

Relationship between Energy Consumption and Economic Growth in OECD Countries: A Cointegration Analysis

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Abstract: This paper investigates the relationship between energy consumption and economic growth for a panel of 38 OECD countries over the period 1990–2021. Using panel data techniques, including unit root, cointegration, and error correction models, the study examines both the short- and long-term dynamics between primary energy supply and GDP per capita. The results reveal that the variables are integrated of order one and cointegrated in the long run, confirming a stable equilibrium relationship between energy use and economic activity. Granger causality tests indicate a unidirectional causality running from economic growth to energy consumption in the short term, suggesting that growth leads to higher energy demand. In the long term, however, the bidirectional relationship supports the feedback hypothesis, highlighting the mutual dependence between energy and growth in OECD countries. These findings suggest that policies promoting energy efficiency and sustainable energy investment can foster long-term growth without compromising energy needs.

Keywords: Energy Consumption, Economic Growth, Causality, Cointegration, Error Correction Model

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