

Carbon pricing and the Paris Agreement

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Overview

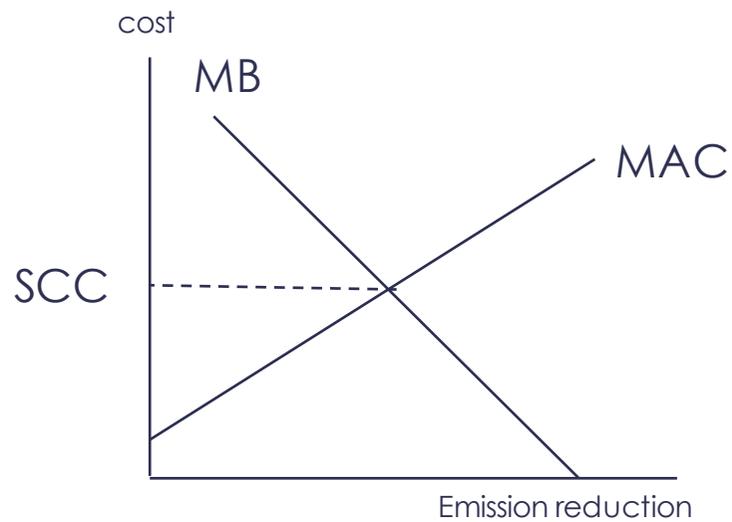
- Methodological issues
 - Shadow prices vs social costs
- Practical implications
 - What kind of price

Two ways of finding the economic cost of CO₂

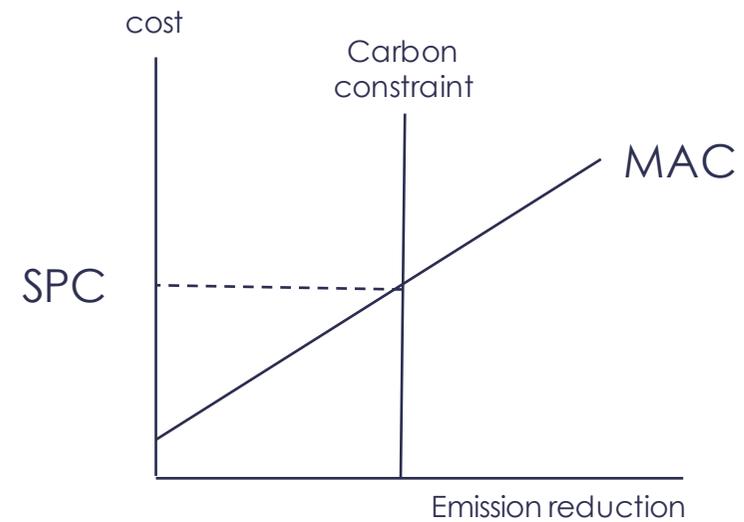
Social costs vs the shadow price of carbon

- Cost-benefit framework: Equate marginal abatement costs with marginal damage (social) costs of emissions
 - Carbon price equals the social costs of carbon
- Cost-effectiveness framework: Calculate the marginal costs of meeting a given (exogenous) carbon constraint
 - Carbon price equals the shadow price of the carbon constraint

Social costs of carbon vs the shadow price of carbon



Social cost of carbon
(benefit-cost framework)

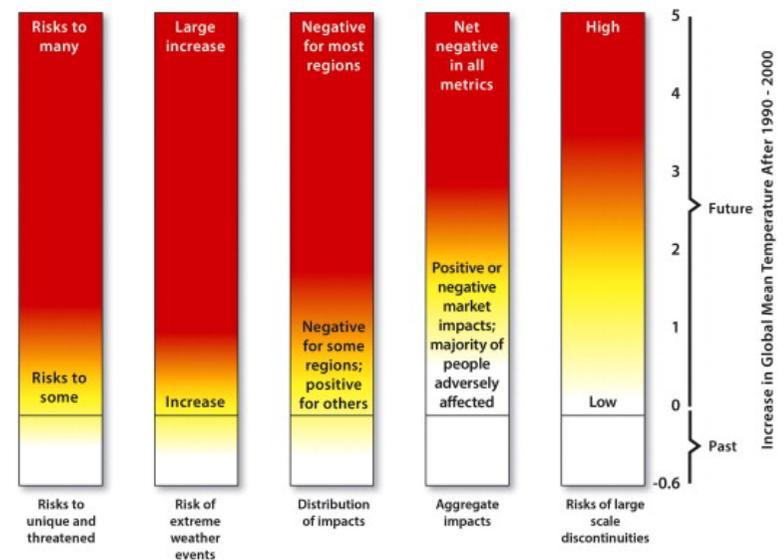


Shadow price of carbon
(cost-effectiveness framework)

