Turnpike Optimality in Environment-Input-Output System: Analysis on the Adjustment Potential of China's Industry Structure for Carbon Emission Reduction

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Abstract: From the perspective of Chinese industries' carbon emission reduction, this article works out the China's potential in industry structure adjustment on long terms. Because it is determined comprehensively both by the carbon emission coefficients of the difference industries and the contribution of different industry to GDP, we present a new dynamic optimal input-output model which is aiming at maximum of accumulation of China's GDP during the planning period, and is constrained by the accumulation of China's carbon emission reduction on the target of Copenhagen Conference. Based on an Energy-Carbon-Emission-Economy Input-Output table compiled from 1992-2007, we modify the technology coefficient and capital formation matrix and value added and final demand by industries in order to make the solution reasonable. Since dynamic optimal model with multi-dimension is hard to be resolved, we present an inverse algorithm design to give solution of the dynamic optimal input-output Model. As a result, we obtain the path of output structure on the long terms, which illustrates how the industry structure is adjusted on the long terms to achieve the target of reduction of carbon emission on Copenhagen Conference.