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Analyzing the impacts of geopolitical risk and economic uncertainty on natural resources rents

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ABSTRACT:

The determinants of natural resources rents have been extensively analyzed in the resources economics and policy literature; however, the role of geopolitical risk and uncertainty in rents remains unexplored. Given that these indicators are rather volatile and thus important to discover for developing countries which own a large portion of natural resources in the world, this study aims to examine the effects of geopolitical risk and economic policy uncertainty on natural resources rents in a group of developing economies by applying the novel panel quantile estimation technique on the panel data over 1985–2018. The empirical results suggest that geopolitical risk has a negative impact on the natural resources rents for all quantiles while economic growth increases natural resources rents across middle-and-high quantiles. In contrast, the influence of economic policy uncertainty on resources rents varies across the quantiles. The uncertainty increases natural resources rents in low quantiles and decreases rents in high quantiles. Thus, quantile regression results reveal heterogeneous impacts of the selected main determinants of natural resources rents. Important policy implications are further discussed in the study.

1. Introduction

Natural resources such as gold, oil, gas, and minerals are widely regarded as potential drivers of economic growth and development (Ben-Salha, 2020; Topcu et al., 2020). Demand for natural resources is growing swiftly. The contemporary world is going through a "super cycle" of product prices, propelled by demand from emerging countries. The extraction of natural resources depends upon capital intensity, with yearly international investment about $1 trillion (Barma et al., 2011). Annual global primary resource extraction and use have exceeded 100 billion tons per year; and estimates by the International Resource Panel indicate that by 2050 annual global material use could amount to between 170 billion and 184 billion tons (Schroder, 2020). According to the IRP (2019), global gross domestic product (GDP) has increased four times while the population has doubled since the 1970s, this has led to the increasing demand for natural resources to support development and wellbeing. Over time the natural resource extraction has grown and reached "92 billion tons in 2017, compared with 27 billion tons in 1970". The two important drivers behind the increase in resource extraction include population and economic growth. Natural resources (materials) are extracted, traded, and transformed to fulfill human and development needs. The increasing demand for natural resources originated from infrastructural needs and higher living standards in "developing and transitioning economies particularly in Asia" (IRP , 2019). Thus, natural resource extraction offers an opportunity for developing infrastructure and initiating structural reforms in the developing world.

Natural resources rents are monetized about $4 trillion per annum, which comprises 7% of world income (Barma et al., 2011). Many developing countries are considered as "resource-dependent". Non-renewable resources are relatively more important to poor and weak economies because they are the main source of revenues. However, the "paradox of plenty" prevails in resource-rich fragile economies where historical evidence has shown that when resources are poorly managed, the gains from natural endowments can be disappointing (Satti et al., 2014). Political cataclysms such as the current issues in the Middle East and North Africa (MENA) countries can expose them to severe commodity price fluctuations and production instability. Natural resources-based development can be leveraged through policies which are compatible with the institutional framework and political economy

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(Matallah, 2020). Accordingly, the key concern is to manage natural resources rents in a suitable manner, including devising policies to attract the mandatory investment and technologies to construct the resource industry in the long term. Thus, harnessing and managing natural resources and their allied rents can play a vital role in the development of developing countries.

The literature on natural resources rents and economic growth nexus has received considerable attention in the past. Both theoretical and empirical studies have mainly focused on the impact of natural resources on economic growth. However, neither theoretical nor empirical literature provides conclusive outcomes (Dogan et al., 2020). One strand of the literature highlights that economic growth increases in response to higher resources rents. A higher resources rents supports job creation, escalates investment in exploration, and improves infrastructure and financial development. Such studies consider natural resources as blessing for economic growth and support "natural resource blessing" hypothesis (Hamdi and Sbia, 2013; Shahbaz et al., 2018). The other strand of literature considers a negative association between economic growth and resources rents because resource dependence escalates rent-seeking activities which adversely affect growth and development outcomes. The studies examining the "resource curse hypothesis" include Leite and Weidmann (1999) and Satti et al. (2014). Though a large body of the literature has explored natural resource and growth nexus with inconclusive outcomes, an equally important issue whether growth spurs natural resources rents is not focused. Economic growth can increment natural resources rents by creating opportunities for exploration and investment in natural resource extraction. However, empirical studies have overlooked the importance of economic growth as a driver of natural resources rents.

Another potential factor that can predict changes in natural resource is geopolitical risk. Geopolitical incidents are increasingly shaping economic interactions at both local and global levels. A number of geopolitical events like terrorist incidence, local/regional instability, political copes, energy crisis, political violence, terrestrial disputes, and other geopolitical events across the globe are increasing geopolitical risks. These risks not only directly affect human life, but they are also influencing economic sphere of the world. In this situation, oil exporting countries are also responding to such shocks. The large economies from the North such as United States and from the South such as China and India with high demand of oil for their output growth depend upon the Persian Gulf oil, Russian oil, and Caspian region oil (BP, 2004). The Persian Gulf comprises 60% of "Organization of Petroleum Exporting Countries (OPEC)" oil reserves (OPEC, 2018). Given the strategic importance of Persian Gulf, Oil rent is likely to be affected by geopolitical risks. Other than oil rents, contemporary geopolitical risks have great concerns for supply and demand of other natural resources rents such as rents related to natural gas, coal, mineral, and forests. Besides, future expected geopolitical and economic policies uncertainties also likely to influence natural resource production processes and rents.

Risk and uncertainty cause fluctuations in natural resources rents by changing demand and supply conditions. Theoretical links between geopolitical risk and natural resources rents predict diverse outcomes. On the one hand, geopolitical uncertainty is associated with lower consumption as well as postponed investment decisions owing to increasing precautionary savings (Cheng and Chiu, 2018; Bloom, 2009). The studies that support the negative impact of geopolitical uncertainty on natural resources rents include Cunado et al. (2020), Cheng and Chiu (2018), and Caldara and Iacoviello (2018). On the other hand, the literature also suggests a positive association between geopolitical risks and natural resources rents. The geopolitical uncertainty can increase natural resources rents owing to the shortage or high demand of the products. For example, Noguera-Santaella (2016) explored the impact of 32 different geopolitical events on oil price employing monthly data since 1859. Their findings suggest that oil prices are positively associated with geopolitical risks.

