Highway carbon unlocking efficiency study based on super-efficiency SBM-Malmquist

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ABSTRACT

Carbon neutrality and sustainable development goals (SDGs), as new requirements for global development at this stage, have raised higher requirements for achieving the coordination of economic efficiency and ecological development of transportation infrastructure, especially highways. To promote the achievement of SDGs and carbon neutrality goals, this research intends to investigate the carbon unlocking efficiency of highways. In this paper, we take China as an example, use the data of 18 listed highway companies and their provinces from 2010-2019 to conduct the study, measure the static carbon unlocking efficiency by using the super-efficiency SBM model with undesirable outputs, combine with the Malmquist index model for the decomposition of the efficiency and the dynamic analysis, and use the Tobit panel model to analyze the factors affecting the carbon unlocking efficiency of the highway. The results show that (1) From a static perspective, the carbon unlocking efficiency of China's highways has been inefficient in general. (2) From a dynamic perspective, the carbon unlocking efficiency of China's highways shows a trend of decreasing first and then developing steadily, with noticeable differences between carbon unlocking in the East, Central, and West. The carbon unlocking efficiency change index is in the rising stage overall. (3)The regional economic level, industrial structure, and urbanization level have a significant positive correlation with carbon unlocking efficiency, while the level of scientific and technological development and the level of opening up have a negative effect.

ATTACHMENTS

SBM-MALMQUIST.xlsx TOBIT.xlsx

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