Emission trading, linking, offsetting

… how do they interact with complementary policies and support mechanisms ?

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Hertie School of Governance

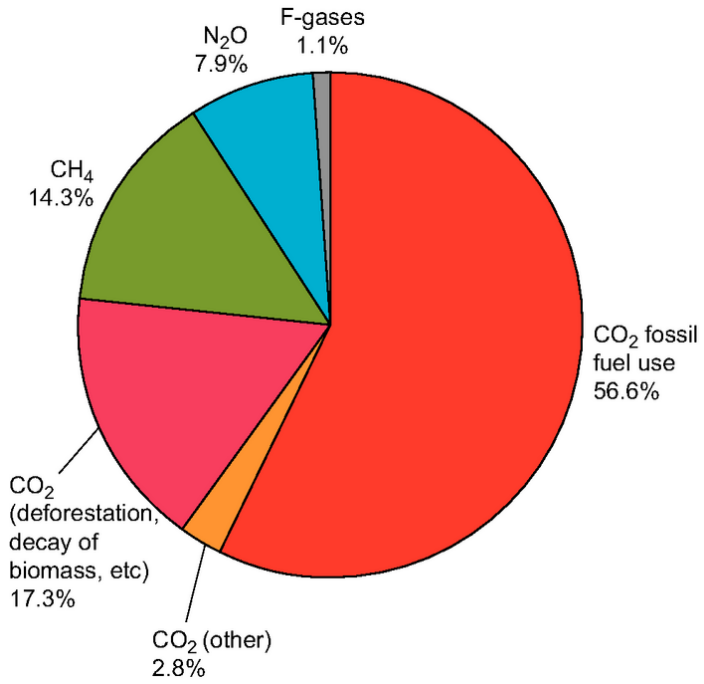
PIK

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
WMO Working Group III Mitigation of Climate Change UNEP