In a recent study, Mokni et al. (2020) explored the dynamic association between oil price shocks and gold price in the presence of economic policy uncertainty. They employ "time-varying parameter vector autoregression (TVP-VAR)" using daily data from January 2, 1997 to January 30, 2019. There results reveal that macroeconomic uncertainty has a significant impact on the association between oil price shocks and gold price. In another study, Li et al. (2019) investigated the dynamic spillovers of geopolitical risks and gold prices for eighteen emerging countries over the period 1985–2019.Their finding reveal a positive connectedness between geopolitical risks and gold prices. The studies that supported the positive impact of geopolitical risk on resources rents include Bouoiyour et al. (2019), Antonakakis et al. (2017), Omar et al. (2017), and Noguera-Santaella (2016). Therefore, it is vital to understand that how the geopolitical risk affects natural resources rents, as the empirical literature predicts ambiguous outcomes. Besides, in some economies these rents from resources are used to improve wellbeing and support development while in other economies they cause conflicts and wars.

The global and regional risks are not limited to geopolitical economy, but risks associated with economic policy uncertainties are mounting in the contemporary world. Macroeconomic policy uncertainty undermines the growth in any economy. The frequent and ambiguous policy adjustment increases economic policy uncertainty (Liu and Zhang, 2020) and it is negatively associated with investment, employment, growth, and stock prices (Baker et al., 2016). Besides, economic policy uncertainty leads to volatility in natural resources rents (Yang, 2019), thereby reducing the profits earned on natural resources. The impact of macroeconomic policy uncertainty on investment and growth is negative as under uncertainty the investors hold their investment decisions which have a far-reaching (negative) effect on the economy. The structural oil shocks lead to uncertainty in economic policy as oil prices affect the economy. The oil price shocks lead to income redistribution, expectation about the real interest rate and inflation respectively Dakhlaoui and Aloui (2016). For the successful operation of any market, stability is the initial condition.

The empirical evidence on the relationship between uncertainty and natural resources rents is not yet certain. For example, on the one hand, many studies provide the evidence of positive association between economic uncertainty and oil price volatility (Van Robays 2016; Bakas and Triantafyllou, 2019). On the other hand, some studies showed that uncertain events and oil price volatility are not connected (e.g., Joëts et al., 2017). The available literature has highlighted the importance of natural resources rents, economic policy uncertainty and geopolitical risk. However, the empirical literature is quite limited. The existing empirical studies generally focus on different types of natural resources rents such as oil rent and gold rent overlooking the importance of total natural resources rents. Since the links of rents and its determinants are quite complex and diverse, analyzing a single form of the natural resources rents may provide an incomplete picture. Therefore, total natural resources rents as the sum of oil, natural gas, coal, mineral, and forest rents can be quite useful in untangling natural resource economy in an uncertain economic and geopolitical environment. The literature on geopolitical risk is qualitative in its essence and, to the best of our knowledge, no previous study has explored the impacts of geopolitical risks and economic policy uncertainty on natural resources rents. Likewise, the growing literature on economic policy uncertainty has focused on energy and carbon emissions, but no study has linked economic policy uncertainty with natural resources rents.

In the light of above discussions and the review of existing literature, this study stands as a pioneering research in the field as it connects natural resources rents with two emerging strands; namely, geopolitical risk and economic policy uncertainty. Based on the prior, the objective of the study is to explore the association in the natural resources rents, geopolitical risk, policy uncertainty trilogy. Basically, this study pursues answer to the empirical enquiry on: do geopolitical risks and policy uncertainty impact the natural resource rents in the selected resource-endowed developing countries? Besides, do the impacts of growth, geopolitical risk and policy on rents vary depending upon the distributional profile of our outcome variable (resources rents).

Containing a number of novel elements, this study contributes to the literature in following ways: First, this is first study of its kind that explores the role of geopolitical risks, and policy uncertainty as macroeconomic determinants in the natural resources rents-economic growth nexus over the period 1985–2018. This long span of time covers major global economic and political risks such as "the 1998 Asian financial crisis, the 2002 dotcom crisis, the 2008 global financial crisis, the 2010–2012 European debt crisis, and the 2014–2016 oil price collapse"). Second, this study connects geopolitical risk and rents for the developing world and also provides estimates of an exclusive role of economic policy uncertainty in shaping natural resources rents. Third, this study employs the novel quantile regression proposed by Powell (2016). The advantage of this technique is that it allows "*parameters to change based on an unknown function of fixed effect and an observation-specific disturbance term while relaxing the identification assumption*". Finally, this study advances in geopolitical risk research by initiating an empirical evidence on geopolitical economy and natural resource nexus by considering the heterogenous distribution of natural resources rents. In particular, our research suggests that the ongoing research on the dynamic impacts of geopolitics on different economic and environmental outcomes need to consider the interactive role of resources rents for deeper insights of the issues at hands. Findings of the study are useful for global investment projects, international institutions, domestic governments, political scientists, environmental experts, energy economists, geologists, central bank officials, fiscal policy managers and think tanks. Managing development strategies in the presence of uncertain policy environment and growing geopolitical risks require academic as well as policy attention. This study kickstarts a new debate in the field of natural resource economics and a geopolitical economy.

The remaining study is organized in the following manner: Section 2 is based on the studies examining natural resource-growth nexus, natural resource-geopolitical risk nexus, and natural resource-economic uncertainty nexus. Section 3 provides information about the model and data, while section 4 presents methods and empirical results. Conclusion and policy implications are presented in section 5.

2. Literature review

2.1. Natural resource rents-economic growth nexus

The literature has witnessed several studies examining the impact of natural resources on economic growth. Two strands of literature have emerged over time (Stijns 2005; Dogan et al., 2020). One strand of the literature suggests that resource-abundant economies perform poorly in growth than resource-deficient economies due to poor institutional quality (Quixina and Almeida, 2014). Such an inverse relationship between economic growth and natural resource is termed as the "natural resource curse hypothesis". The possible reason behind this discussed by Ben-Salha et al. (2018), includes the decline in the prices of the primary product as compared to the manufactured product over the long run. This relationship of decreasing the price of primary goods over the long run is termed as the Prebisch-Singer hypothesis. The second reason includes the volatility of prices of primary products due to their price determination in the international market. The higher the decrease in the prices of primary products the less will be the revenues making resource-dependent economies vulnerable and lack incentives for investors to invest in these economies and increases uncertainty. The third reason behind the negative impact of a natural resource on growth is based on the argument of "Dutch disease". It represents that the increasing share of virgin materials in exports decreases the competitiveness of other sectors. The high revenues from the export of primary products lead to wealth accumulation and increase prices of other products (non-tradable) and lead to currency appreciation. Rents lead to an increase in public consumption and a decrease in productive investment. The fourth reason behind the negative impact is through the channel of institutional quality. Strong institutions promote reuse of rents for the productive purpose to enhance development and wellbeing while week institutions lead to expropriating and corruption and rent-seeking activities thereby endangering growth and development respectively (Ben-Salha et al., 2018). In this context, the study of Leite and Weidmann (1999) supported a higher level of corruption and rent-seeking activities in resource-abundant developing economies due to weak institutions. Satti et al. (2014) supported the resource curse hypothesis for the Venezuelan economy over the period 1971–2011. Their findings suggest a decrease in growth due to natural resource abundance. The feedback hypothesis is supported between natural resource abundance and growth.

