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Do Green Finance and Environmental Regulation Influence Green Innovation in China?

Abstract

This dissertation investigates how green finance and environmental regulation jointly influence green innovation in China, a crucial question for economies undergoing a transition toward sustainability. Although green finance has expanded rapidly in recent years, its effectiveness in stimulating technological innovation depends strongly on the broader institutional environment, particularly the design and enforcement of environmental regulation. Existing research offers fragmented evidence, often treating regulatory instruments as a homogeneous category and overlooking their interaction with financial mechanisms. This study addresses these gaps by integrating three types of environmental regulation—command-and-control, market-based and informal—into a unified analytical framework.

The empirical analysis employs a two-way fixed-effects model using a panel dataset of more than 30,000 firm-year observations from A-share listed companies between 2010 and 2021, matched with provincial-level indicators of green finance and environmental regulation. Green innovation is measured through the number of green patent applications, while green finance is captured through a composite index constructed using the entropy-weighting method. Interaction models are applied to examine how different regulatory tools shape the marginal impact of green finance on firms' innovation behaviour. A series of robustness tests, including alternative model specifications, lag structures, and subsample analyses, ensure the stability of the results.

The findings show that green finance significantly promotes green innovation, and that environmental regulation moderates this relationship in heterogeneous ways. Market-based regulation strengthens the innovation-enhancing effect of green finance, whereas command-and-control tools exhibit mixed or limited outcomes. Informal regulation also plays a positive

complementary role, particularly in regions with stronger public participation and information transparency. These results highlight the importance of coordinating financial development with differentiated regulatory instruments to foster sustainable technological progress. The dissertation offers policy recommendations to improve the synergy between green finance and environmental regulation and support China's transition toward a low-carbon economy.

Keywords: green finance; environmental regulation; green innovation; sustainability transition; panel data analysis; policy interaction