Technische Universität Berlin

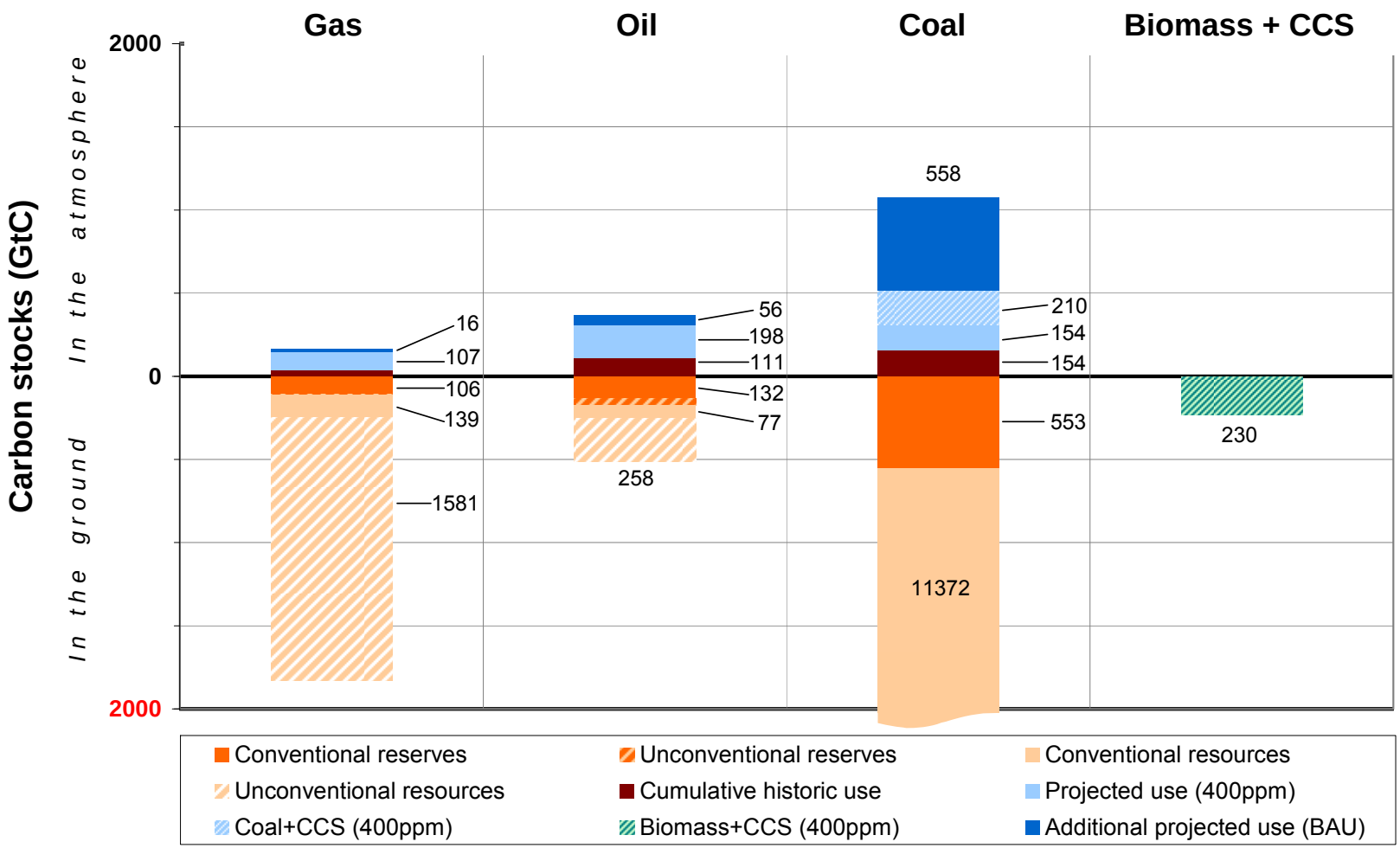
Climate Change and Fossil Resources

- Large contribution of fossil fuels combustion to global warming
- Climate policy will reduce use of fossil resources
- Carbon resources in the ground are large



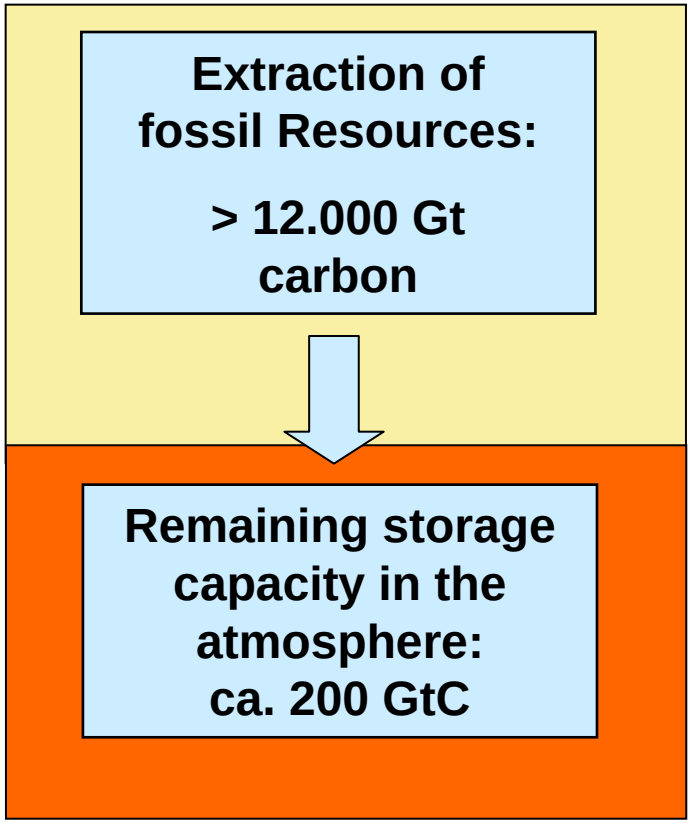
(IPCC 2007)

