

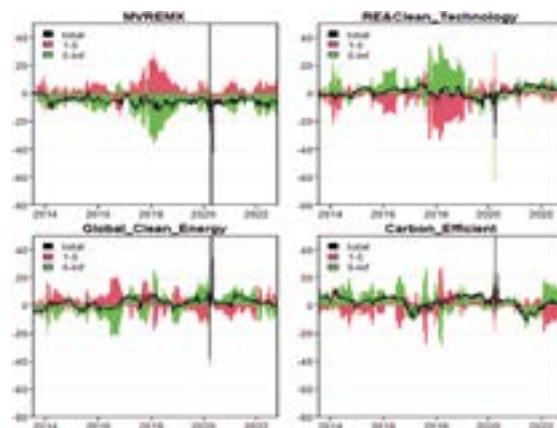
A dynamic connectedness analysis between rare earth prices and renewable energy

Mara Madaleno¹, Dilvin Taskin², Eyup Dogan³, Panayiotis Tzeremes⁴

There is an undeniably important role of rare earth minerals in renewable energy technologies. This study aims to infer the relationship between rare earth, clean energy, renewable energy technologies, and carbon emissions, using daily stock price index data and applying the novel quantile time-frequency connectedness model, and the cross-quantilogram dependence approach during 2012–2022. Results evidence spillovers among rare earth minerals and renewable energy, dependent on market conditions, time horizons, and analyzed quantiles. They also highlight the net receiver role of rare earth, especially in the short term. Given the promises of many countries to net zero emissions, a rapid transition to renewable energy and renewable energy technologies is essential. Rare earth minerals are indispensable for these technologies, their prices remain a dominant factor in diminishing carbon emissions. Investigation of the performances of the rare earth companies to other related industries is of crucial significance both from a global perspective to mitigate emissions and from the investors' perspective as a significant asset class. The paper includes the COVID-19 pandemic period, which had significant impacts on renewable energy technology, renewable energy investments, and financial markets. To the best of the authors' knowledge, this is the first paper that considers the associations between the investments of rare earth and strategic minerals and the sustainability-related indices. Policymakers need to recognize the importance of rare earth minerals to mitigate carbon emissions and improve strategies to reduce the risks associated with their limited availability and regional disparities in distribution. Findings might help investors understand diversification benefits and support policymakers in developing strategies for lessening import dependence on rare earth metals, as important as they are for renewable technology adoption to ensure green growth.

Reference

Madaleno, M., Taskin, D., Dogan, E. & Tzeremes, P. (2023). A dynamic connectedness analysis between rare earth prices and renewable energy. *Resources Policy*, 85 (Part B), 103888. <https://doi.org/10.1016/j.resourpol.2023.103888>



- ¹ – GOVCOPP & Department of Economics, Management, Industrial Engineering and Tourism, University of Aveiro.
- ² – Faculty of Business, Yasar University, Turkey.
- ³ – Department of Economics, Abdullah Gul University, Turkey, Interdisciplinary Research Center in Renewable Energy and Power Systems, King Fahd University of Petroleum and Minerals, Saudi Arabia.
- ⁴ – Department of Accounting and Finance, University of Thessaly, Greece.

FIGURE 1
Short- and long-term and overall net total directional connectedness (at the 5th quantile). Findings are based on a QVAR model with a 200-day rolling window size, a lag length of order one (BIC), and a 100-step-ahead GFEVD. The black area represents the time dynamic connectedness values while the green and red areas depict the long and short-term findings.