Extended Abstract
Purpose

Environmental pollution and terrorism are the two main problems the world faces nowadays. Environmental pollution has a strong impact on sustainable development. Terrorism harms not only economic and social life but also the environment. The environmental damages caused by terrorism include terrestrial conflicts, terrorist camps and bases, training activities, and carbon dioxide emissions (CO_2) related to energy consumption. Similar to official military forces, terrorists use a great deal of fossil fuel energy for armed vehicles, including tanks and heavy weapon carriers, manufacturing arms and ammunition, and sustaining their activities, including heating, among others. Additionally, the employment of military weapons and equipment against terrorism consumes a large amount of energy. The effect of terrorism on the environment is not limited to CO_2 emissions, terrorists also use a large scale of various chemicals and heavy metals related to mass destruction weapons. The chemicals and heavy metals contaminate soil, air, and water, which cannot be easily purified. In response to the spread of terrorism, governments have allocated considerable resources to combat terrorism. These efforts include intelligence gathering, law enforcement, military operations, and security enhancements, all contributing to increasing military expenditure. Excessive military expenditure has several environmental implications. The manufacturing and maintenance of military equipment result in significant emissions of greenhouse gases. The military sector is a significant contributor to worldwide fossil fuel use, hence playing a role in the exacerbation of climate change and the generation of air pollutants. Furthermore, military operations frequently lead to the destruction of habitats, deforestation, and soil contamination within areas affected by conflict, thereby causing detrimental effects on local ecosystems.

Accordingly, this study provides a unique perspective on the environmental sustainability of Middle Eastern countries by linking climate change with terrorism and military spending, which are new and unknown environmental sustainability factors. In this regard, the main objective of the present study is to empirically test the impact of the global terrorism index and military spending on the load capacity factor (a new comprehensive index of environmental sustainability) in 8 countries in the Middle East region during the period 2011-2023.

Methodology

The panel data used in the analysis of this study is annual data from 2011 to 2023 for 8 countries of the Middle East region. The data used are military

expenditure, global terrorism index, real gross domestic product (GDP), trade, and LCF (LCF is obtained by dividing the biological capacity by the ecological footprint). Data on GDP (per capita, constant 2015 dollars), and trade (% of GDP) were obtained from the World Bank. Data on biological capacity (per capita, gha) and ecological footprint (per capita, gha) are taken from the Global Footprint Network. Data on military expenditure (% of GDP) and the global terrorism index (which ranges from 0 to 10) are also taken from SIPRI and IEP, respectively. The present study employs the P-QARDL method to examine the interrelationships between military expenditure, terrorism, and environmental sustainability across different quantiles of the dependent variable. The primary advantage of the P-QARDL is its increased resilience to non-normal errors. Additionally, the skewness, heterogeneity, and outliers of the dependent variable are taken into account. This model improves upon the traditional ARDL model by assessing the short-run and long-run impacts across various quantiles of LCF. Furthermore, the P-QARDL model provides estimates even with a small sample size, and the data contain outliers. In line with the ARDL model, it is advantageous when the variables are integrated of order one [I(1)] or zero [I(0)]. Finally, we conduct a causality analysis using the panel causality test proposed by Dumitrescu and Hurlin, an improved version of the conventional Granger causality test for heterogeneous panels.

Findings

The results show that the short-term and long-term impact of terrorism on environmental sustainability is negative and significant in all quantiles (except the final quantile) and is quantitatively small (10th-75th). Also, the magnitude of this negative impact increases in the upper quantiles. The short-term and long-term impact of military spending on environmental sustainability is also negative and significant in the 25th-75th quantiles. Therefore, it can be said that terrorism and military activities are a threat to environmental sustainability. Based on the results of the D-H causality test, it can be said that military spending, terrorism, economic growth, and trade are predictors of environmental sustainability in the studied countries. The results show that economic growth in the lower quantiles, where environmental sustainability is at a lower level, leads to environmental degradation; but in the long run, the extent of this negative impact should decrease, which in a way confirms the EKC hypothesis. Also, trade in the low, medium, and high quantiles leads to a decrease in environmental sustainability in selected countries in the Middle East region, and the severity of this negative impact is greater in the high quantiles. The "pollution haven" hypothesis is not rejected in the mentioned quantiles.

Conclusion

The results show that terrorism and military activities have led to destruction and pressure on the environment in most Middle Eastern countries and are considered a threat to it. The Middle Eastern region requires a comprehensive or holistic strategy that effectively addresses security concerns while also prioritizing the preservation of the environment for both present and future generations. In addition, governments in the Middle Eastern and their armed services can adopt various ways to mitigate the environmental impact of military exercises and promote ecological sustainability.