Carbon in Soil and Atmosphere



Source: Kalkuhl and Edenhofer 2010

Cap and trade guarantees meeting a climate target

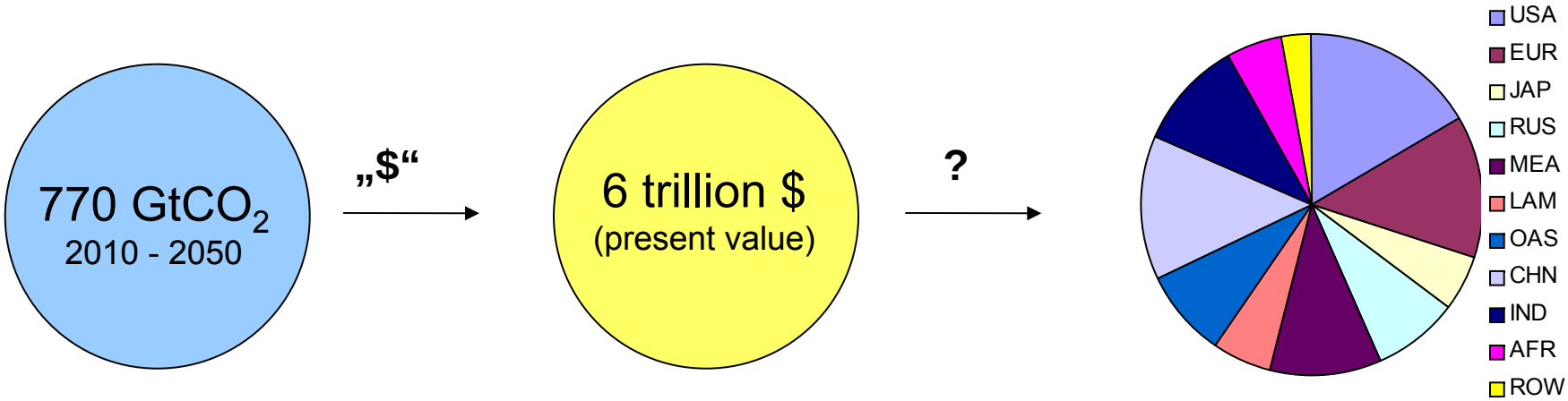


- **Rent = economic scarcity**
- **„Scarce“ carbon budget implies a scarcity rent**
- **But fossile resources are devalued**
- **Need to (re)distribute rents**

- **Need for global and national Institutions**

The Challenge of Redistribution

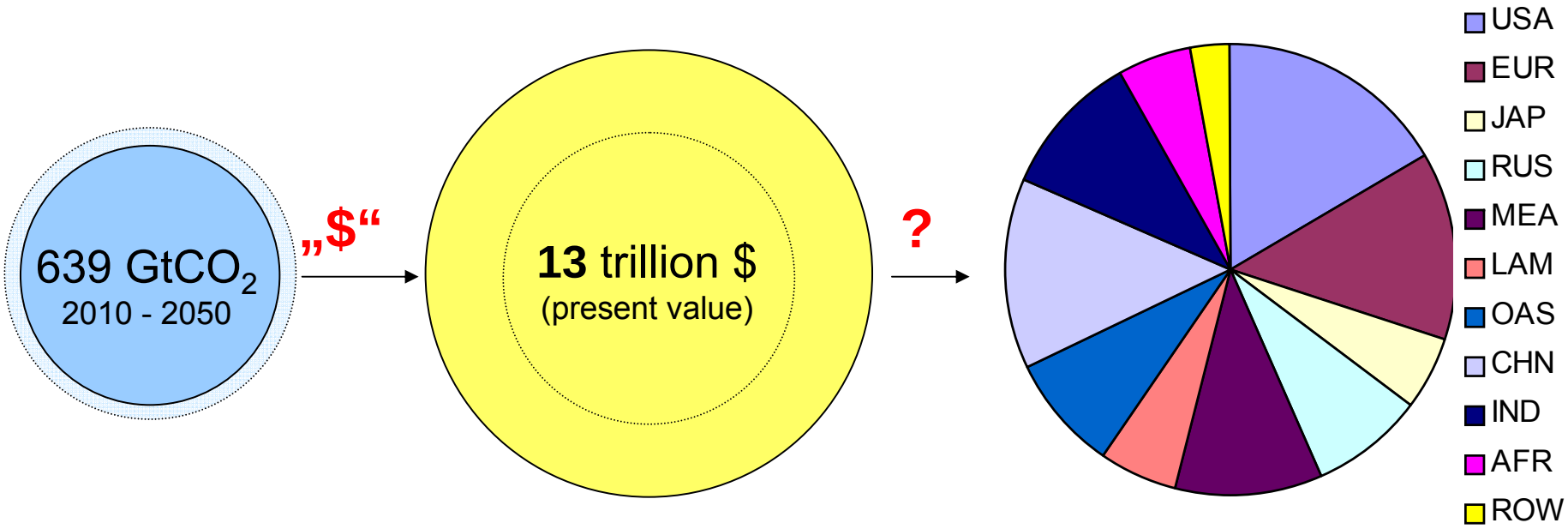
- A 2°C climate target only permits very few additional CO_2 emissions.
- Cap & Trade signals this scarcity on markets – emergence of a new rent → „climate rent“



