PETROLEUM RESOURCES DEVELOPMENT AND BALANCING ENERGY TRILEMMA: EMPIRICAL EVIDENCE FROM OIL PRODUCERS IN AFRICA

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Overview

The triple challenge of providing secure, affordable, and sustainable energy has become a much talked about issue in recent times due to concerns about climate change. The world energy system is more likely than not to experience a fundamental restructuring to decarbonize. It is, however, plausible that decarbonisation will pose difficulties and opportunities for the petroleum industry and petroleum-dependent economies, especially in Africa. According to the energy trilemma dimensions, focusing on one at the expense of the other two is likely to be just as harmful to improving human quality of life as ignoring climate change. The world may not be able to get away with overcoming one of the trilemma's challenges at the price of the other two. Sound management of petroleum resources is crucial in the efforts to find a balance between energy security, energy equity and the sustainability of energy systems. Therefore, it is essential to investigate the performance of oil-producing African economies on the energy trilemma index over the years and also assess the impact of petroleum rent extraction on the dimensions of energy trilemma quandary.

The study is structured as follows: The introduction of the study is followed by a review of related literature on the evolution of the energy trilemma index as well as the relationship between energy trilemma and petroleum rent extraction. The third section covers the index creation approaches and the choice of appropriate methodology that fit the data to achieve the purpose of the study. Section four presents the performance of the energy trilemma performance and the panel regression models for the oil-producing African countries. The final section captures the policy implications derived from the results obtained in the previous section.

Methods

This paper focuses on oil-producing economies in Africa using data spanning 2005 to 2020. It employs the panel-ARDL approach to investigate the extent of the impact of petroleum rent extraction and income on sustainable energy development. The World Energy Council's approach in computing energy trilemma index is adopted using sixteen (16) indicators classified into three dimensions such as energy security, energy equity and environmental sustainability. Data for this analysis is sourced from the World Bank's World Development Indicators, Country Policy and Institutional Index, Doing Business and Competitiveness Index, and the US Energy Information Administration.

Results

The study reveals that petroleum resource development proxy as rent extraction and income significantly improved the energy trilemma index in energy systems transformation. The impact of institutions driving environmental sustainability on the energy trilemma index is negatively strong and weak in the long run and short run, respectively. In terms of institutional quality measured by the country's rating on institutions responsible for ensuring accountability, transparency and fighting corruption, the study found that the energy trilemma index is improved as institutional rating increases in the short run. The empirical research also found that petroleum economic rent and income enhance the performance of countries in terms of environmental sustainability in the long run. In the long run, as countries' income increases, they turn to adopt decarbonization technologies, improve energy efficiency and emit fewer greenhouse gases. The impact of petroleum rent and income on energy security is found to be positive and negative, respectively, in the long run. Higher levels of petroleum economic rent and income is attributed to improvements in energy equity through increased access, affordability, and quality of electricity supply.

Conclusions

The direct relationship between petroleum rent extraction and the energy trilemma index is obvious. To avert inertia in balancing these dimensions, oil-producing economies in Africa, especially emerging oil economies like Ghana, must be strategic, especially, as they walk steadily the energy transition talk..

References

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