Regional and Sectoral Impacts of Climate Change under International Climate Agreements: A Computable General Equilibrium Modeling for Non-Cooperative and Bargaining Solutions

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Abstract

This article examines regional and sectoral impacts of climate change under international climate agreements for abating GHGs. Using the dynamic Evaluation Model for Environmental Damage and Adaption (EMEDA), it examines interactions and heterogeneity among various countries. Specifically, we define a sub-global CO2 abatement game involving players from three regions (Japan, China and the U.S.). Simulated results show that: 1) in each scenario, overall costs of impacts in developed countries are less than those in developing nations, some of which lose more than 10% of their real GDPs; 2) an extra 0.8 degrees C temperature rise occurs in 2100 with China and the U.S. deviating from the scenario proposed by international society. This leads to increased climate damages in other developed countries by over 1% of real GDP; and 3) positive sectoral impacts can be found in several regions such as Japan, China, the U.S., EU, FSU and Africa.

JEL-Classification: C68, C70, Q54

Keywords: EMEDA; integrated assessment model; IAMs; CGE models; global warming; climate change; non-cooperative game; bargaining game; Nash equilibrium; Nash bargaining solution.

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