Analytical reasons to prefer a shadow price of carbon

- Aggregate costs is not the only concern
 - IPCC identified 5 reasons for concern
- In principle social cost estimates could factor in other reasons for concern
 - In reality economic models do not do this very well
- Credible range in social cost estimates is too wide to guide policy
 - All politically feasible prices fall within the range

IPCC reasons for concern



Methodological reasons to prefer a shadow price of CO₂

- Deciding what is “dangerous human interference” is not a scientific judgement; it is a policy judgement informed by science (IPCC)
- Paris Agreement expresses the global consensus among policy makers on what is “dangerous”
 - Objectives were reached in full knowledge of the available science, balancing any competing concerns
- This makes “well below 2°C” a more legitimate target than any social cost estimate

Overview

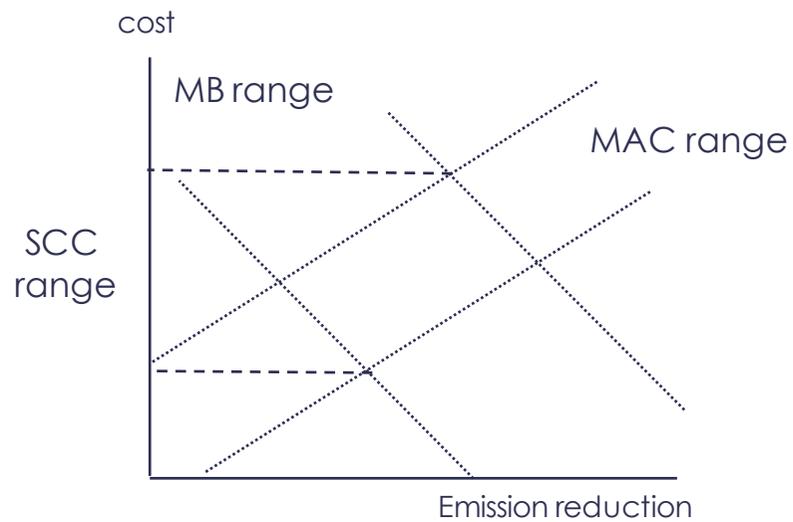
- Methodological issues
 - Shadow prices vs social costs
- **Practical implications**
 - **What kind of price**

A different kind of uncertainty

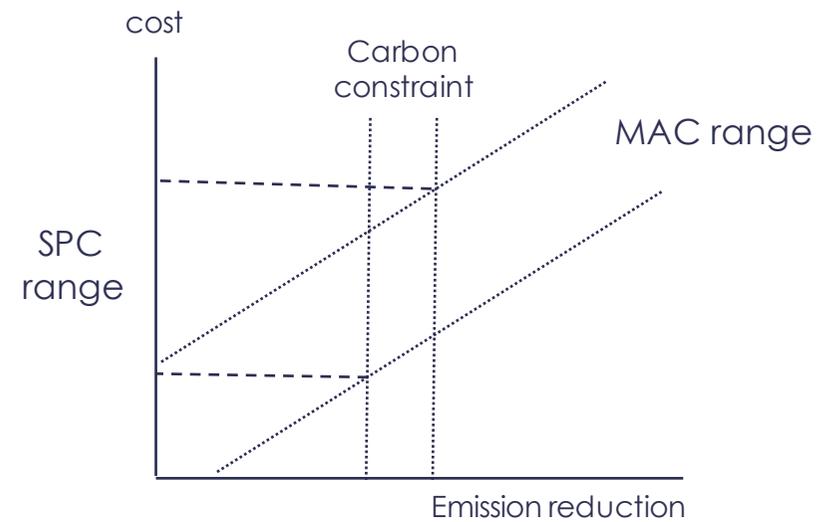
Perhaps but not necessarily a narrower range of estimates

- Social cost estimates are most sensitive to ethics and science parameters
 - discount rate, climate sensitivity, slope of the damage function
 - MAC parameters less relevant since the damage curve is relatively flat locally
- Shadow price estimates are most sensitive to economic and engineering parameters
 - technology costs, learning curves, energy savings potential
 - main damage parameter that matters is climate sensitivity

Social costs of carbon vs the shadow price of carbon



Social cost of carbon
(benefit-cost framework)



