Governing climate engineering: insights from a public good or bad experiment

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Abstract
Climate engineering - the deliberate large-scale manipulation of the Earth’s natural system- is a proposed method for reducing climate change economic impacts. It is a controversial strategy, which raises major governance challenges. One is the risk of over-provision above what socially optimal, where the country with the highest preference for climate engineering deploys it at the expenses of other regions -a term which has been dubbed 'free driving'. We investigate this issue by means of a laboratory experiment on a public 'good or bad' game. Decision makers produce a public commodity (i.e. engineer the climate), but differ in their ideal point and loose from any upward or downward deviation from these ideal points. We test whether, in the baseline, the theoretical equilibrium prediction of an overproduction of climate engineering relative to the social optimal holds in the lab, and find it does. We then test the role of two plausible technological and institutional responses: (1) counter-geoengineering, the possibility of undoing climate engineering production; and (2) treaty, the possibility of dictating another team’s production level in exchange for money. As theoretically predicted, while counter-geoengineering is able to bring total climate engineering production down to the socially optimal level, the “geoengineering war” that ensues reduces players’ profits and increases overall inequality. On the other hand, the ability to sign treaties brings production closer to the socially optimal level, although not as close as when participants are able to counter-geoengineer. Those who are successfully able to bring down their total production through treaties improve overall payoffs and inequality.