While another strand of the literature supported improved growth resulting from the efficient use of natural resources and supported the resource bless hypothesis. According to the resource bless hypothesis the rents received from resources can be used to enhance investment and support improved infrastructure, thereby boosting economic growth (Hamdi and Sbia, 2013). While analyzing the causal relationship between natural resources rents and economic growth unidirectional Granger causality is reported from the oil sector to economic growth by Quixina and Almeida (2014) from 1995 to 2012 in Angola. Hamdi and Sbia (2013) supported bidirectional causality between the variables, for Algeria over the time 1971–2009. They argued that the revenue raised from the natural resource can be used for further exploration and mining of natural resources that lead to higher employment opportunities and productivity, thus resulting in higher income. The Granger causality results obtained by Shahbaz et al. (2018) also support the feedback hypothesis between natural resources and economic growth. Koitsiwe and Adachi (2015) by using unrestricted vector autoregressive (VAR) model and variance decomposition supported that variability in the economic growth of Botswana is explained by mining revenues. Mining revenues Granger cause economic growth and government consumption which indicate high dependence of the government on mining revenues making Botswana vulnerable to external shocks. Therefore, to avoid vulnerability, the economy should diversify its export and increase the share of the non-mining sector in export. The meta-analysis conducted by Havranek et al. (2016) on linkages between resource abundance and growth provides that evidence that literature lack consensus on the relationship as 20% of studies suggests positive, 40% suggest insignificant while 40% suggest a negative impact of a natural resource on economic growth.

However, the literature focusing on the impact of economic growth on natural resource is limited. There is only one study that examined the impact of economic growth on natural resources rents. The study of Ben-Salha et al. (2018) supports the positive impact of real GDP on natural resources rents using a pooled mean group (PMG) estimator for resource-abundant economies over the span 1970–2013 in the long run. The results obtained for the short run analysis were insignificant. The positive impact of GDP on resources rents indicates that higher income increases investment and exploration of natural resources which support economies through higher revenues over the long run. The above discussion suggests that a large chunk of studies has been turned out in the literature establishing growth effects of natural resources but the impact of growth on natural resources rents is overlooked.

2.2. Natural resource rents-geopolitical risk nexus

The literature on natural resources rents and geopolitical risks can be categorized into four strands. The first strand of the literature suggests a negative impact of geopolitical risks on natural resources rents (Barkoulas et al., 2008; Cunado et al., 2020; Olanipekun and Alola, 2020). Barkoulas et al. (2008) explored the link between oil prices and risk reactions of commodity linked equity during a geopolitical event and confirmed that risk levels in oil industries increased following the

September 11, 2001 event. They showed that geopolitical risk weakens returns on oil investment. Cunado et al. (2020) reported geopolitical risk leads to a decline in oil returns owing to a decrease in oil demand indicating a change in global economic activity. Olanipekun and Alola (2020) examined the impact of geopolitical risk and oil production in the Persian Gulf using the non-linear autoregressive distributed lag model (NARDL). Their findings suggest a decrease in oil production resulting from shocks in geopolitical risk.

The second strand of the literature suggests a positive impact of geopolitical risks on natural resources rents (Noguera-Santaella, 2016; Omar et al., 2017; Bouoiyour et al., 2019; Antonakakis et al., 2017). The study of Noguera-Santaella (2016) supported the positive impact of geopolitical events on oil prices before 2000 while the impact was moderated afterward. Omar et al. (2017) reported that in the event of international crises and wars the oil market leads to positive returns, thereby suggesting that oil acts as a safe haven in times of geopolitical uncertainty. This positive impact of geopolitical uncertainty on oil prices is due to an increase in demand for oil for precautionary, speculative, and military purposes. While analyzing the impact of geopolitical events on oil and stock market dynamics Antonakakis et al. (2017) reported a higher impact of geopolitical tensions on the oil market in terms of return and volatility while the impact on the stock market is less severe. By employing the "Markov-switching model, the dependence-switching copula and multifractal detrended fluctuation analysis" the study of Bouoiyour et al. (2019) reported a positive association of oil returns with increasing geopolitical uncertainty.

The third strand of the literature revealed insignificant impacts of geopolitical threats on natural recourse rents (Antonakakis et al., 2017; Joëts et al., 2017). Antonakakis et al. (2017) reported an insignificant impact of geopolitical threats on oil prices. Similarly, Joëts et al. (2017) showed that uncertain events and oil price volatility are not connected.

The fourth strand of the literature focused on the impact of geopolitical risks on overall economic activity rather than natural recourses rents (Eckstein and Tsiddon, 2004; Cheng and Chiu, 2018; Iacoviello, 2018; Soybilgen et al., 2019). According to Eckstein and Tsiddon (2004), the risk of terrorism leads to diversification of expenditures from real sector to provision and ensuring security which is neither excludable nor rival in nature and government must provide such services. Thus, an increase in terrorism leads to an increase in defense expenditure to ensure security by the government, and a decline in other productive services, and a decrease in investment and consumption thereby a decline in economic growth. Thus, terror threats lead to an economic slowdown. The economic slowdown in Israel resulted from terrorism threats which would have been otherwise 10–15% higher than GDP growth in 2003, respectively. The analysis of 38 emerging economies, by Cheng and Chiu (2018) suggested that geopolitical risk leads to economic contractions by decreasing output. The shocks to the geopolitical risk index results in a decline in consumption and investment.