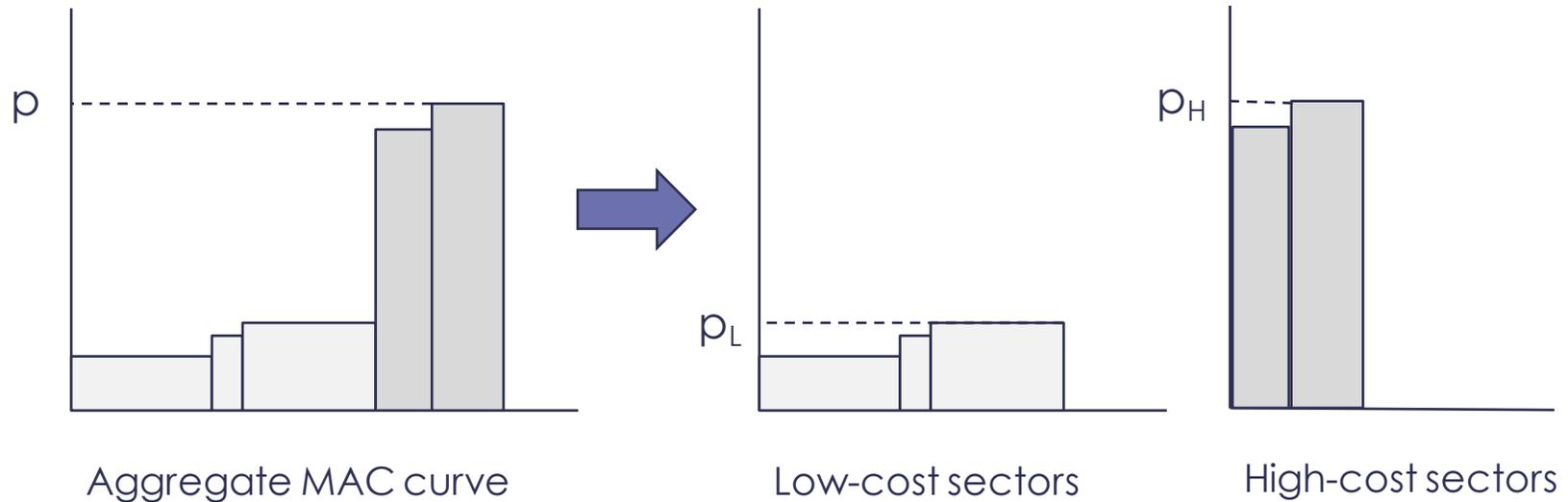
Shadow price of carbon
(cost-effectiveness framework)

Not necessarily a uniform price of carbon

- The shadow price of carbon will differ *across countries* if countries have different carbon constraints (levels of ambition)
 - NDCs do not guarantee that marginal abatement costs equate across countries
 - International carbon trading may in time lead to more uniform carbon prices
- Carbon prices may differ *across sectors* if sectors have very different abatement costs
 - Differentiated carbon prices may reduce the risk of excessive rents