→ How to distribute this rent amount nations?

The Challenge of Redistribution

Limited availability of CCS:



→ Climate rent is dependant on all kinds of assumptions!

International Environmental Agreements

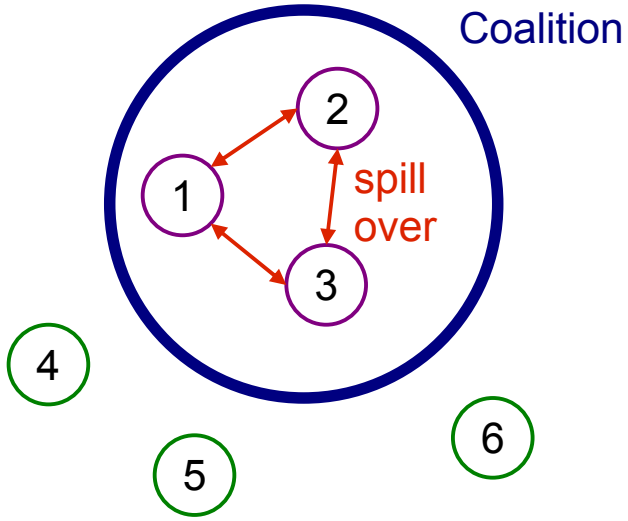
- Global climate policy implicitly assumes full international cooperation
- In reality: lack of a global authority
  instead: international environmental agreements (IEA)
- Participation is low whenever IEA (Barrett 1994) actually achieve something
- Can a clever design of environmental agreements achieve higher participation?

- Possibilities:
  - Research Cooperation
  - Trade restrictions
  - Permit trade with non-members of the agreement

