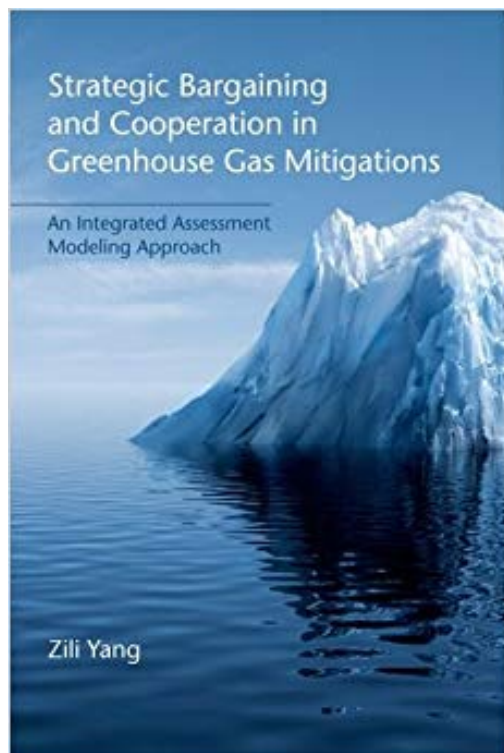


Strategic Bargaining and Cooperation in Greenhouse Gas Mitigations: An Integrated Assessment Modeling Approach

by Zili Yang



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The impact of climate change is widespread, affecting rich and poor countries and economies both large and small. Similarly, the study of climate change spans many disciplines, in both natural and social sciences. In environmental economics, leading methodologies include integrated assessment (IA) and game theoretic modeling, which, despite their common premises, seldom intersect. In *Strategic Bargaining and Cooperation in Greenhouse Gas Mitigations*, Zili Yang connects these two important approaches by incorporating various game theoretic solution concepts into a well-known integrated assessment model of climate change. This framework allows a more comprehensive analysis of cooperation and strategic interaction that can inform policy choices in greenhouse gas (GHG) mitigation. Yang draws on a wide range of findings from IA and game theory to offer an analysis that is accessible to scholars in both fields. Yang constructs a cooperative game of stock externality provision--the economic abstraction of climate change--within the IA framework of the influential RICE model (developed by William D. Nordhaus and Zili Yang in 1996). The game connects the solution of an optimal control problem of stock externality provision with the bargaining of GHG mitigation quotas among the regions in the RICE model. Yang then compares the results of both game theoretic and conventional solutions of the RICE model from incentive and strategic perspectives and, through numerical analysis of the simulation results, demonstrates the superiority of game theoretic solutions. Yang also applies the game theoretic solutions of RICE to such policy-related concerns as unexpected shocks in economic/climate systems and redistribution and transfer issues in GHG mitigation policies. Yang's innovative approach sheds new light on the behavioral aspects of IA modeling and provides game theoretic modeling of climate change with a richer economic substance.



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