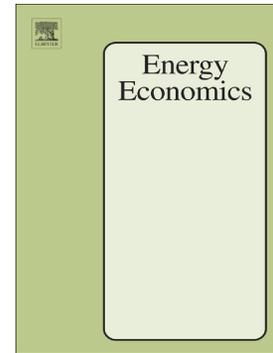


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**Identifying the driving forces of national and regional CO₂ emissions in China:
Based on temporal and spatial decomposition analysis models**

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Abstract

This study explores the driving forces of the changes of national and regional CO₂ emissions using temporal decomposition analysis model, and investigates the driving forces of the differences of CO₂ emissions between China's 30 regions and the national average using spatial decomposition analysis model. The changes or the differences in national and regional CO₂ emissions during 2000–2014 are decomposed into nine underlying determinants. Temporal decomposition results show that economic scale effect is the dominant driving force leading to the increases in both national and regional CO₂ emissions, while energy intensity effect is the main contributor to the reduction of CO₂ emissions. Contribution of various variables to CO₂ emissions between eastern region and central region are roughly same. Spatial decomposition results demonstrate that the differences of CO₂ emissions among China's 30 regions are expanding increasingly. Economic scale effect is main driving force responsible for the difference in CO₂ emissions among regions, and energy intensity effect, energy structure effect and industrial structure effect are also important factors which result in the increasing differences in regional CO₂ emissions. In addition, resource-based and less developed regions have greater potential in the reduction of CO₂ emissions. Understanding CO₂ emissions and the driving forces of various regions is critical for developing regional mitigation strategies in China.

Keywords: Driving forces; CO₂ emissions; Temporal decomposition analysis; Spatial decomposition analysis; China

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