livelihoods of local communities, especially those directly associated with the

water bodies from which the oil is extracted (Afolabi, 2023). Oil exploration in the area has caused large-scale oil spills, water and soil contamination, and ecological deterioration has negatively impacted the economy and health of residents. These events resulted in several protest demonstrations and social conflicts in the area, evolving into activism and the kidnapping of local oil industry laborers (Afolabi, 2022; Onyena and Sam, 2020). However, natural resources also affect conflict resolution and management in preventing violence in post-conflict contexts (Humphreys, 2005). To promote equity in resource-rich countries, transparent and sound governance structures must be employed to serve the common good of present and future generations (Love-Koh et al., 2020; Stewart, 2002).

Similarly, Ross (2004) notes that natural resource rents can destabilise a country's political foundations. The author argues that natural resource dependence increases the risk of political violence because rent-seeking behaviour leads to increased competition for control of resources. Collier and Hoeffler (2004) mention that countries highly dependent on natural resources were found to be more likely to face civil war and political uncertainty. Oppositely, Koubi et al. (2016) and Brückner and Ciccone (2010) show that political constancy and the elimination of violence can boost economic development, even in countries highly dependent on natural resources, such as African countries. Koubi et al. (2016) and Brückner and Ciccone (2010) consider that political stability is a prerequisite for effective natural resource management and the promotion of economic growth.

### 2.3. Government effectiveness and natural resources rents

Government Effectiveness consists of the perceived quality of public services, their resilience to political pressure, the trait of policy creation and execution, and the promise of governments' dedication to such policies (Chambers and Munemo, 2019). In Africa, natural resource rents have negatively affected government effectiveness (Henri, 2019).

The literature tends to focus on resource governance development, resource development, and institutional development (e.g., Isham et al., 2005; Mehlum et al., 2006). More recent studies have sought to demonstrate the impact of the relationship between government effectiveness and NRR on the economic growth of countries or regions (Adabor, 2023; Destek et al., 2023; Tan et al., 2023; Wang et al., 2023; Yu, 2023). In the case of the Mena regions, Destek et al. (2023) concluded that NRR positively impacts countries' economic growth but government effectiveness negatively. Nonetheless, the role of governance effectiveness in promoting natural resources has been barely studied (Fagbemi and Omowumi Adeoye, 2020), and development policy decisions and policy outcomes may also be decided by natural resources (Nabli and Arezki, 2012). The study by Adabor (2023) demonstrated a positive relationship between gas resource rents and government effectiveness. Thus, economic growth drives gas resource rent, and government effectiveness drives economic growth and is not a consequence. As such, government effectiveness is essential in preventing the "resource curse phenomenon." According to Abman and Longbrake (2023), there is still little empirical evidence demonstrating that rents from natural resources are deteriorating the effectiveness of political institutions in the phenomenon designated by Ross (2015) as the "political resources curse." In resource-rich countries, natural resources tend to cause bribery and rent-seeking among elites. Moreover, resource rents undermine public demand for democratic responsibility and transparency (Badeeb et al., 2017; Torvik, 2002).

### 2.4. Regulatory quality and natural resources rents

Concerns about environmental quality in developing and developed nations have increased because of the adverse impacts of pollution on climate, human health, food security, and preservation of natural resources (Zuo et al., 2022). There has also been a demand for improving the supervisory quality and executing more stringent environmental

procedures to reduce the growing global environmental impact (Ahmad et al., 2020). Regulatory quality refers to the perceived competence of the government to design and employ strong guidelines and controls that enable and advance private sector growth (Kaufmann et al., 2011).

Recent research has delved into the influence of governance, institutions, and management quality on the correlation between natural resource rents and ecological quality (Afolabi, 2023). One study conducted by Rjoub et al. (2021) analyzed the effects of governance, natural resources, and security threats on sub-Saharan Africa's economic development. The authors concluded that while natural resource rents can drive economic development, they can also lead to environmental damage, and effective governance is essential in mitigating this negative impact. In the same region, Yaméogo and Barro (2021) found that regulatory quality is crucial in promoting ecological quality, but corruption has a contrary effect. Furthermore, their study disclosed that the deficiency of government efficiency in the area has a negative effect on ecological management. In Nigeria, Fagbemi and Kotey (2022) stated that the over-reliance on natural resources might worsen the country's current economic issues, resulting in increased ecological degradation. The authors found that the improvement of the quality of the country's institutions could decrease the negative impact of resource rent on ecological quality. Additionally, Amiri et al. (2019) contended that enhancing institutional quality is essential in tackling the resource curse syndrome, which affects several resource-rich countries.

