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GREEN DEVELOPMENT EFFICIENCY AND ENVIRONMENTAL REGULATION IN CHINESE STEEL COMPANIES: AN ANALYSIS USING THE P-SBM SHANNON ENTROPY MODEL AND REGRESSION

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Abstract

The steel industry is a cornerstone of China's economy, and balancing steel production with energy and environmental sustainability is crucial for its future transformation and advancement. This study utilizes the P-SBM-Shannon Entropy (Panel Slack-Based Measure) model to assess the Green Development Efficiency (GDE) of Chinese steel companies from 2016 to 2021 and examines how environmental regulations (ER) influence GDE. Key findings include: (i) Efficiency scores from the P-SBM-Shannon Entropy model are generally lower than those obtained using the standard P-SBM model. (ii) The average GDE of steel companies is rising, with ER playing a significant role in enhancing their green development levels. (iii) Companies with lower efficiency scores are primarily located in the Northeastern and Western regions, where they face challenges related to fuel and energy costs and fixed asset values. Additionally, substantial opportunities exist to reduce sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emissions.

Key words: data envelopment analysis, environmental pollution, environmental regulation, green development efficiency, projection, sustainable development

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