Caldara and Iacoviello (2018) suggested a decrease in real activity, lower stock returns, and capital flight to developed economies resulting from geopolitical risk. Using a vector autoregressive model for the US they supported a decline in production, employment, and trade resulting from geopolitical risk. The response of different industries to geopolitical risk varies as the defense sector experience positive returns while steel and mining experience negative returns. The decrease in production resulting from geopolitical risk hurts oil prices. Soybilgen et al. (2019), examined the impact of the geopolitical risk (GPR) index on growth from 1986 to 2016 in 18 emerging economies. The findings of the study support a decrease in GDP by 0.2–04% resulting from a point increase in the GPR index.

The above discussion reveals that exploring geopolitical risks and natural resources rents nexus has been become the new emerging area of the research. However, the available research is limited and does not provide conclusive findings. Besides, the existing research has mainly focused on oil returns overlooking other dimensions of natural resources rents. Further, the studies have mainly focused on linear associations or causality tests, ignoring the heterogenous impacts of geopolitical risks across the distributional profiles of natural resources rents.

2.3. Natural resources rents-economic uncertainty nexus

Other than geopolitical risks economic uncertainty has been emerged another global challenge that has important links with natural resources rents. The related literature can be categorized into following groups. First group of the studies argues that natural resources including precious metals and oil which can act as a hedger during economic and political uncertainty (Kilian, 2009; Lescaroux, 2009; Balcilar et al., 2016; Yang, 2019). The studies in this group report a positive association between economic uncertainty and natural resource rents. For example, Kilian (2009) decomposes real oil price fluctuation into supply shocks, aggregate demand shocks, and demand shocks to the oil market and reported that all shocks have positive impact but with a varying degree. The precautionary demand leads to a persistent and large increase in oil prices and arises due to uncertainty in supply shortfall thereby helping in inventory holdings and insurance against oil supply disruptions. The aggregate demand shock results in a delayed but sustained increase in oil prices while supply shock leads to a small increase in prices and is transitory. Therefore, it is important to identify the type of shock being faced by the economy. Similarly, Lescaroux (2009) examined the linkage between oil and 6 metal prices and suggested that co-movement between oil prices and 6 metal are the result of macroeconomic shocks. Balcilar et al. (2016) supported the causality from economic policy uncertainty to gold prices and volatility. However, they suggested that economic and policy uncertainty varies according to the sample period and statistically weaker for lower frequency data. They supported asymmetric hump-shaped causality. Similarly, the study of Yang (2019) used a wavelet approach to examine the dynamic relationship among the variables across time, which supports the comparison of short- and long-term results. These findings suggest that oil prices fluctuate due to economic policy uncertainty.

The second group of the studies reported a negative association between economic uncertainty and natural resource rents (Kang and Ratti, 2013; Yang, 2019). The study of Kang and Ratti (2013) highlighted that 19% of the variability in stock returns over the long run is caused by economic uncertainty while 32% results from structural oil shocks. Economic policy uncertainty leads to a decline in returns of the oil sector, auto and retail sector, and gold sector respectively. The higher economic policy uncertainty resulting from positive oil market demand shock leads to a decrease in real stock returns. Besides, Yang (2019) found out that economic policy uncertainty leads to volatility in natural resources rents, thereby reducing the profits earned on natural resources.

The Third group of the studies reported mixed evidence on the links of economic uncertainty with natural resources rents (Uddin et al., 2018; Mokni et al., 2020). While detangling the nonlinear association between oil price shocks and precious metals the study of Uddin et al. (2018), supported the negative impact of risk shocks, and the positive impact of demand and supply shocks on precious metal returns using "Markov regime-switching regression". A study by Mokni et al. (2020) reveals the diverse impacts of economic uncertainty on gold prices. The oil shocks affect gold returns thereby supporting connectedness between the markets. The oil supply shocks are the transmitter of time-varying spillovers from the oil market to gold returns. However, their findings did not support any asymmetric relationship between oil supply shocks and gold returns while they support the negative spillover impact of economic policy uncertainty from oil shocks to gold returns. Furthermore, the influence of economic policy uncertainty on the gold-oil relationship is regime dependent.

Fourth group of the studies focused on the impact of policy uncertainty on overall economic activity rather than natural recourses rents (Azzimonti and Talbert, 2014; Mumtaz and Theodoridis, 2015; Baker et al., 2016; Dakhlaoui and Aloui, 2016; Liu and Zhang, 2020). Findings of these studies have indirect implications for natural resources rents because economic performance has an important role to play in accruing rents. According to Azzimonti and Talbert (2014), emerging economies are more polarized than developed ones and are faced with higher economic policy uncertainty due to political disagreement. This leads to a lack of trust in economic policy initiated and results in fluctuation in consumption, investment, and output. These effects are transmitted to natural resources as well whose discoveries, exploration and extraction are associated with huge investment. The lack of investment leads to a decline in output thereby affecting natural resources rents. While analyzing the transmission of the impact of economic policy uncertainty between the economies, Mumtaz and Theodoridis (2015) used the dynamic structural vector autoregressive model (SVAR) and showed that the increase in volatility of the US real activity leads to a decline in United Kingdom (UK) GDP. Furthermore, by employing a non-linear DSGE model to analyze the linkage between structural uncertainty shocks and dynamic behavior they found that supply volatility shocks in the US lead to a negative impact on UK output and inflation (increase in inflation and decrease in output) due to higher uncertainty. The decline in output is associated with higher savings due to precautionary reasons, while the impact of US demand shocks volatility has a negligible impact on the UK economy respectively.

Baker et al. (2016) constructed a measure of economic policy uncertainty and supported that uncertainty leads to negative economic outcomes in the United States (US) and 11 other economies. Their findings support that macroeconomic performance was negatively affected by policy uncertainty in the US and Europe. Policy uncertainty leads to a decrease in investment, employment, growth, and stock price volatilities. Dakhlaoui and Aloui (2016) reported that economic policy uncertainty in the US has an impact on BRIC stock market revenues and volatility. Economic policy uncertainty can help in the prediction of economic recessions as analyzed on BRIC economies. A negative relationship exists between the stock returns in BRIC economies and economic uncertainty. "The volatility spillovers between the two sets of variables oscillate between negative and positive values. During the economic recession US economic policy uncertainty index is highly correlated with the BRIC stock market volatility as suggested by the rolling correlation approach". As the impact of shocks is transmitted across the economies therefore it has major implications for the natural resource-abundant economies. The transformation of these shocks can impose a negative impact on their resource earnings due to a decline in the demand or increase in uncertainty. Similarly following the supply-side structural reforms in China in 2015 the study of Liu and Zhang (2020) reported that more frequent and ambiguous policy adjustments lead to economic policy uncertainty. Therefore, an increase in economic policy uncertainty is associated with a decline in investment and short-term debt issuance for the private sector which leads to a decrease in production.