Finally, Sinha and Sengupta (2019) asserted that strong institutions and effective governance could reduce the relationship between human development and natural resource rent. The findings suggest that high-quality institutions and regulations can help ameliorate the negative effect of natural resource rents on the environment, as Nwani and Adams (2021) concluded.

### 2.5. Rule of law and natural resources rents

Many African countries are grappling with significant challenges related to environmental degradation and natural resource management. However, guarantees of the rule of law and protection of citizens against abuse of power, including political power, are often lacking (Assa, 2018). The rule of law encompasses various aspects of society's perceived trust and compliance with rules, such as the quality of policy execution, property rights, the effectiveness of law enforcement and courts, and the prospect of illegality and violence (Chambers and Munemo, 2019). Measuring the rule of law can be complex, as it involves examining the stock of institutions created by past policies (Norman, 2009). The governance indicators proposed by Kaufmann et al. (2003), encompassing the judicial system's reliability, transparency, predictability, efficacy of law enforcement, criminal rates, and guarantees of property rights, are often used to assess the rule of law. However, it is essential to consider existing institutions and the operational environment, including the degree and diffusion of conflict (Norman, 2009). The insufficient stability of the rule of law in Africa stems from the rarity of self-governing and credible courts, which undermines the ability of local institutions to promote transparency and good governance in natural resource management (Assa, 2018). In terms of the exploitation of natural resources, an improvement in the rules of law leads to greater responsibility for the exploitation of natural resources and reduces abusive government and business behavior, improving the use of natural resources (Wang et al., 2023). Countries are abundant in natural resources, but as smaller democracies mean that citizens do not express their preferences, they have less power to monitor the actions of companies and governments and are less aware of using and exploiting natural resources (Adams and Nsiah, 2019).

### 2.6. Corruption and natural resources rents

The discovery of natural resources in developing countries, especially in Africa, is often considered a "curse" due to the corruption and

lack of transparency existing in oil-rich countries, impeding the sustainable socio-economic development of these countries (Henri, 2019). Control of corruption involves assessing the degree of public authority being employed for private benefits, encompassing corruption in both minor and major forms and the possibility of privileged and vested interests capturing the state (Kaufmann et al., 2011).

Government corruption usually leads to the "resource curse," where adequate resource rights, the rule of law, and a fair income distribution structure are not established (Abdulahi et al., 2019). According to Mehlum et al. (2006), the "resource curse" arises in countries having inferior institutional quality and can result in rent-seeking behaviour, mismanagement of oil revenues, socio-economic and political crises, weakening of democratic processes and regional conflicts, and potentiating geopolitical risks. The mishandling of natural resource revenues seems to be one of the main attributes of weakening Africa's democratic procedures and economic development. Therefore, it is important to establish strong institutions and an effective governance structure to ensure the continuing sustainable growth of these countries (Henri, 2019).

The literature points to a correlation between natural resource abundance and corruption (Busse and Gröning, 2013; Goel and Korhonen, 2011; Okada and Samreth, 2017; Tsani, 2015). However, existing research shows that this relationship is complex and depends on levels of corruption and the measures used to assess resource abundance. The studies by Goel and Korhonen (2011) and Busse and Gröning (2013) used quantile regression to assess the impacts of resource wealth on various degrees of corruption. Tsani (2015) also used quantile regression to examine the connection between resource endowments, governance, and institutional quality; as a result, a positive relationship was observed between them. Finally, Okada and Samreth (2017) applied quantile regression to assess the effects of resource rents on corruption, considering oil rents as delegates for resource wealth. The abovementioned studies indicate a significant connection between natural resource richness and corruption (Busse and Gröning, 2013; Goel and Korhonen, 2011; Okada and Samreth, 2017; Tsani, 2015). Henri (2019) indicates that corruption is the most affected problem, followed by the rule of law or justice, ineffective public administration, poor regulation, lack of voice and accountability, and political uncertainty.

## 3. Data and model

The present study examines the influence of perceived governance quality on natural resource income in MENA and SSA countries from 1996 to 2021. The sample consists of 58 countries, with 16 countries located in the MENA region and 42 in the SSA region (list of countries by regions in Appendix). These countries were selected because they derive income from natural resources and, as such, present data on natural resource rents. The period considered in the study was due to the availability of governance quality indicators.

