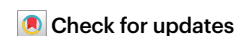


Leadership in carbon pricing encourages other countries to follow

Manuel Linsenmeier, Adil Mohommad & Gregor Schwerhoff



Climate policy adoption in one country increases the probability of adoption in neighbouring countries. Governments can thus support global climate action by adopting a leadership role in climate policy and do not need to worry about freeriding behaviour.

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The policy problem

Many countries want to assume responsibility for climate change by introducing policies to reduce greenhouse gas emissions. However, reaching an agreement so that a large coalition of countries proceeds jointly is challenging, leading to concerns that taking unilateral action might cause freeriding behaviour or carbon leakage. Freeriding behaviour means other countries might diminish their efforts as another country has partly handled the problem. Carbon leakage implies that other countries might offset the lead country's efforts by increasing their emissions. When some, but not all, countries are willing to implement climate policy, a stalemate situation can occur, where no country acts. Alternatively, freeriding and carbon leakage concerns can complicate policymaking and delay climate policy introduction.

The findings

We find that a country that introduces carbon pricing increases the probability that connected countries will also introduce carbon pricing. A connection between countries can be related to geography, trade or international organizations. This international diffusion of climate policies can result in large emissions reductions abroad that even exceed the domestic emissions reductions of a policy. Previous research indicates that the positive influence might work through policy learning, technology diffusion or fairness considerations. The results also suggest that countries can introduce carbon pricing without concern for freeriding. Leadership in climate policy contributes to resolving the challenge of climate change at the global level by encouraging others. The paper also points out that international policy diffusion addresses possible concerns about carbon leakage. By making it more likely that other countries introduce carbon pricing, domestic carbon pricing reduces carbon emissions abroad.

The study

This study uses a global dataset on carbon pricing policies, country connections and previously shown variables to explain which countries introduce carbon pricing. The study consists of two parts. In the first part, we empirically estimated the probability that a country would introduce carbon pricing depending on previous policies in other countries and the connections between countries regarding geographic proximity and shared membership in international organizations. The study uses proportional hazard models that address the binary nature of policy adoption and the probability of yet unobserved future adoption. In the second part, we used the statistical results to simulate international policy diffusion and calculate the indirect greenhouse gas emissions reductions from diffusion. To this aim, Monte Carlo simulations incorporating the probabilistic empirical estimates were used. The indirect emissions reductions are only calculated for countries that have not yet introduced carbon pricing (Fig. 1).

Recommendations for policy

- Introducing carbon pricing encourages other countries to do the same, contributing to greenhouse gas emissions reductions abroad, which means additional global benefits from climate leadership.
- Countries with the largest global benefits from policy diffusion are centrally located among countries that have not yet introduced carbon pricing.
- Freeriding behaviour does not seem to be the primary response to climate leadership, reducing possible carbon leakage concerns.
- International organizations seem to be one channel through which countries influence each other's climate policies. Strengthening international cooperation thus supports global climate policy.
- Pointing out the global benefits of climate leadership can help to realize these benefits. International leadership is particularly relevant for countries with relatively small domestic greenhouse gas emissions.

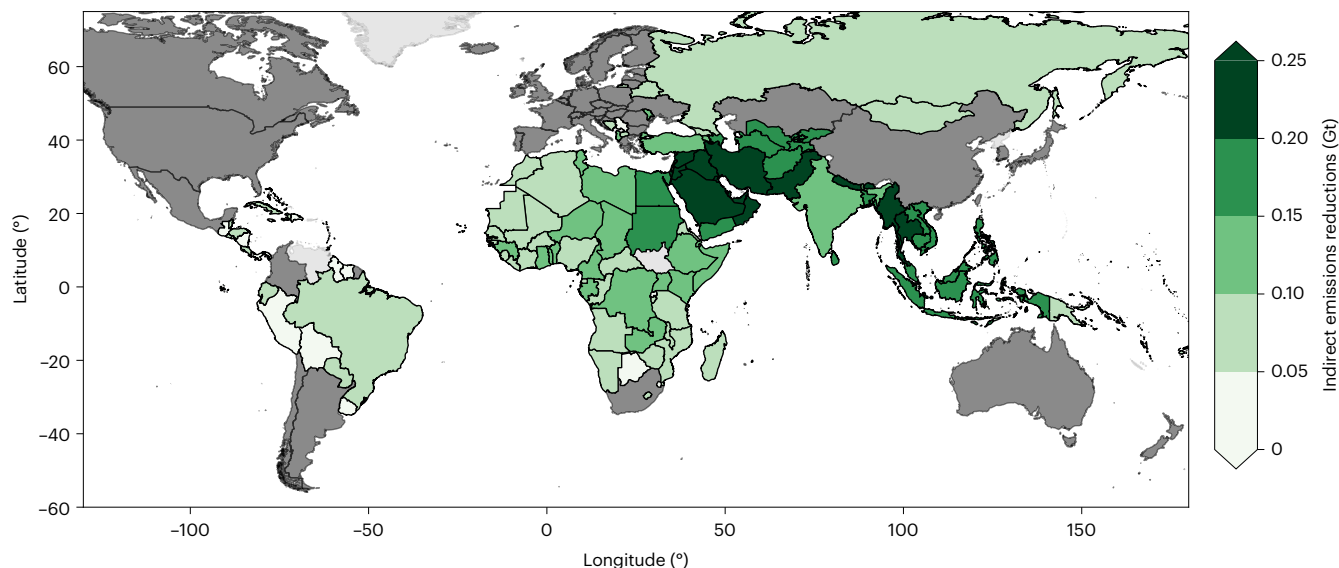


Fig. 1 | Indirect emissions reductions from the international diffusion of carbon pricing policies as calculated from Monte Carlo simulations over 2022–2050. The cumulative global emissions reductions attributed to policy adoption in a specific country and subsequent diffusion. Countries with a carbon

pricing policy by the end of 2021 are shown in dark grey. Figure adapted with permission from M. Linsenmeier et al. *Nat. Clim. Change* <https://doi.org/10.1038/s41558-023-01710-8> (2023), Springer Nature Ltd. Basemap adapted from World Bank Official Boundaries under a Creative Commons license [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/).

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Further reading

1. Gulbrandsen, L. H., Sammut, F. & Wettstad, J. Emissions trading and policy diffusion: complex EU ETS emulation in Kazakhstan. *Glob. Environ. Polit.* **17**, 115–133 (2017).

This study documents policy diffusion by comparing the legislation for emission trading systems (ETS) and thus illustrates how policy diffusion works in practice.

2. Kammerer, M. & Namhata, C. What drives the adoption of climate change mitigation policy? A dynamic network approach to policy diffusion. *Policy Sci.* **51**, 477–513 (2018).

This article describes the role of social influence between countries and how it helps climate policy spread through country networks.

3. Schwerhoff, G. The economics of leadership in climate change mitigation. *Clim. Policy* **16**, 196–214 (2016).

This literature review provides a systematic overview of the channels through which countries influence each other with climate policy.

4. Thisted, E. V. & Thisted, R. V. The diffusion of carbon taxes and emission trading schemes: the emerging norm of carbon pricing. *Environ. Polit.* **29**, 804–824 (2020).

This study differentiates the roles of learning and emulating as drivers of climate policy diffusion.

Competing interests

The authors declare no competing interests.