Aforementioned discussion suggests that understanding the effects of geopolitical risk and policy uncertainty is becoming an important field of the research. The existing studies have focused on resource curse (resource bless) hypothesis, oil prices, output, and return volatility. Besides, the burgeoning literature on geopolitical risks and policy uncertainty has widely acknowledged the vital role of risk and uncertainty in shaping economic interactions. However, to the best of our knowledge, no study has explored the impacts of economic growth, geopolitical risk, and policy uncertainty on total natural resources rents for developing countries. The present study fills this research gap by investigating the impacts of economic growth, geopolitical risk and economic uncertainty on natural resources rents for a panel of 18 developing economies from 1985 to 2018.

3. Model and data

The recent study Ben-Salha et al. (2018) uses the gross domestic product (GDP) as a single independent variable in estimating natural resources rents (NRR). Aforementioned discussion suggests that natural resources rents have inherent relationships with geopolitical risks and policy uncertainty and excluding their effects will not provide the clearer picture of growth-rent nexus. Thus, building on the mentioned study and inspired by Mokni et al. (2020), Olanipekun and Alola (2020), and Lyu et al. (2021), this research proposes the following empirical model:

$$\mathrm{NRR}_{it} = \beta_0 + \beta_1 \mathrm{GDP}_{it} + \beta_2 \mathrm{GPR}_{it} + \beta_3 \mathrm{EU}_{it} + \mu_{it} \quad (1)$$

- NRR (total natural resources rents): It is the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents; measured in per capita (constant $2010).
- GDP (gross domestic product): It is measured in per capita (constant $2010).
- GPR (geopolitical risk index): The historical geopolitical risk index developed by Caldara and Iacoviello (2017) is employed as a proxy constructed a global index of geopolitical risk and the annual average of the indices for each year is calculated in this context. Their procedure involves an electronic text-search of 11 international newspapers from the archives where they fetched articles containing words or set of terms like geopolitical risk, geopolitical tension, geopolitical uncertainty, military, war, nuclear threats, nuclear war, fear of war, and terrorism among others. The number of such articles found in each time period represents a share of total news articles for that period.
- EU (economic uncertainty index): This index developed by Ahir et al. (2018) constructs indices of economic uncertainty using frequency counts of "uncertainty" (and its variants) in the Economist Intelligence Unit country reports. The reports discuss major political and economic developments in each country, along with analysis and forecasts of political, policy, and economic conditions. They are created by country-specific teams of analysts and a central editorial team. To make the EU comparable across countries, the raw counts are scaled by the total number of words in each report.

This study covers the data for analyzed variables from 1985 to 2018 for 18 developing economies. (Because the data for geopolitical risk index is available only for 18 developing countries and start from 1985; and, the data for natural resources rents are available up to 2018). These countries are Argentina, Brazil, China, Colombia, Hong Kong, India, Indonesia, Israel, South Korea, Mexico, Malaysia, Philippines, Russia, Saudi Arabia, South Africa, Thailand, Turkey, and Venezuela. The data are drawn from the World Bank's World Development Indicators[1] and Economic Policy Uncertainty.[2]

The natural resources rents can be beneficial for the economy to support economic development if channelized properly otherwise can lead to negative economic and political consequences. Therefore, the significance of the study can be realized from the fact that it examines the potential role of geopolitical risk and economic uncertainty on natural resources rents in developing economies that are already struggling and are heavily dependent on this resource to support their development expenditures.

3.1. Panel quantile regression

The panel quantile regression introduced by Powell (2016) (QRPD), is based on within-group variation (nonadditive fixed effects) for identification and maintain non-separable disturbance terms associated with quantile estimation.

The distribution of the dependent variable $Y_{i,t}$ is estimated through

[1] https://databank.worldbank.org/source/world-development-indicators.
[2] https://www.policyuncertainty.com/.

panel quantile regression *for treatment variables* $D'_{i,t}$. To maintain non-separable disturbance terms associated with quantile estimation the study used nonadditive fixed effects to model the results as

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

$D'_{i,t}\beta(\tau)$ strictly increases in quantiles τ, and $U^*_{i,t}$ represents the function of the disturbance terms and *proneness for the outcome.* The structural quantile function explains the quantile of the latent outcome variable $Y_d = D'\beta U^*$ for randomly selected $U^* \sim U(0,1)$ and a fixed potential value of the treatment effect and can be expressed as

$$S_Y(\tau/_d) = d'\beta(\tau)\tau \in (0,1) \tag{3}$$

The study specified quantile regression to analyze the impact of geopolitical risk and economic uncertainty on natural resources rents as follows

$$(NRR_{it})(\tau / \propto_i, \gamma_t, X_{it} = \propto_i + \gamma_t + \partial_1 GDP_{it} + \partial_2 GPR_{it} + \partial_3 EU_{it} \tag{4}$$

$\propto_i$ represent "the non-adaptive fixed effects", X_{it} is a "matrix of the independent variables at individual countries i and time t".

Table 1 presents descriptive statistics of natural resources rents, real income, geopolitical risk and economic uncertainty. Along with mean, standard deviation, minimum, and maximum values of the data, the table also presents percentile values. It is evident form Table 1 that that standard deviation (1663.72) of natural resources rents is greater than that of its mean value (716.15), implying that the rents have high dispersion across selected developing economies. Similarly, minimum (0.11), maximum (10975.86), 25th percentile (25.81), 50th percentile (144.42) and 75th percentile (514.93) values show considerable variation in natural resources rents. The descriptive statics for risk and uncertainty variables suggest that data heterogeneity is more dominant in the case of economic uncertainty than that of geopolitical risks. It is evident that the data for dependent variable is not normally distributed. Thus, substantial heterogeneity in the dependent variable requires the use of quantile regression approach.