Inspired by the models of Henri (2019) and Dogan et al. (2021), this study proposes to test the following empirical model (1):

$$NRR_{it} = \beta_0 + \beta_1 VOICE_{it} + \beta_2 CORRUPTION_{it} + \beta_3 EFFECTIVENESS_{it} + \beta_4 STABILITY_{it} + \beta_5 REGULATORY_{it} + \beta_6 RULE_{it} + \mu_{it} \quad (1)$$

In Table 1, we can see the definition of the variables.  $\mu_{it}$  is the error term for country  $i$  between times  $t$ .

"Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption" are the six dimensions of worldwide governance and refer to the perception of the quality of governance of the countries.

## 4. Methods

Firstly, to characterize the sample used in this study, we conducted a

**Table 1**  
Definition of variables.

Variables	Definition	Authors
<b>NRR – “Total natural resources rents (% GDP)”</b>	“It is given by the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.”	Agboola et al. (2021); Ampofo et al. (2021); Ampofo et al. (2020); Ben-Salha et al. (2021); Jović et al. (2016); Okada and Samreth (2017).
<b>VOICE – “Voice and Accountability”</b>	“It refers to perceptions of the extent to which a country’s citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Ranging from approximately –2.5 to 2.5.”	Arslan et al. (2022); Bonilla et al. (2020); Brunnschweiler et al. (2021); Henri (2019); Epo and Nochi Faha (2020).
<b>CORRUPTION – “Control of Corruption”</b>	“It captures perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption, and “capture” of the state by elites and private interests. Ranging from approximately –2.5 to 2.5.”	Abdulahi et al. (2019); Busse and Gröning (2013); Goel and Korhonen (2011); Henri (2019); Okada and Samreth (2017); Tsani (2015).
<b>EFFECTIVENESS – “Government Effectiveness”</b>	“It 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. Ranging from approximately –2.5 to 2.5.”	Badeeb et al. (2017); Chambers and Munemo (2019); Fagbemi and Omowumi Adeoye (2020); Henri (2019); Torvik (2002).
<b>STABILITY – “Political Stability and Absence of Violence/ Terrorism”</b>	“It measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Ranging from approximately –2.5 to 2.5.”	Asiamah et al. (2022); Dalyop (2019); Do (2021); Henri (2019); Kunawotor et al. (2020).
<b>REGULATORY – “Regulatory Quality”</b>	“It captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Ranging from approximately –2.5 to 2.5.”	Ibrahim and Ajide (2021); Epo and Nochi Faha (2020); Henri (2019); Ndikumana and Sarr (2019); Nwani and Adams (2021).
<b>RULE – “Rule of Law”</b>	“It captures perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Ranging from approximately –2.5 to 2.5.”	Abdulahi et al. (2019); Epo and Nochi Faha (2020); Fagbemi and Omowumi Adeoye (2020); Henri (2019); Nchofoung et al. (2021).

Source: World Bank (2021)

statistical analysis (mean, standard deviation, maximum and minimum values) of the dependent variables (NRR) and the independent variables relating to the perception of the quality of governance (voice, corruption, effectiveness, stability, regulatory and rule) by regions (MENA and SSA).

Then, to avoid estimating spurious regressions, we previously performed a univariate analysis for each data series. Thus, to assess the possible cross-sectional dependence between the countries considered in the study, we implemented the unit root test of Pesaran (2007), and to assess heterogeneity, we used the Hashem Pesaran and Yamagata (2008) cointegration test, as used in the study of Dogan et al. (2021).

Assuming the existence of cross-country dependence and heterogeneity among the countries considered in the study, we assess the long-term relationship of the variables using the cointegration test of West-erlund (2005). Given the type of data used in this study, which involves time series, variables over short periods tend to be unbalanced, but over the long run, variables will move in a way that approximately satisfies a relationship. Thus, if the time series are cointegrated, their behaviour will fulfil the established long-term relationship, obeying a systematic relation, not requiring the correct specification of how the data were generated, and allowing the estimation of the uncomfortable parameters.

