

China's Regional Structure Change and Greenhouse Gas Emissions Right: a GIS-based Multi-regional Goal Programming Input-Output Model Combining with CGE Analysis

Topic: Environmental input-output modeling X

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China promises to decrease carbon intensity by 40% -45% of its 2005 level by 2020. We use a GIS-based Multi-Regional Input-Output model combining the strength of goal programming or CGE analysis to examine industry adjustment across regions to this goal, as well as to evaluate the expected reallocations in response to environmental policies in multi-region systems. The principles of the Ricardian and Heckscher-Ohlin theories of interregional trade are applicable to environmental economics. In accordance with the composition effect, cleaner production requires technical change (i.e. direct input and capital formation coefficients) and energy mix improvement, can also be attained by better allocation of production and carbon emissions. This way the gains to free trade in products and emissions can be determined, including the case where the environmental constraints are surrounded with uncertainty. The results reveal how industry and investment structure change across regions effectively influence the national carbon emissions target, and regional carbon emissions right allocations through computation the value price of emissions.

Keyword: Multi-Regional input-output analysis, carbon emissions, structure change, carbon emissions right