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SPATIO-TEMPORAL CHARACTERIZATION OF THE EFFICIENCY OF STI-ECO INTEGRATION

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Abstract

Within the context of high-quality development, it is critical for narrowing regional disparities to examine the interaction between scientific and technological innovation (STI) and ecological environment (ECO). The study used Super-NSBM model to address undesirable outputs while integrating the output of STI stage into the ECO stage. Inter-provincial panel data from 2012 to 2023 are employed to analyze the spatiotemporal development of STI–ECO comprehensive efficiency at national and regional levels. The results reveal that: (1) the eastern region exhibits the greatest disparities in comprehensive efficiency, followed by the western region, while the central region shows the least; (2) the Dagum's Gini coefficient of east-west regions surpasses east-central regions, with the lowest found in the central-west, and the western region displays the most rapid growth; (3) the evolution of comprehensive efficiency initially experienced polarization, subsequently transitioning towards multipolarization; (4) interprovincial development has become increasingly balanced, characterized by a reduction in spatial dependence and a shift in clustering patterns from high-high (H-H) and low-low (L-L) to high-low (H-L) and low-high (L-H); (5) four policy recommendations are proposed to enhance the comprehensive efficiency across three major regions and to narrow the relative disparities nationwide.

Key words: STI-ECO comprehensive efficiency, Dagum's Gini coefficient, Moran's index, Spatiotemporal characterization, Super-NSBM

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