Finally, we use the quantile panel data estimator (QRPD) of Powell (2022) to estimate the long-run relationships defined in the empirical model (1). The QRPD has already been used in other studies on this topic (Dogan et al., 2021; Hadj and Ghodbane, 2021; Haseeb et al., 2021; Inuwa et al., 2023). This method is based on the variation analysis within quartile groups, assuming that fixed effects are non-additive and disturbance terms are not separable from the estimated quartile. Thus, it allows us to analyse the effects of natural resource rents in different intervals (quartiles) of the independent variables concerning the perception of governance quality. Moreover, it considers the individual heterogeneity of the variables, estimating the effects of the quartile treatment to generate the data. This is thus a more robust analysis than provided by the Ordinary Least Square method when there are outliers and non-normal distribution of the dependent variable, as in the case of natural resource rents. Consequently, it allows the impact of the covariate to be observed across the entire data and not just the mean, even when there is data transformation (Sinha and Sengupta, 2019). In order not to separate the disturbance terms from the quartile estimation, this study, to estimate the results, used non-additive fixed effect as suggested by Dogan et al. (2021) as follows:

$$Y_{i,t} = D'_{i,t} \beta U^*_{i,t} U^*_{i,t} \sim U(0,1), \tag{2}$$

where  $D'_{i,t} \beta(\tau)$  increases only in quantiles  $t$  and  $U^*_{i,t}$  is a function of the disturbance terms and guidelines for the outcome. The quantile regression specified for this study aims to analyse the impact of the six dimensions of perceived governance quality on natural resource rent and can be specified by Equation (3):

$$(NRR)_{it}(\tau/\alpha_i, \gamma_t, X_{it} = \alpha_i + \gamma_t + \partial_1 VOICE_{it} + \partial_2 CORRUPTION_{it} + \partial_3 EFFECTIVENESS_{it} + \partial_4 STABILITY_{it} + \partial_5 REGULATORY_{it} + \partial_6 RULE_{it}, \tag{3}$$

where  $\alpha_i$  represents “the non-adaptive fixed effects” and  $X_{it}$  is a “matrix of the independent variables at individual countries  $i$  and time  $t$ ,” as used in Dogan et al. (2021).

### 5. Results

Table 2 shows the results of the statistics of the dependent (NRR) and independent (voice, corruption, effectiveness, stability, regulatory, and rule) variables. In all variables, the standard deviation is higher than the average value, revealing that all variables present a high dispersion in the MENA and SSA regions. Thus, we can conclude that the variables considered in the empirical model do not present a normal distribution.

**Tabela 2**  
Statistical description of the variables of the empirical model.

	NRR	VOICE	CORRUPTION	EFFECTIVENESS	STABILITY	REGULATORY	RULE
<b>MENA REGION</b>							
Mean	19,990	-0,971	-0,270	-0,199	-0,651	-0,277	-0,274
Std. Deviation	20,737	0,579	0786	0,826	1031	0,876	0809
Minimum	0,001	-2050	-1698	-2349	-3180	-2282	-1857
Maximum	67,890	0,787	1559	1505	1224	1311	1279
Percentiles							
25	0,884	-1333	-0,872	-0,798	-1344	-0,904	-0,919
50	18,773	-1039	-0,466	-0,213	-0,620	-0,165	-0,231
75	33,471	-0,711	0306	0,390	0025	0,445	0423
Obs.	368	368	368	368	368	368	368
<b>SSA REGION</b>							
Mean	11,681	-0,557	-0,615	-0,763	-0,499	-0,687	-0,639
Std. Deviation	12,015	0,740	0607	0,581	0869	0,611	0659
Minimum	0,001	-2226	-1648	-1887	-2848	-2269	-1928
Maximum	59,584	1007	1245	1161	1224	1197	1231
Percentiles							
25	3972	-1136	-1078	-1175	-1087	-1101	-1149
50	8085	-0,552	-0,713	-0,802	-0,359	-0,693	-0,673
75	15,131	-0,067	-0,274	-0,484	0074	-0,324	-0,261
Obs.	989	989	981	986	989	989	989

Furthermore, from the statistical results, we can also conclude that the independent variables concerning governance quality present very heterogeneous data, leading to substantial heterogeneity in the dependent variable NRR that underlies the modelling of the data through a quantile regression.

As shown in Table 2, on average, the MENA region has a higher NRR (as a percentage of GDP%) than the SSA region (19.990% and 11.681%, respectively). The MENA region, compared to SSA, on average, despite the negative perceptions, has a higher perception of control of corruption (-0.270), government effectiveness (-0.199), regulatory quality (-0.277), and the rule of law (-0.274). The SSA region, on average, has a higher perception of voice (-0.557) and government stability (-0.499) despite the negative perceptions.

Table 3 shows the results of the cross-sectional dependence test (CD-Test) and heterogeneity test. We can conclude that the null hypothesis of cross-sectional independence of the countries considered in this study is rejected, and therefore, there is cross-sectional dependence among the economies. Moreover, the heterogeneity-test results also reject the null hypothesis of homogeneity of the countries considered in this study. Thus, cross-sectional dependence and heterogeneity among the countries considered in the sample exist.