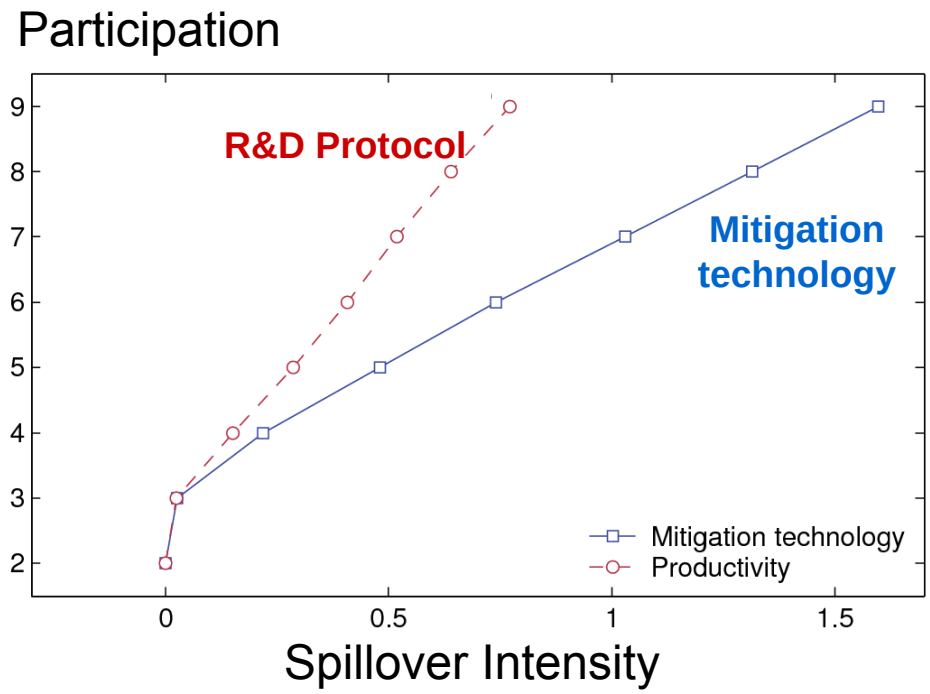
Bali 2007

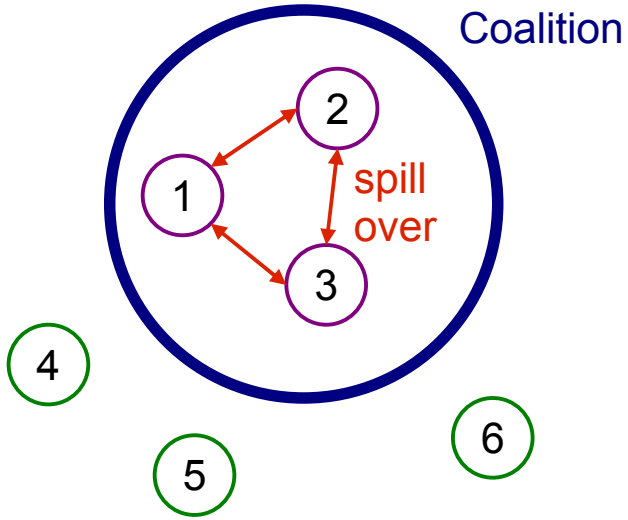
Research cooperation

- Research (R&D) exhibits *spillover*
- Policy may foster spillovers by encouraging research partnerships
- When spillovers are exclusive to coalition members, participation may increase
- R&D regarding
  - Mitigation technology
  - General productivity improvements