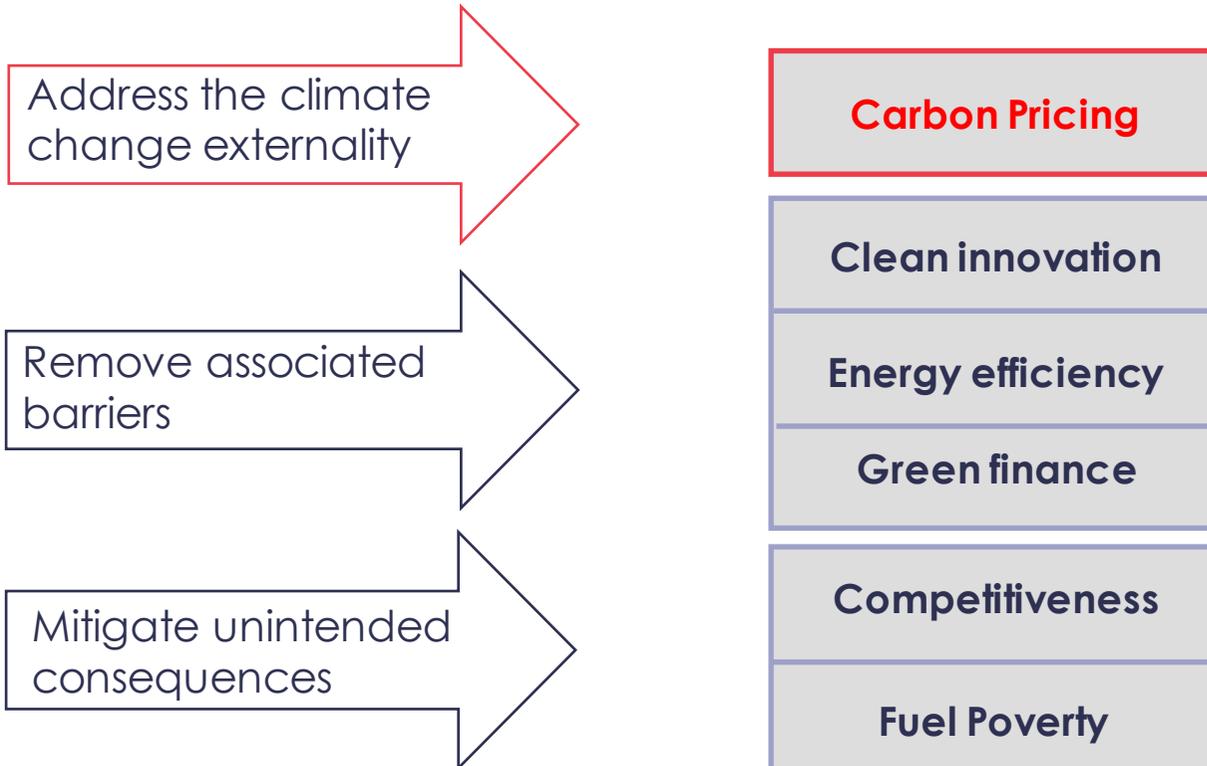
Is there a case for differentiated carbon prices?

Differentiated prices create less rent (i.e., fewer distributional issues)

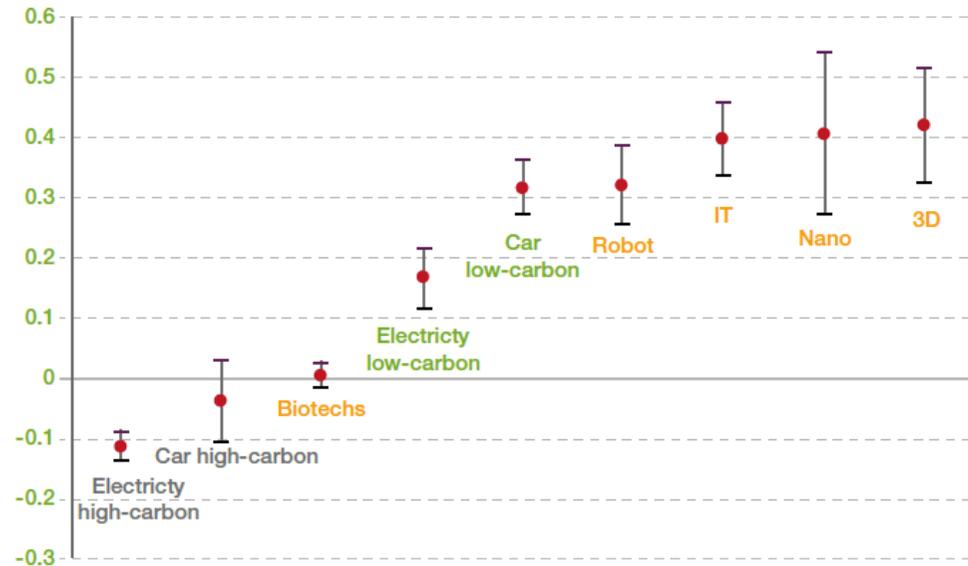


Not only a carbon price

Climate change policy requires additional interventions



Example: The knowledge spill-overs from clean innovation



Note: The figure compares the intensity of knowledge spillovers (as measured by patent citations) in a number of technologies, compared to the average patented technology. The y-axis represents the percentage difference in the intensity of knowledge spillovers. For example, a value of 0.2 means that the technology induces 20% more knowledge spillovers than the average patented technology. Red dots are point estimates; the black lines show 95% confidence intervals. Source: Dechezleprêtre et al. (2014)

Conclusions

From the social cost of carbon to the shadow price of carbon

- Environmental Economics 101: Calculate the social cost of carbon and price the externality at that level; this is the only policy intervention required
- Environmental Economics 401: Use a shadow price of carbon that reflects the Paris consensus; use additional policy instruments to address associated market failures
- PS: Some policy makers may still respond to monetary estimates of climate change impacts; providing them requires a new generation of models / analysis



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