

Cooperation on Climate-Change Mitigation*

(Preliminary Draft)

May 10, 2007

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Abstract

We model greenhouse gas (GHG) emissions by countries as a dynamic game in which the emissions increase atmospheric concentrations of GHG that negatively affect all countries' welfare. Each country in each time period chooses a level of emissions, understanding that the combination of all countries' emissions influences the evolution of the GHG stock. We allow for heterogeneities in countries' payoffs. Within this setting, we analyze self-enforcing climate-change treaties which are supportable as subgame perfect equilibria of the dynamic game. We provide a simulation model to illustrate the conditions when it is possible to support a first best outcome. We also parameterize the simulation model to mimic current conditions to show whether a self-enforcing agreement that achieves optimal climate change policy is possible, the structure of what such a solution might look like, and which countries have the most to gain from such an agreement.

Key words: climate change, international environmental agreement, dynamic game

*The authors thank Stephen Salant and the seminar participants at the University of Hawaii and an AERE session at the Allied Social Science Associations Meetings in 2007. The authors are responsible for any remaining errors.

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