Research cooperation

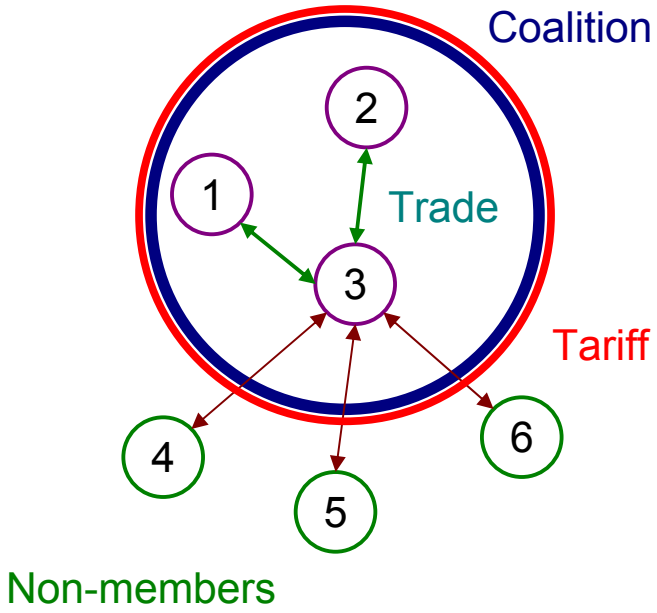




Trade restrictions

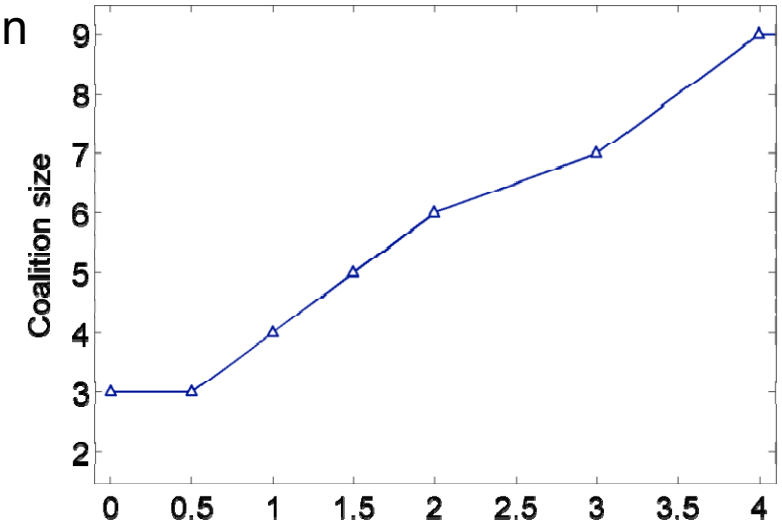
- Coalition members raise tariffs on import from non-members

- Stiglitz:
  - *"unfair advantage"* for countries that do not participate in climate policy
  - "energy tax" to restore a level playing field