As there is cross-sectional dependence and heterogeneity between countries, the Dickey-Fuller test (CADF) and the panel unit root test of Pesaran (2007) were performed, and the results are shown in Table 4. As we can see, the variables considered in the research model in both regions became stationary in the first differences; therefore, the

**Table 3**  
Cross-sectional Dependence test (CD-Test) and Heterogeneity-test.

	CD-Test	p-value	Heterogeneity-test	p-value
<b>MENA</b>				
NRR	45.670	0.000	15.340	0.000
VOICE	13.562	0.000	11.234	0.000
CORRUPTION	14.673	0.000	13.980	0.000
EFFECTIVENESS	23.879	0.000	18.845	0.000
STABILITY	24.689	0.000	14.121	0.000
REGULATORY	27.895	0.000	16.889	0.000
RULE	12.217	0.000	10.756	0.000
<b>SSA</b>				
NRR	39.292	0.000	17.231	0.000
VOICE	12.165	0.000	11.530	0.000
CORRUPTION	14.836	0.000	12.908	0.000
EFFECTIVENESS	21.504	0.000	13.439	0.000
STABILITY	22.387	0.000	14.476	0.000
REGULATORY	25.332	0.000	15.362	0.000
RULE	11.816	0.000	11.003	0.000

**Table 4**  
Panel unit root test.

	Levels		First-Differences	
	CADF	p-value	CADF	p-value
<b>MENA</b>				
NRR	45.670	0.529	4.965	0.000
VOICE	13.562	0.287	2.678	0.000
CORRUPTION	14.673	0.458	3.908	0.000
EFFECTIVENESS	23.879	0.908	3.254	0.000
STABILITY	24.689	0.269	4.223	0.000
REGULATORY	27.895	0.223	4.765	0.000
RULE	12.217	0.336	3.612	0.000
<b>SSA</b>				
NRR	2.345	0.296	3.657	0.000
VOICE	2.672	0.456	3.322	0.000
CORRUPTION	1.995	0.561	2.861	0.000
EFFECTIVENESS	2.646	0.663	3.934	0.000
STABILITY	3.112	0.397	4.602	0.000
REGULATORY	2.034	0.239	4.127	0.000
RULE	1.447	0.655	2.030	0.000

probability of estimating spurious regressions is residual.

Given the existence of cross-sectional dependence and heterogeneity, the Westerlund (2005) cointegration test assessed the long-term relationship between the variables. The results in Table 5 confirm a long-term relationship between the variables considered in the empirical model.

After performing all the tests to ensure that the estimation of the empirical model would not result in spurious regressions, we applied the quantile regression method to the empirical model for each region (SSA and MENA). The results are described in Table 6. We considered that quartiles 10t to 30t correspond to low NRR, 40t to 60 to medium NRR, and 70 to 90 to high NRR.

The impact of Voice and Accountability on NRR is significant and negative for all quartiles in the MENA and SSA regions. This impact is more negative in the MENA region until the 40th quartile, with a reduction until the 90th. In the SSA region in the first three quartiles, the impact is insignificant when NRR is lower and worsens until the last quartile. Control of corruption has a significant and negative impact on

**Table 5**  
Cointegration test.

	Statistic	p-value
<b>Variance Ratio</b>	4.894	0.003

**Table 6**  
Results of the empirical model estimation by the quantile regression method.

	LOW NRR			MEDIUM NRR			HIGH NRR		
	q0,1	q0,2	q0,3	q0,4	q0,5	q0,6	q0,7	q0,8	q0,9
MENA									
VOICE	-7315*	-11,131*	-12,247*	-13,272*	-12,246*	-11,657*	-8814*	-8143*	-8030*
CORRUPTION	-2605	-3089	-6477	-11,983*	-15,192*	-21,144**	-11,477*	-10,932**	-7539*
EFFECTIVENESS	12,062*	13,865*	12,435*	-7345*	-7309*	-7414*	-14,540*	-16,954**	-20,334*
STABILITY	-0,989	-1754	-0,594	-0,718	-0,263	-1224	4073**	6438*	7001*
REGULATORY	-5446**	-8207*	-5955**	-4307	-0,230*	-3679*	-6061**	-3896**	-6729**
RULE	-5556	-2632	-7259	-10,128**	-14,552*	-19,243*	-15,604*	-12,839*	-4181*
SSA									
VOICE	-0,171	-0,034	-0,320	-0,978**	-1154**	-1489**	-1649**	-3609**	-9660*
CORRUPTION	-0,030	-0,455	-0,412	-1372*	-1478*	-1535*	-0,344*	-0,242*	-0,138*
EFFECTIVENESS	1661*	3152*	3469*	-2920*	-2106*	-2439*	-0,741	-2047	-3635
STABILITY	-0,962*	-1326*	-1371*	-1409*	-1127*	-0,548*	0,403*	2833*	7709*
REGULATORY	-0,632*	-1569*	-1698**	-1338*	-0,288*	-0,931*	-5,34*	-7488*	-9280*
RULE	-0,167	-0,234	-0,212	-0,694**	-1331*	-2468*	-3369*	-5990*	-8599*

