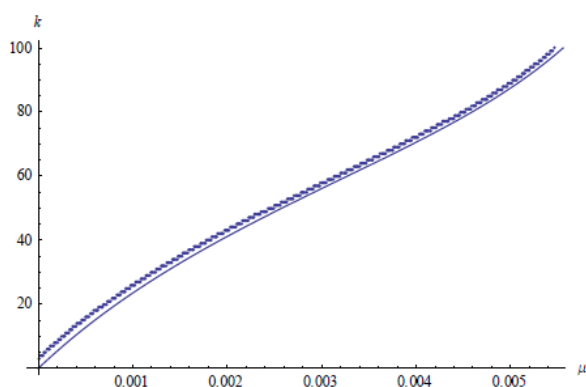


Climate cooperation with technology investments and border carbon adjustment

A central question in climate policy is whether early investments in low-carbon technologies are a useful first step towards a more effective climate agreement in the future. We introduce a climate cooperation model with endogenous R&D investments where countries protect their international competitiveness via border carbon adjustments (BCA).



Effects of Border Carbon Adjustment on Coalition Size with discrete participation decisions (solid line) and with continuous participation decisions (stepwise line)

Motivation

An effective global climate agreement is still far away. Can early unilateral efforts to bring down the costs of abatement help to improve the future prospects of cooperation.

Method

We extend a standard climate coalition formation game in two dimensions: Introducing border carbon adjustment (BCA) raises participation in climate coalitions. This allows us to obtain non-trivial results when endogenizing also R&D investments. Moreover, we neglect the usual integer constraint on the number of signatories. Instead, we treat the participation level in the coalition as a continuous variable. It turns out that this substantially facilitates the determination of the coalition size. This allows us to use a non-parametric approach, and to carry out most of the analysis without closed form solutions and numerical simulations, on which much of the existing literature has relied.

Literature

- Helm, C. & R. Schmidt (2014): Climate Cooperation with Technology Investments and Border Carbon Adjustment, Discussion Paper 2014-65. Cambridge, Mass.: Harvard Project on Climate Agreements.
- Helm, C. & S. Pichler (2014): Climate Policy with Technology Transfers and Permit Trading, *Environmental & Resource Economics*, DOI 10.1007/s10640-013-9756-6.
- Helm, C. & F. Wirl (2014): The Principal-Agent Model with Multilateral Externalities: An Application to Climate Agreements, *Journal of Environmental Economics and Management*, 67, 141-154, 2014.

Results

BCA raises the scope for cooperation and leads to a non-trivial relation between countries' prior R&D investments and participation in the coalition. We find that early investments in R&D render free-riding more attractive. Therefore, with delayed cooperation on emission abatement and ex-ante R&D investments, the outcome is often characterized by high participation but inefficiently low technology investments and abatement.

Conclusions

Our results indicate that early unilateral investments in low-carbon technologies may not necessarily improve the outcome of a future climate agreement. In particular, while such investments reduce future abatement costs and trigger additional abatement efforts (for a fixed coalition size), they also aggravate the free-rider incentive, thereby undermining the potential welfare gains of a future climate agreement. In our model, the crowding-out effect via reduced participation is often so strong that early technology investments are even harmful. Hence, anticipating membership decisions in a future climate coalition as well as its abatement effort, countries strategically underinvest in low-carbon technologies.



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Research Topics

- International Environmental Agreements
- Economics of Renewable Energies
- Incentive Contracts and Asymmetric Information

Regular Courses

- Mikroökonomische Theorie, Finanzwissenschaft, Public Economics, Advanced Microeconomics, Contract Theory