4. Methods and empirical results

To apply reliable and accurate unit root test and cointegration test, this study checks possible cross-sectional dependence and heterogeneity by applying Pesaran (2004) and Pesaran and Yamagata (2008) tests, respectively. Pesaran (2004) test is based on the "average of pair-wise correlation of coefficients from OLS residuals obtained from augmented Dickey-Fuller regression for each variable in the panel". Pesaran and Yamagata (2008) developed a slope homogeneity test which is applicable even when N is greater than T. The test examines the cross-section "dispersion of individual slopes weighted by their relative precision". The null hypothesis of cross-sectional independence is rejected. Similarly, the null hypothesis of homogeneity in the panel is also rejected by Pesaran and Yamagata (2008) homogeneity test. The results are provided in Table 2.

Pesaran (2007) unit root test is used as it "simultaneously accounts for cross-sectional dependence and heterogeneity among the economies". The results from cross-sectionally augmented Dickey-Fuller (CADF) test following Pesaran (2007) are posted in Table 3. The selected variables become stationary at their first differences. Hence, the possibility of spurious regressions has been rejected and we can proceed for the next step of cointegration test to determine the long run relationship among selected variables.

We employ Westerlund (2005) test to check the long run relationship as it has certain advantages. It does not require the correct specification of the data generating process apart from the estimation of nuisance parameters. The test incorporates "individual-specific short-run dynamics, individual-specific intercept and trend terms, and individual-specific slope parameters". The test has small size distortions and good power. The distribution of the test is "from nuisance parameters". According to the results in Table 4 from Westerlund (2005)'s panel cointegration test which is robust to heterogeneity and cross-sectional dependence, the analyzed variables have a long-run relationship.

To estimate the long run relationships among selected variables we employ Powell (2016) quantile panel data estimator (QRPD), which is based on within-group variation (nonadditive fixed effects) for identification and maintain non-separable disturbance terms associated with quantile estimation. The QRPD estimator account for individual heterogeneity, the varying impact of policies, allows estimation of quantile treatment effects for the data generating process, and is consistent for small T. The QRPD estimator allows the parameter to change "based on an unknown function of the fixed effect and an observation-specific disturbance term while relaxing the identification assumptions required for QR and IVQR" (Powell, 2016).

Table 5 reports the estimation outcomes from Powel's (2016)'s quantile regression method. The impact of GDP on natural resources rents is significant in all quantiles. However, this impact is negative in lower quantiles (5th, 15th, and 25th) while positive in upper (50th,

Table 2
Results from cross-sectional dependence and heterogeneity tests.

Variable	CD-test	p-value	Heterogeneity-test	p-value
NRR	38.97*	0.00	15.38*	0.00
GDP	56.38*	0.00	19.13*	0.00
GPR	17.3*	0.00	13.12*	0.00
EU	11.42*	0.00	11.89*	0.00

Note: * stands for 1% level of significance.

Table 3
Results from panel unit root test.

Variable	Levels		First-differences	
	CADF	p-value	CADF	p-value
NRR	2.33	0.51	3.28*	0.00
GDP	2.44	0.31	3.45*	0.00
GPR	1.99	0.95	3.49*	0.00
EU	2.49	0.23	4.06*	0.00

Note: * stands for 1% level of significance.

Table 4
Results from panel cointegration test.

	Statistics	p-value
Variance ratio	3.47*	0.008

Note: * stands for 1% level of significance.

Table 1
Descriptive statistics.

Variable	Obs#	Mean	Std. Dev.	Min	Max	25th percentile	50th percentile (Median)	75th percentile
NRR	612	716.15	1663.72	0.11	10975.86	25.81	144.42	514.93
GDP	612	10038.16	8135.00	485.00	38699.00	4238.25	7799.50	12804.00
GPR	612	97.24	25.48	35.75	199.10	79.64	93.04	111.39
EU	612	0.061	0.050	0.002	0.418	0.025	0.051	0.083

Table 5
Results from quantile regression estimations.

Variables	q0.05	q0.15	q0.25	q0.50	q0.75	q0.85	q0.95
GDP	−1.03**	−0.87**	−0.38*	0.92**	1.41**	1.49**	1.57**
GPR	−1.06	−0.06	−0.88	−0.94**	−0.66**	−0.30	−0.04
EU	0.08	0.60**	0.51*	0.04	−0.25**	−0.20*	−0.27**
Constant	19.03**	16.24**	16.63**	6.25**	0.71*	−1.05*	−2.71*

Note: ** and * represent 1% and 5% level of significance, respectively.

75th, 85th, and 95th) quantiles and the magnitude of the coefficient increases as natural resources rents move from lower to upper quantile. Our findings are consistent with the results of Ben-Salha et al. (2018) who suggested a positive impact of GDP on natural resources rents. The positive influence of GDP on natural resources rents exhibits that revenues are used for exploration and infrastructure development. This leads to an increase in employment opportunities and enhances productivity (Hamdi and Sbia, 2013). It boosts the output in the economy over the long run thereby, supporting development and wellbeing, respectively. As far as the negative effects of economic growth on resources rents in low-rent economies is concerned, it can be attributed to the inefficiencies of resource extraction such as low economies of scale and scope.

Although the coefficient of geopolitical uncertainty is negative in all quantiles but statistically significant only in 50th and 75th quantile. The results suggest that the impact of geopolitical uncertainty on natural resources rents is negative and decreases as natural resources rents moves from 50th to 75th quantile, respectively. This finding is consistent with the prior research which suggests a negative impact of geopolitical risks on oil rents (Barkoulas et al., 2008; Cunado et al., 2020; Olanipekun and Alola, 2020). Cunado et al. (2020) reported geopolitical risk leads to a decline in oil returns owing to a decrease in oil demand indicating a change in global economic activity. Caldara and Iacoviello (2018) who supported a decrease in real activity and decline in stock returns because of geopolitical risk as it leads to capital flight. Cunado et al. (2020) also suggested a decrease in oil results resulting from geopolitical uncertainty. Our findings contrast with Bouoiyour et al. (2019), Omar et al. (2017), and Noguera-Santaella (2016). They reported that geopolitical uncertainty increases oil returns due to an increase in demand for oil for precautionary, speculative, and military purposes.