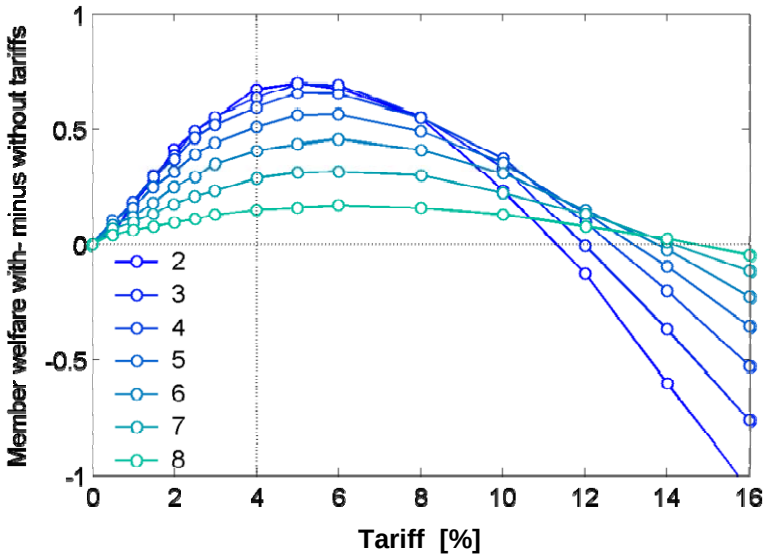


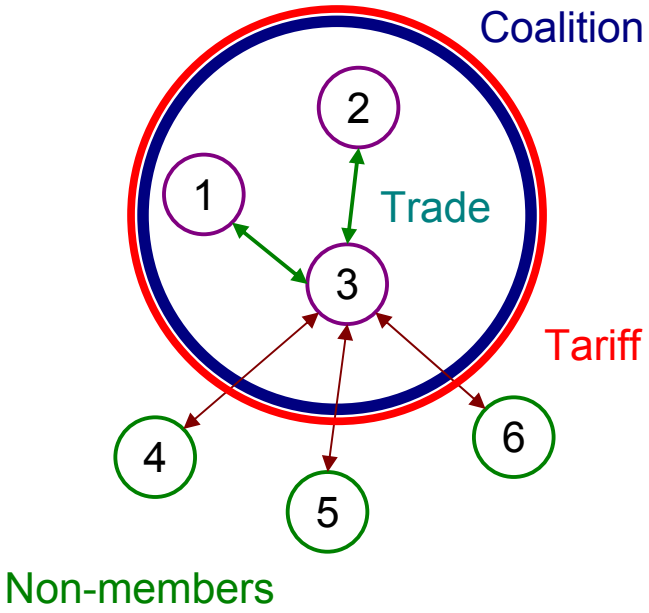
Trade restrictions

Participation



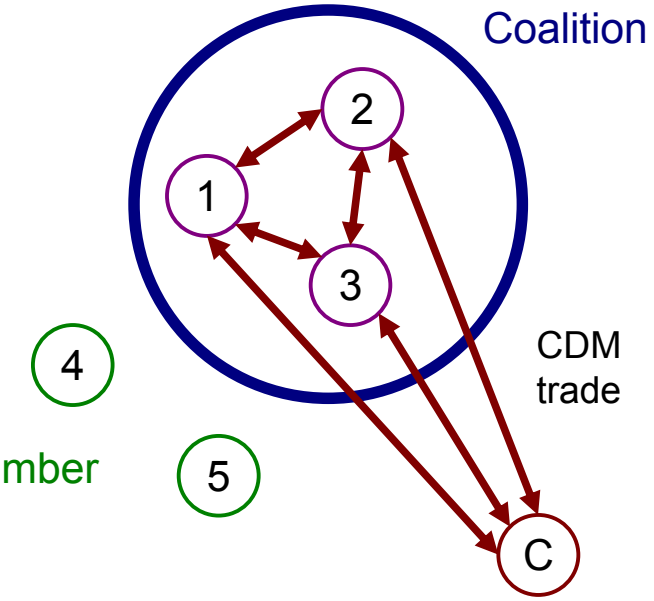
Gains for coalition members





Permit trade with non-members

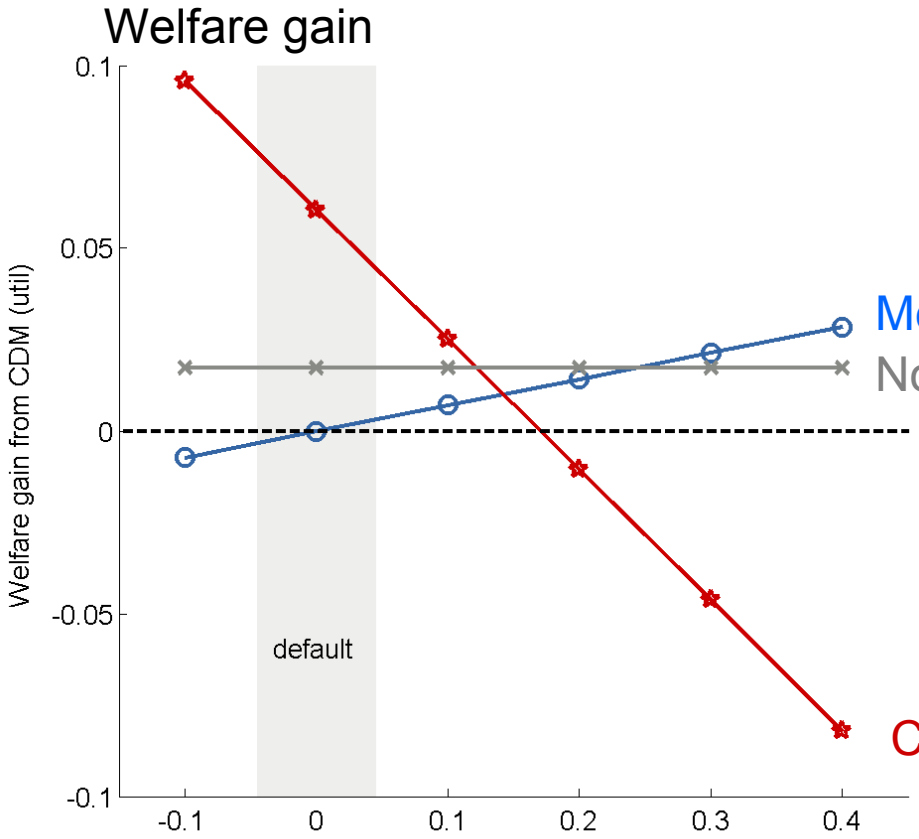
- Kyoto's flexible mechanisms
  - Permit trade (ETS)
  - Joint Implementation (JI)
  - Clean Development Mechanism (CDM)
    - Aim: "cost-effective emission reductions"
    - Facilitate complying with abatement targets for Annex 1 countries
    - (Clean) Development aid through technology transfers

