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EXAMINING THE DYNAMICS OF ECO-EFFICIENCY ENHANCEMENT UNDER ENVIRONMENTAL REGULATION CONSTRAINTS

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Abstract

This paper explores the complex mechanisms through which environmental regulation drives improvements in enterprise eco-efficiency. By integrating quantitative cost-benefit models, we incorporate detailed environmental cost factors alongside the heterogeneity of enterprise technologies, enabling a nuanced analysis of regulatory impacts. The model reveals that the stringency of environmental regulations affects enterprise costs in distinct ways, depending on the technological sophistication of the firms. Specifically, the findings highlight an upward concave relationship between regulatory severity and costs for high-tech enterprises, indicating diminishing marginal impacts of stricter regulations on their operational expenses. In contrast, for low-tech enterprises, costs exhibit a downward convex dynamic, suggesting escalating cost burdens as regulatory stringency increases. These differentiated cost trajectories underscore the importance of considering technological heterogeneity in regulatory design. The insights derived from this study offer valuable guidance to policymakers in optimizing regulatory frameworks across diverse industry contexts, achieving a balance between environmental sustainability and economic viability.

Key words: eco-efficiency, environmental costs, environmental regulation, quantitative cost-benefit, situational analysis

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