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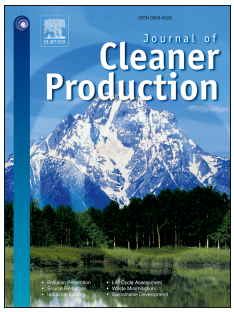

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How do population and land urbanization affect CO_2 emissions under gravity center change? A spatial econometric analysis

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Abstract: We examines the movement trajectory of gravity centers of China's CO_2 emissions on a regional level based on a gravity model, and then investigate the impact of urbanization on CO_2 emissions by utilizing an extended Stochastic Impacts by Regression on Population, Affluence and Technology (STIRPAT) model under the change of gravity center. We measure the urbanization in different dimensions including both population and land urbanization. Besides, a panel data between 2005 and 2014 is used for our empirical estimation, and the Spatial Durbin Panel model is used for estimation. The results show that the movement trajectory of gravity centers as a whole moved towards the northwest over the period. With CO_2 emissions distribution presenting the characteristics of spatial agglomeration, we utilize the spatial econometric model to capture spatiality. The results show that the effect of population urbanization is insignificant; however, population urbanization has a positive and significant spatial spillover effect. Meanwhile, we find that the impact of land urbanization is significantly positive, while its spatial spillover effect is insignificant. Regarding other socioeconomic factors, it is proved that population scale, energy intensity and GDP per capita have a significantly positive impact, while industrialization level has a negative influence. These novel methodology and findings reveal that policy makers should carefully consider the characteristics of the rapid urbanization growth in China through the establishment of low-carbon urbanization policy standards, and strategies should emphasize China's land-use conditions and promote coordinate development between population urbanization and land urbanization to achieve the sustainable development of urbanization and a low-carbon economy.

Key words: Urbanization; CO_2 emissions; center of gravity; spatial econometric model

1. Introduction

China, as the largest emitter in the world, has taken up more than a quarter of the

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