

Strategic Conflicts on the Horizon: R&D Incentives for Environmental Technologies

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Climate Engineering technologies (CE) are being discussed as potentially beneficial measures against global warming. Future deployment however is infeasible without research and development (R&D) today. The required R&D expenditures are substantial and, in the absence of a global regulating entity, fall on self-interested countries. Thus, the prospects of successful innovation critically depend on innovation incentives. This paper focuses on a specific mechanism for strategic distortions in this R&D game. In this mechanism, the outlook of future conflicts surrounding CE deployment directly impacts on the willingness to undertake R&D. Apart from free-riding, the strategic conflict we can expect for carbon dioxide removal (CDR) techniques characterized by high deployment costs, a different deployment conflict with distortive effects on innovation may occur: The low deployment costs and heterogeneous preferences surrounding solar radiation management (SRM) might give rise to so-called 'free-driving'. In this recently considered possibility (Weitzman 2012), the country with the highest preference for SRM deployment, the free-driver, may dominate the deployment outcome to the detriment of others. The present paper develops a simple two stage model for analyzing how technology deployment conflicts, free-riding and free-driving, shape R&D incentives of two asymmetric countries. The framework gives rise to rich findings, underpinning the narrative that future deployment conflicts pull forward to the R&D stage. While the outlook of free-riding unambiguously weakens innovation incentives, the findings for free-driving are more complex, including the possibility of super-optimal R&D and incentives for counter-R&D.