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# EXPLORING THE NONLINEAR RISK SPILLOVER EFFECTS OF THE CLEAN ENERGY INDEX ON CHINA'S MAJOR HIGH-TECH FIRMS: A WAVELET COHERENCE AND TIME-VARYING ANALYSIS

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## Abstract

This paper employs wavelet coherence (WC) and time-varying parameter vector autoregression (TVP-VAR) models to analyze the nonlinear risk spillover effects between the Clean Energy Index (CCE) and major Chinese high-tech companies over the period from January 1, 2020, to February 28, 2025. The findings reveal that: (a) the Total Connectedness Index (TCI) between the CCE and high-tech stocks fluctuates between 40% and 50%, with significant peaks observed in 2021, 2022, and 2024, reflecting the dynamic impact of policy changes, the global energy crisis, and economic recovery on risk transmission; notably, high-frequency spillover effects are particularly pronounced for new energy vehicle companies such as BYD and CATL; (b) the wavelet coherence analysis uncovers heterogeneous associations in the time–frequency domain, with the CCE exhibiting strong positive correlations with BYD and CATL in the high- and medium-frequency ranges, while showing long-term co-movement with companies like Tencent and Alibaba in the low-to-medium frequency range, thereby highlighting the multi-layered impact of clean energy market volatility on the high-tech sector; and (c) robustness tests confirm the stability of the model results, filling a research gap in the study of risk spillovers between the clean energy and high-tech sectors. These findings offer important insights for government policy aimed at synchronizing energy and technology strategies and for investors seeking to optimize risk management practices, suggesting that enhanced policy coordination and green investment incentives could improve industry resilience.

*Key words:* China Clean Energy (CCE), high-tech enterprises, TVP-VAR, risk spillover, Wavelet Coherence (WC)

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