Note: \* 1% level of significance and \*\* 5% significance level.

medium and high NRR economies in the MENA and SSA regions, moving upward in the 40th to 60th quartiles and downward in the 70th to 90th quartiles. It means that in medium NRR African economies, higher levels of corruption impact positively and incrementally on natural resource rents. Government Effectiveness positively and significantly impacts low NRR economies in the MENA and SSA regions. In the economies of the two regions with medium and high NRR, Government Effectiveness has a negative impact on NRR. However, in the economies of the SSA region with higher NRR (70th to 90th quartiles), this impact is not significant. The Political Stability and Absence of Violence/Terrorism negatively impact low and medium NRR economies, although it is not significant in these quartiles in the MENA region. In high NRR economies, government stability has a positive and increasing effect. The Regulatory Quality of government negatively impacts NRR across all quartiles in the economies of MENA and SSA regions. As such, countries with natural resource rents generally have negative regulatory quality. Finally, the rule of law negatively influences resource rents in MENA and SSA regions in medium and high NRR quartiles.

**6. Discussion**

In recent years, attempts have been made to explain geopolitical risk drivers in countries rich in natural resources. Deterioration in the quality of governance may not only be a consequence of high NRRs. Still, it may be the cause that explains why certain regions and countries obtain higher NRRs, leading to economic and social inequalities and greater political tensions.

The impact of Voice and Accountability on NRR is negative for all quartiles in the MENA and SSA regions. The loss of Voice and Accountability tends to grow with the endowment of natural resource rents. These results show that in the economies of the MENA and SSA regions, citizens perceive that they cannot participate in government choice, they do not have freedom of expression and association, nor are the media free. This implies that the highest NRRs are obtained in these economies when citizens have less voice and accountability. The lack of voice and accountability may be an institutional problem caused by the fact that there are natural resource rents, as shown in Henri (2019)'s study of the reality of Africa.

Moreover, when institutions are strong, the negative impact of the lack of voice and accountability on NRRs tends to reduce, as shown by the results obtained for MENA regions, corroborating the study by Dwumfour and Ntow-Gyamfi (2018). Thus, African countries benefit in terms of economic growth from natural resource rents when there is a greater perception by citizens of having a voice and accountability (Oyinlola et al., 2015). Citizens with freedom of expression and the ability to hold the government to account and make it more efficient (Mlambo, 2022).

The corruption levels are higher in MENA regions, as per Table 1, and their impact on NRRs is higher than that of the SSA region. Several previous studies have found a positive relationship between corruption and African natural resource rents (Henri, 2019; Okada and Samreth, 2017; Petermann et al., 2007). In the initial phase of the resource exploitation process, all the players who have entered this game are defined. In this phase, the operators who will exploit the natural resources and the contractual terms are selected. However, this phase implies opportunities for corrupt gains, especially for private companies that the government helps by changing rules and access to privileged information, often in exchange for bribes (Kolstad and Søreide, 2009). Thus, control of corruption has an inverse relationship with economic growth in African countries (Tabash et al., 2022).

The results show that Government Effectiveness positively impacts low NRR economies in the MENA and SSA regions. In the economies of the two regions with medium and high NRR, Government Effectiveness has a negative impact on NRR. Thus, the results show that in economies with higher NRRs, the lack of Government Effectiveness favours obtaining higher rents from exploiting natural resources, as found by Adabor (2023). The lack of Government Effectiveness translated by the lack of quality of public services, their dependence on political pressures, and the absence of credible government policies may be an institutional problem promoted by exploiting natural resources in African countries (Henri, 2019). Government Effectiveness as an indicator of institutional quality in Africa has been the worst performing in several previous studies, such as Adeleye et al. (2017), Agbloyor (2019), and Kunawotor et al. (2020), demonstrating the economic and political vulnerability of these economies. However, government efficiency can play a primary role in the growth of economies (Brunnschweiler, 2008; Inuwa et al., 2022) because the effectiveness of the bureaucracy and the absence of dependence on political pressures can reflect the strength of a government to resist external pressures and channel revenues to the right ends (Cadoret and Padovano, 2016).

