

Abstract

This paper studies the strategic interaction of arbitrarily many heterogeneous regions in a macroeconomic growth model of climate change. Regions differ with respect to production technologies, productivity and factor endowments, stocks of fossil fuels, and climate damages. They trade on friction-less international markets for capital and fossil fuels and choose climate tax policies under different scenarios of cooperation and non-cooperation. We derive closed form solutions of optimal policies for both the non-cooperative equilibrium where regions internalize only domestic climate damages and the efficient solution internalizing global climate damages. We extend all these results to cases with partial cooperation where regions form coalitions and choose policies to maximize welfare of their coalition. Finally, we study how transfers can incentivize regions to cooperate and determine a class of optimal transfer schemes under which all regions are better-off under full cooperation relative to the non-cooperative outcome. Numerical simulations based on calibrated parameter values are used to illustrate and quantify our theoretical results under different coalition scenarios.