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Drivers of trade market behavior effect on renewable energy consumption: a study of MINT (Mexico, Indonesia, Nigeria, and Turkey) economies

(2025) *Discover Sustainability*, 6 (1), art. no. 141, .

DOI: 10.1007/s43621-024-00715-3

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Abstract
This study provides an in-depth analysis of how key macro trade determinants affect renewable energy consumption in MINT economies (Mexico, Indonesia, Nigeria, and Turkey) over the period from 1995 to 2022. By applying the energy bundle theory as a guiding framework, we investigate the influence of factors such as trade balance, trade reserves, exchange rate, population, and labor force participation rate on trade openness (TOPEN) and its connection to renewable energy consumption (REC). Advanced econometric techniques, including Step-wise regression, fully modified least squares, pooled ordinary least squares and fix effect methods, are used to assess the dynamics of these relationships. Granger causality and Pedroni co-integration tests reveal both short- and long-term interactions between trade factors and renewable energy consumption. The results indicate that trade balance, trade reserves, and labor force participation have a significant positive effect on renewable energy consumption, while exchange rates and population growth show a negative impact. Although no reciprocal relationship between trade reserves and renewable energy consumption is found, unidirectional influences are identified between renewable energy consumption and other trade determinants, specifically trade balance, exchange rate, population, and labor force participation, underscoring the distinctive economic interactions within MINT economies.This study emphasizes that trade balance, trade reserves, and labor force participation significantly enhance renewable energy consumption in MINT economies. It advises policymakers to stabilize exchange rates and address population growth due to their adverse effects. © The Author(s) 2025.

Author Keywords
Panel data; Trade openness; Trade openness drivers; Trade reserves

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Publisher: Springer Nature

ISSN: 26629984
Language of Original Document: English
Abbreviated Source Title: Discov Sustain
2-s2.0-85219178116
Document Type: Article
Publication Stage: Final
Source: Scopus

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