The results obtained for the indicator of Political Stability and Absence of Violence/Terrorism are contradictory. In low and medium NRR economies, this indicator has, in general, a negative impact on NRR, but in high NRR economies, the effect is positive and growing. Rents from natural resource exploitation can destabilise political systems, leading to marginalisation of government and civil society (Henri, 2019). As such, natural resource-rich economies are at risk of greater economic and political instability, and the stability of institutions is an important determinant of natural resource rents (Robinson et al., 2006). The results show that in economies with higher NRRs, political instability has a positive impact on resource rents, while the opposite is true for economies with low and medium NRRs. This result is corroborated by Bjorvatn and Farzanegan (2015), who indicate that natural resource rents stabilise when political strength is high and fractional regime is

low but destabilise when political regimes are weak from birth, as is the case in African regions.

The results show that countries with natural resource rents generally have negative regulatory quality. Government regulation is measured by the perceived ability of the government to create and implement consistent policies and regulations to promote the private sector. Regulation is an important requirement in natural resource exploitation because the choices of private parties tend to skew the benefits of societies collectively gaining power in the market (Adams et al., 2019). Thus, regulation can restrict the beneficial choices of private entities. Government involvement and control in the exploitation of natural resources implies the imposition of regulation, notably by granting privatization of these sectors and licences, and there is a risk of increased corruption (Kolstad and Søreide, 2009).

Finally, the results demonstrated that MENA and SSA regions with medium and high NRR have lower rules of law. This means that in NRR-rich regions, there tends to be a deterioration in the perception of the rule of law, as found by Henri (2019) and Norman (2009). The lack of the rule of law guarantees and protection of citizens against abuse of power, including political power, can lead to the perception that there is no rule of law (Assa, 2018; Wang et al., 2023). On the other hand, the lack of the rule of law guarantees occurs because, in Africa, the perception of independent and credible courts is still rare, preventing local institutions from promoting transparency and good governance in natural resource management (Assa, 2018; Chambers and Munemo, 2019).

### 6.1. Theoretical and policy implications

Natural resource rents can influence economic growth, triggered not by the quantity of resources but by the quality of governance in resource-rich economies (Oyinlola et al., 2015). However, the quality of governance in resource-rich countries, marked by political instability, high corruption, low levels of the rule of law, voice, and accountability, and poor quality of public services (Henri, 2019; Nchofoung et al., 2021) affects NRR and as such, may explain the high geopolitical risks of these economies.

The results of this study allow some theoretical and practical implications to be inferred. At the theoretical level, governance quality has been treated as a dependent variable of natural resource rents. Conversely, our study shows that natural resource rents may be a consequence of the quality of governance, which creates an enabling environment for high returns in resource-rich economies that are then not channelled to the general population, benefiting only the private sector that engages in this activity.

In terms of practical implications, this study demonstrates that African countries should promote quality governance and diversify their economies (Henri, 2019). First, voice and accountability can prevent natural resource revenues from disappearing through increased monitoring and accountability of authorities. Second, the promotion of quality governance can be achieved through eliminating corruption, which can be achieved through greater transparency of the transfer of property rights in natural resource exploitation and tax-efficient taxation of NRR (Mlambo, 2022). In addition, focused management of the institutions that deal with natural resource exploitation can prevent rent-seeking and channel incentives to the right actors.

Third, less complex, more transparent, and less contradictory regulations increase the possibility of more effective governance. Fourth, the possibility of renegotiating with private companies by granting them greater tax benefits, adjustments in concession fees, and extensions of contract terms can benefit the empowerment of government institutions. Engaging, interested, and interest-driven dialogues with a broad group of natural resource stakeholders, including the private sector, can promote the quality of governance and the channelling of resource rents to the government and civil society. Fifth, political stability and the implementation of the rule of law should be the essential conditions for

the sustainability of government institutions (Biresseolioglu et al., 2019). This requires greater government effectiveness, translated into a more efficient capacity to deliver public services, and the implementation of assertive, thoughtful, and diversified resource management policies. Finally, promoting human rights in African regions, improving the quality of education, and reducing social inequalities can contribute to effective governance quality promotion and reduce geopolitical tensions in natural resource-exploiting regions.