The impact of economic uncertainty is positive on natural resources rents in the 15th and 25th quantile while the magnitude decreases from 0.60 to 0.51 between the 15th and 25th quantile. The results for the lower quantiles are in line with the prior studies which suggest a positive impact of policy uncertainty on resources rents (Kilian, 2009; Lescaroux, 2009; Balcilar et al., 2016; Yang, 2019). These studies argue that natural resources including precious metals and oil can act as a hedger during economic and political uncertainty. Contrary to this, our results also reveal that economic uncertainty leads to a decline in natural resources rents is higher quantiles (75th, 85th, 95th) from 0.25, 0.20 to 0.27, respectively. This finding is consistent with the earlier research which has reported a negative association between economic uncertainty and natural resource rents (Kang and Ratti, 2013; Yang, 2019). Kang and Ratti (2013) highlighted that economic policy uncertainty leads to a decline in returns of the oil sector, auto and retail sector, and gold sector, respectively. Further, Yang (2019) has also showed that policy uncertainty escalates volatility in natural resources rents, thereby lowering the profits earned on natural resources.

5. Conclusion and policy implications

Geopolitical risks and economic policy uncertainty remain the most threatening global challenges that economies, across the globe, have had to struggle with. A large body of the literature has focused on rents-growth nexus unravelling the causative association. However, little or nothing is clear about the role of geopolitical political risks and economic uncertainty on resources rents for the resource-endowed developing world.

This study examines the impacts of economic growth, geopolitical risk and economic uncertainty on natural resources rents for a panel of 18 developing economies from 1985 to 2018. The study used the Pesaran (2004) test to examine cross-sectional dependence and Pesaran and Yamagata (2008) to test for panel data heterogeneity. The stationarity of the variables was examined by the "cross-sectionally augmented Dickey-Fuller (CADF)" test. The cointegration between the variables was confirmed by Westerlund (2005) test. Finally, the long run estimates are obtained using a novel technique quantile regression for panel data developed by Powell (2016).

The results reveal that GDP decreases resources rents in the 5th to 25th quantile while contributes to higher rents from 50th quantile to onward quantiles with the highest impact in the 95th quantile. Meanwhile geopolitical risks consistently decrease resources rents throughout the distribution of the quantiles with a significant impact in the 50th and 75th quantile. Finally, the empirical results reveal a mixed impact of economic uncertainty on natural resources rents which is positive in 15th and 25th quantile while negative in 75th, 85th, and 95th quantile, respectively. The severe impact of economic uncertainty on resources rents is in the 95th quantile standing at −0.27, respectively. Thus, quantile regression results reveal the heterogeneous effects of major determinants of natural resources rents across the quantiles. These results are very challenging and bear several interesting policy implications.

Since geopolitical risk based on global and regional issues can have deteriorating impact on natural resources rents and consequently compromising peace and wellbeing, resolution agendas need to be encouraged among selected developing economies, particularly among countries with middle-and-high (0.75) quantiles. While safeguarding the concerns of an individual developing economy, states should devote efforts to seek economic and political harmony and minimizing external threats. Likewise, an environmental regulation aiming safety and protection arrangements can be improved to protect the installation and investment for natural resources' extraction and production activities. Besides, the administration of natural resources rents needs to be included in formulating economic policies in resource rich economies because it can have favorable effect on natural resource production and rents whether uncertainties are positive or negative.

A key message of this study is that policy mangers need to deal geopolitical risk and policy uncertainty independently as both have heterogenous impacts across the distribution of natural resources rents. Mitigating geopolitical risks should be the priority of all sampled developing countries whereas lowering policy uncertainty is mainly boosting resources rents in high resources rents economies. Thus, developing countries with high resources rents (0.75-and-above quantiles) need to lower policy uncertainty by devising long run policies and improving regulation framework of their economies. In contrast, developing economies with low resources rents (0.25-and-below quantiles) can afford policy uncertainty and they need to focus on managing their growth performance because growth has a negative effect in these economies. They can focus on complementary policy reforms such as improving institutional set up or financial sector to mitigate the adverse effects of economic growth on natural resources rents. Finally, developing economies with high resources rents need to foster their growth performance by adopting growth-oriented policies because the results have revealed that economic growth increases natural resources rents across middle-and-high quantiles with the highest impact in 95th quantile.

This research has certain limitations as well. It mainly focused on economic growth, geopolitical risk and policy uncertainty to understand the natural resources rents dynamics across developing countries with diverse profile of natural resources rents. Future research may focus on globalization and financial development in shaping the relationships of selected variables with natural resources rents. Further, this study explored linear relationship between selected variables whereas future studies can explore nonlinear and asymmetric relationships.

