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Research of the Impacts of Environmental Regulation on Energy Efficiency in Logistics Industry

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Abstract

Global climate change has a significant impact on energy demand and economic development, and has profoundly altered the ecological environment. Improving energy efficiency is a critical strategy for mitigating carbon emissions and achieving carbon neutrality, with enhancing the energy efficiency of the logistics sector playing a pivotal role in addressing its significant carbon footprint. This study employs panel data and a threshold effect model to investigate the impact of environmental regulations on the energy efficiency of the logistics industry. The findings reveal that different types of environmental regulations exhibit threshold effects on energy efficiency. Specifically, command-and-control environmental regulations demonstrate a double threshold effect, whereas market-based incentives and other types of environmental regulations exhibit a single threshold effect. Furthermore, command-and-control environmental regulations negatively impact the energy efficiency of the logistics industry, although this adverse effect diminishes as the intensity of such regulations increases. Market-based environmental regulations initially have a negative impact on energy efficiency at lower intensities but transition to a positive effect once the threshold is surpassed. Similarly, other types of environmental regulations negatively affect energy efficiency at lower intensities but exert a positive influence after crossing the inflection point. Heterogeneity analysis indicates that the impact of environmental regulations on the energy efficiency of the logistics industry is more pronounced in the western region of China. Based on the empirical findings, the study concludes with targeted policy recommendations to enhance energy efficiency in the logistics sector.

Keywords: Climate Change; Energy Consumption; Ecological Policy; Environmental Resilience; Sustainable Development;