## 7. Conclusion

Geopolitical risks triggered by tensions arising from the exploitation of natural resources have been one of the biggest global challenges and the ones that most affect the world economies. The existing literature has focused on explaining governance quality as a consequence of natural resource rents. However, little is known about how this relationship is not inverse, that is, to what extent governance quality is not a consequence of natural resource rents' existence in economies. In this context, the present study aimed to assess the impact of perceived governance quality on natural resource rents in MENA and SSA regions. The results highlight a negative perception of governance quality in both MENA and SSA economies. Thus, natural resource rents as a percentage of GDP are, on average, very high in these regions and are provided because of a lack of voice and accountability, political instability, violence and terrorism, lack of government effectiveness, low regulatory quality, the non-existent rule of law and high corruption characterizes a government environment. Moreover, lower government quality tends to contribute even more to resource rents when medium and high NRRs exist in economies, with this impact being less pronounced in economies with low NRRs. Thus, the results demonstrate that government quality affects natural resource rents in African regions. So far, evidence from empirical studies has shown that rents derived from the exploitation of natural resources affect the quality of government. There is a biased relationship that the more significant the deterioration in the quality of government, the greater the revenues from the exploitation of natural resources in the analyzed African regions, increasing the probability of geopolitical tensions.

This study adds to the existing literature on geopolitical risk, the quality of governance, and its relationship with the rents obtained from the exploitation of natural resources. Furthermore, it is one of the first studies to empirically demonstrate that the quality of governance can explain the NRR of regions and countries abundant in natural resources. Previous studies have tried to illustrate that NRR influences the quality of governance. Furthermore, this study uses a sample in several countries and temporal terms when comparing two regions (MNA and SSA) that are important regarding world trade in natural resources. Thus, it allows a more comprehensive and heterogeneous analysis of governance quality indicators and NRR. The results also demonstrate that the different performances of these regions, in terms of governance indicators and their influence on the NRR, can allow political, economic, and social decision-making that contribute to more effective and efficient governance, reducing geopolitical risks in these regions.

This study is not without limitations. First, the study's sample size was limited to the temporal availability of data for the variables analyzed. Specifically, the sample was restricted to countries where data on natural resource rents were available. Furthermore, it focused on two African regions that derive rents from different natural resources whose commercial values may be very different and were not taken into account in the analysis of this study. We may consider a broader range of regions and years in future studies. It would also be interesting to replicate this study by types of natural resources (food, oil, gold, and diamonds, among others). This would allow analyzing whether there is a relationship between the typology of the natural resource, the quality of governance, and the probability of geopolitical risks.

The geopolitical risk was measured by the six dimensions of governance quality, and other indicators may lead to different results. In

future studies, it would be interesting to compare the impact of different geopolitical risk indicators on NRR in MENA and SSA regions, such as the geopolitical risk index of [Caldara and Iacoviello \(2022\)](#) or the economic policy uncertainty index of [Baker et al. \(2016\)](#).

Furthermore, in this study, a linear relationship between the quality of governance and natural resource returns was considered. In future studies, non-linear relationships between the variables under study may be considered, introducing macroeconomic indicators as control variables in the tested model. These indicators can be GDP growth, unemployment, inflation rate, and interest rate, among others.

**Author statement**

João J. Ferreira: Conceptualization, Methodology, Formal Analysis, Writing, Supervision.

Sofia Gomes: Software, Data Curation, Writing.

João M. Lopes: Methodology, Statistical analysis, Writing.

Justin Zhang: Review & Editing, Visualization, Writing, Supervision.

**Declaration of competing interest**

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Data availability**

Data will be made available on request.

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**Appendix**

*SSA Countries*

Angola	Guinea	Rwanda
Burundi	Gambia, The	Sudan
Benin	Guinea-Bissau	Senegal
Burkina Faso	Equatorial Guinea	Sierra Leone
Botswana	Kenya	São Tomé and Príncipe
Central African Republic	Liberia	Eswatini
Cameroon	Lesotho	Togo
Congo, Rep.	Madagascar	Tanzania
Comoros	Mali	Uganda
Cape Verde	Mozambique	South Africa
Eritrea	Mauritania	Congo, Dem. Rep.
Ethiopia	Mauritius	Zambia
Gabon	Malawi	Zimbabwe
Ghana	Namibia	
Nigeria		

*MENA Countries*

United Arab Emirates	Jordan
Bahrain	Lebanon
Djibouti	Libya
Algeria	Morocco
Egypt, Arab Rep.	Oman
Iran, Islamic Rep.	Qatar
Iraq	Saudi Arabia
Israel	Yemen, Rep.

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