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HETEROGENEOUS IMPACTS OF NATURAL DISASTERS, TECHNOLOGY AND GREEN DEVELOPMENT ON RENEWABLE ENERGY PRODUCTION: EVIDENCE FROM CHINA

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Abstract

This study examines the heterogeneous effects of natural disasters (ND), green development (GD), technological innovation (TI), pollution treatment (PT), and income (Y) on renewable energy (RE) production in China using the Quantile Method of Moments Regression (QMMR) approach. By investigating how these factors influence RE at different quantiles, this study provides a nuanced understanding of the environmental, technological, and economic drivers of renewable energy dynamics. The results reveal that ND significantly boosts RE in higher quantiles, suggesting that environmental shocks foster the adoption of renewable energy as an adaptive strategy. GD shows mixed effects, with positive impacts at moderate quantiles but negative effects at higher levels, indicating that poorly designed green initiatives can hinder energy transition efforts. TI consistently has a positive impact, especially in high-performing regions, reinforcing its role as a key enabler of clean energy growth. The findings highlight the need for province-specific policies that prioritize resilient energy systems, technological innovation, and effective pollution control to support China's transition to carbon neutrality and a sustainable low-carbon economy.

Key words: China, green development, natural disaster, pollution treatment, renewable energy, technology

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