Declaration of interests

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

References

Ahir, H., Bloom, N., Furceri, D., 2018. The world uncertainty index. Available at SSRN 3275033.
Antonakakis, N., Gupta, R., Kollias, C., Papadamou, S., 2017. Geopolitical risks and the oil-stock nexus over 1899–2016. Finance Res. Lett. 23, 165–173. Available at. www.resourcepanel.org/reports/global-resources-outlook.
Azzimonti, M., Talbert, M., 2014. Polarized business cycles. J. Monetary Econ. 67, 47–61.
Bakas, D., Triantafyllou, A., 2019. Volatility forecasting in commodity markets using macro uncertainty. Energy Econ. 81, 79–94.
Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. Q. J. Econ. 131 (4), 1593–1636.
Balcilar, M., Gupta, R., Pierdzioch, C., 2016. Does uncertainty move the gold price? New evidence from a nonparametric causality-in-quantiles test. Resour. Pol. 49, 74–80.
Barkoulas, J.T., Hu, A., Santos, M.R., 2008. The link between commodity prices and commodity-linked-equity values during a geopolitical event. Acad. Account. Financ. Stud. J. 12 (2), 1–26.
Barma, N., Kaiser, K., Le, T.M., Viñuela, L., 2011. Rents to Riches? the World Bank.
Ben-Salha, O., Dachraoui, H., Sebri, M., 2018. Natural resources rents and economic growth in the top resource-abundant countries: a PMG estimation. Resources Policy.
Bloom, N., 2009. The impact of uncertainty shocks. Econometrica 77 (3), 623–685.
Bouoiyour, J., Selmi, R., Hammoudeh, S., Wohar, M.E., 2019. What are the categories of geopolitical risks that could drive oil prices higher? Acts or threats? Energy Econ. 84 (1–14), 104523.
Bp, 2004. Statistical Review of World Energy.
Caldara, D., Iacoviello, M., 2018. Measuring Geopolitical Risk. FRB International Finance Discussion Paper (1222).
Cheng, C.H.J., Chiu, C.W.J., 2018. How important are global geopolitical risks to emerging countries? International Economics 156, 305–325.
Cunado, J., Gupta, R., Lau, C.K.M., Sheng, X., 2020. Time-varying impact of geopolitical risks on oil prices. Defence Peace Econ. 31 (6), 692–706.
Dakhlaoui, I., Aloui, C., 2016. The interactive relationship between the US economic policy uncertainty and BRIC stock markets. International Economics 146, 141–157.
Dogan, E., Madaleno, M., Altinoz, B., 2020. Revisiting the nexus of financialization and natural resource abundance in resource-rich countries: new empirical evidence from nine indices of financial development. Resour. Pol. 69, 101839.
Eckstein, Z., Tsiddon, D., 2004. Macroeconomic consequences of terror: theory and the case of Israel. J. Monetary Econ. 51 (5), 971–1002.
Hamdi, H., Sbia, R., 2013. The relationship between natural resources rents, trade openness and economic growth in Algeria. Econ. Bull. 33 (2), 1649–1659.
Havranek, T., Horvath, R., Zeynalov, A., 2016. Natural resources and economic growth: a meta-analysis. World Dev. 88, 134–151.
IRP (International Resource Panel), 2019. Globalresources Outlook 2019: Natural Resources for the Future We Want. United Nations Environment Programme, Nairobi.
Joëts, M., Mignon, V., Razafindrabe, T., 2017. Does the volatility of commodity prices reflect macroeconomic uncertainty? Energy Econ. 68, 313–326.
Kang, W., Ratti, R.A., 2013. Oil shocks, policy uncertainty and stock market return. J. Int. Financ. Mark. Inst. Money 26, 305–318.
Kilian, L., 2009. Not all oil price shocks are alike: disentangling demand and supply shocks in the crude oil market. Am. Econ. Rev. 99 (3), 1053–1069.
Koitsiwe, K., Adachi, T., 2015. Relationship between mining revenue, government consumption, exchange rate and economic growth in Botswana. Contaduría Adm. 60, 133–148.
Leite, M.C., Weidmann, J., 1999. Does mother nature corrupt: natural resources, corruption, and economic growth. International Monetary Fund.
Lescaroux, F., 2009. On the excess co-movement of commodity prices—a note about the role of fundamental factors in short-run dynamics. Energy Pol. 37 (10), 3906–3913.
Liu, G., Zhang, C., 2020. Economic policy uncertainty and firms' investment and financing decisions in China. China Econ. Rev. 63, 101279.
Lyu, Y., Tuo, S., Wei, Y., Yang, M., 2021. Time-varying effects of global economic policy uncertainty shocks on crude oil price volatility: new evidence. Resour. Pol. 70, 101943.
Matallah, S., 2020. Economic diversification in MENA oil exporters: understanding the role of governance. Resour. Pol. 66, 101602.
Mokni, K., Hammoudeh, S., Ajmi, A.N., Youssef, M., 2020. Does economic policy uncertainty drive the dynamic connectedness between oil price shocks and gold price? Resour. Pol. 69, 101819.
Mumtaz, H., Theodoridis, K., 2015. The international transmission of volatility shocks: an empirical analysis. J. Eur. Econ. Assoc. 13 (3), 512–533.
Noguera-Santaella, J., 2016. Geopolitics and the oil price. Econ. Modell. 52, 301–309.
Olanipekun, I.O., Alola, A.A., 2020. Crude oil production in the Persian Gulf amidst geopolitical risk, cost of damage and resources rents: is there asymmetric inference? Resour. Pol. 69, 101873.
Omar, A.M., Wisniewski, T.P., Nolte, S., 2017. Diversifying away the risk of war and cross-border political crisis. Energy Econ. 64, 494–510.
OPEC, 2018. OPEC Share of World Crude Oil Reserves. https://www.opec.org/opec_web/en/data_graphs/330.htm. (Accessed 10 January 2021).
Pesaran, H.M., 2004. General diagnostic tests for cross-sectional dependence in panels. University of Cambridge. Cambridge Working Papers in Economics 435.
Pesaran, M.H., 2007. A simple panel unit root test in the presence of cross-section dependence. J. Appl. Econom. 22 (2), 265–312.
Pesaran, M.H., Yamagata, T., 2008. Testing slope homogeneity in large panels. J. Econom. 142 (1), 50–93.
Powell, D., 2016. Quantile regression with nonadditive fixed effects. Quantile Treatment Effects 1–28.
Quixina, Y., Almeida, A., 2014. Financial development and economic growth in a natural resource based economy: evidence from Angola. FEP Working Paper no.542. School of Economics and Management, University of Porto.
Satti, S.L., Farooq, A., Loganathan, N., Shahbaz, M., 2014. Empirical evidence on the resource curse hypothesis in oil abundant economy. Econ. Modell. 42, 421–429.
Schroder, P., 2020. Promoting a just transition to an inclusive circular economy. Energy, Environment and Resource Program. Catham House, pp. 1–33.
Shahbaz, M., Naeem, M., Ahad, M., Tahir, I., 2018. Is natural resource abundance a stimulus for financial development in the USA? Resour. Pol. 55, 223–232.
Soybilgen, B., Kaya, H., Dedeoglu, D., 2019. Evaluating the effect of geopolitical risks on the growth rates of emerging countries. Econ. Bull. 39 (1), 717–725.
Stijns, J.P.C., 2005. Natural resource abundance and economic growth revisited. Resour. Pol. 30 (2), 107–130.
Topcu, E., Altinoz, B., Aslan, A., 2020. Global evidence from the link between economic growth, natural resources, energy consumption, and gross capital formation. Resour. Pol. 66, 101622.
Uddin, G.S., Rahman, M.L., Shahzad, S.J.H., Rehman, M.U., 2018. Supply and demand driven oil price changes and their non-linear impact on precious metal returns: a Markov regime switching approach. Energy Econ. 73, 108–121.
Van Robays, I., 2016. Macroeconomic uncertainty and oil price volatility. Oxf. Bull. Econ. Stat. 78 (5), 671–693.
Westerlund, J., 2005. New simple tests for panel cointegration. Econom. Rev. 24, 297–316.
Yang, L., 2019. Connectedness of economic policy uncertainty and oil price shocks in a time domain perspective. Energy Econ. 80, 219–233.