

Assessing the Interaction between Artificial Intelligence and Carbon Emissions based on the Case of China

Zhen Xu

PhD Student

IESEG School of Management, CNRS
Université de Lille, Lille, France
z.xu@guest.ieseg.fr

Linda Zhang

IESEG School of Management, CNRS
Université de Lille, Lille, France
l.zhang@ieseg.fr

Abstract

In this paper, we examine the impact of artificial intelligence (AI) on firm-level carbon emissions. With large carbon emissions in China and wide AI application, some studies use robots to explore the role of AI in firms carbon emissions. Compared with robots, we construct a complete AI index to evaluate AI application. Based on AI index, we explore the interaction between AI and carbon emissions. Our analysis demonstrates that AI significantly mitigates the carbon emissions of China's firms. We highlight that among the dimensions of AI index, innovation, growth potential, assets and equity negatively affect carbon emissions. Additionally, our study finds AI indirectly decreases carbon emissions by improving total factor productivity, offering insights into how AI affects firm-level carbon emissions. Through heterogeneity analysis, we examine the difference of AI's impact on carbon emissions based on industrial characteristics. Specifically, we focus on two distinct industries: manufacturing industry and service industry. The results of our research provide valuable insights for policymakers and firms, guiding policymakers in formulating appropriate policies to encourage AI development and helping firms continuously promote AI application.

Keywords

Artificial intelligence, Carbon emissions, Firm-level, Mechanism, Heterogeneity.