

The nexus of CO₂ emissions, energy consumption, economic growth, and trade-openness in WTO countries

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Abstract:

This paper analyzes the dynamic relationship between CO₂ emissions, energy consumption, GDP, and trade-openness from 1971 to 2013, based on the Environmental Kuznets Curve (EKC) hypothesis for 70 WTO countries. Using recently developed second-generation panel data methods, the empirical results support the EKC hypothesis for the high-, middle-, and lower-income panels used. Concerning the energy consumption and economic growth nexus, the causality results support the conversion hypothesis for the high-income panel, whereas the neutrality hypothesis holds for the lower- and middle-income panels. Based on the causality results, trade-openness does not positively impact CO₂ emissions, GDP leads CO₂ emissions, and trade-openness causes energy consumption within any income panel. The net effect of economic growth, however, could help to stabilize future CO₂ emissions within any income panel.

Keywords:

Environmental Kuznets Curve, CO₂ emissions, Energy consumption, Economic growth, Trade-openness, Granger causality, Second-generation panel data methods
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