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CARBON REDUCTION EFFECT OF DIGITAL TRANSFORMATION IN CHINESE STEEL ENTERPRISES

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Abstract

Digital strategy serves as the core engine for steel enterprises to achieve sustainable development, and it is also a crucial pathway for realizing China's "dual carbon" goals. This study examines the nonlinear effect of digitalization on carbon reductions in Chinese A-share listed steel companies from 2013 to 2022, while also considering the moderating influence of green technology innovation. The findings indicate that digital transformation of Chinese steel enterprises exhibits a "U-shaped" relationship with their carbon emissions, where digital advancements initially reduce emissions but later lead to an increase. At present, most steel enterprises' digitalization level has not yet surpassed the inflection point of the "U-shaped" curve, thereby significantly inhibiting carbon emissions. The heterogeneity test reveals that the "U-shaped" relationship is particularly evident in state-owned steel enterprises and those located in coastal areas. In contrast, non-state-owned steel enterprises have experienced increased carbon emissions throughout the current phase of digitalization. Moreover, moderating effect demonstrates that greater green technology innovation intensifies the "U-shaped" relationship, rendering the curve steeper. This paper enriches the research results on the environmental effects of enterprise digitalization and provides evidence and experience for promoting the synergistic development of digitalization and greening in steel enterprises.

Key words: carbon emission, digital transformation, green technology innovation, nonlinear effect, steel enterprises

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