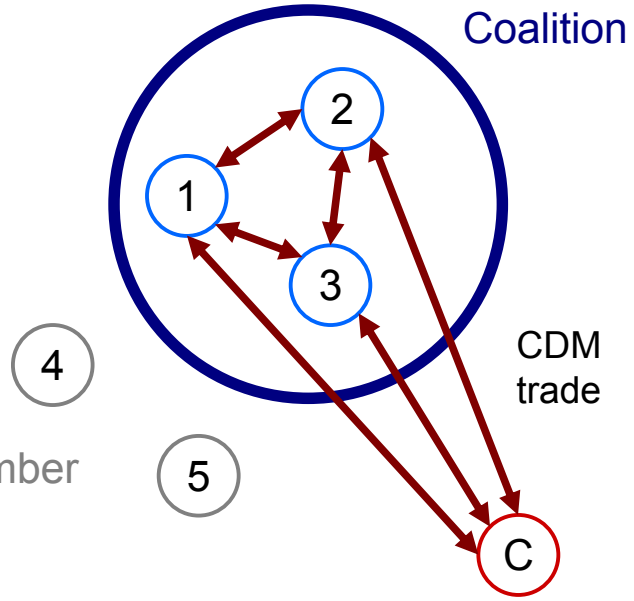


- Post-Kyoto
  - "Improved CDM"

- <u>Our aim:</u>
  - **Permit trade** with non-members to strengthen participation

Permit trade with non-members



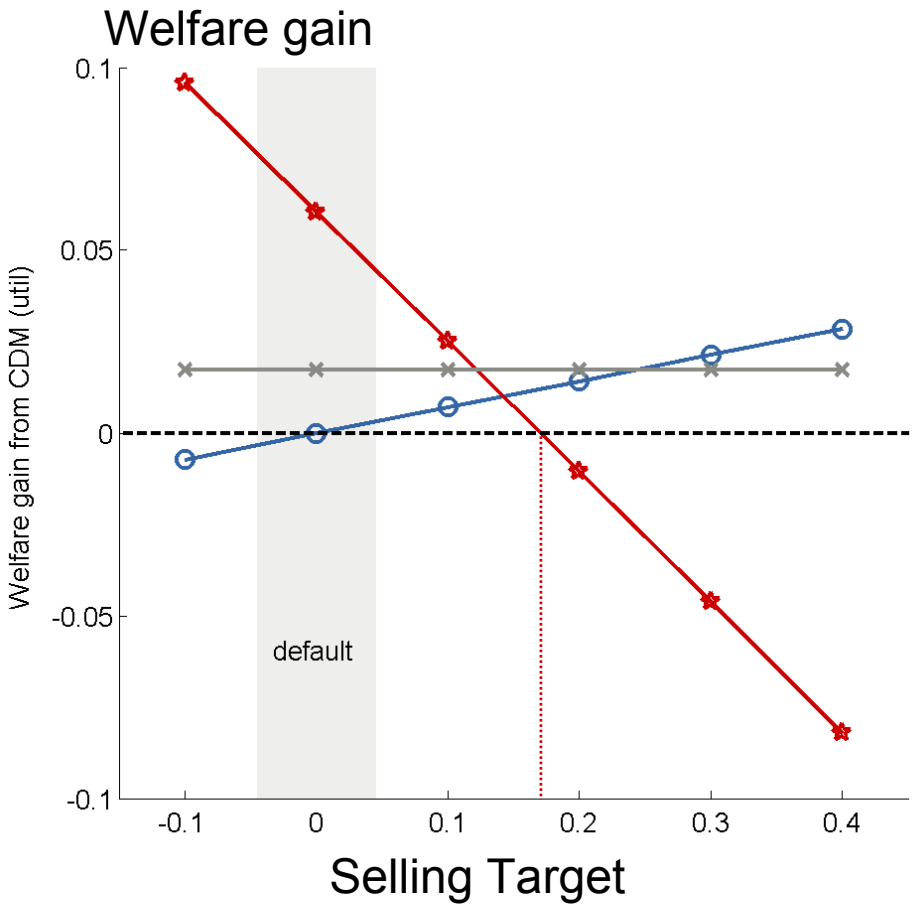


- Selling targets
  - determine the distribution of the gains from CDM trade

Exemplary results for a coalition of 5

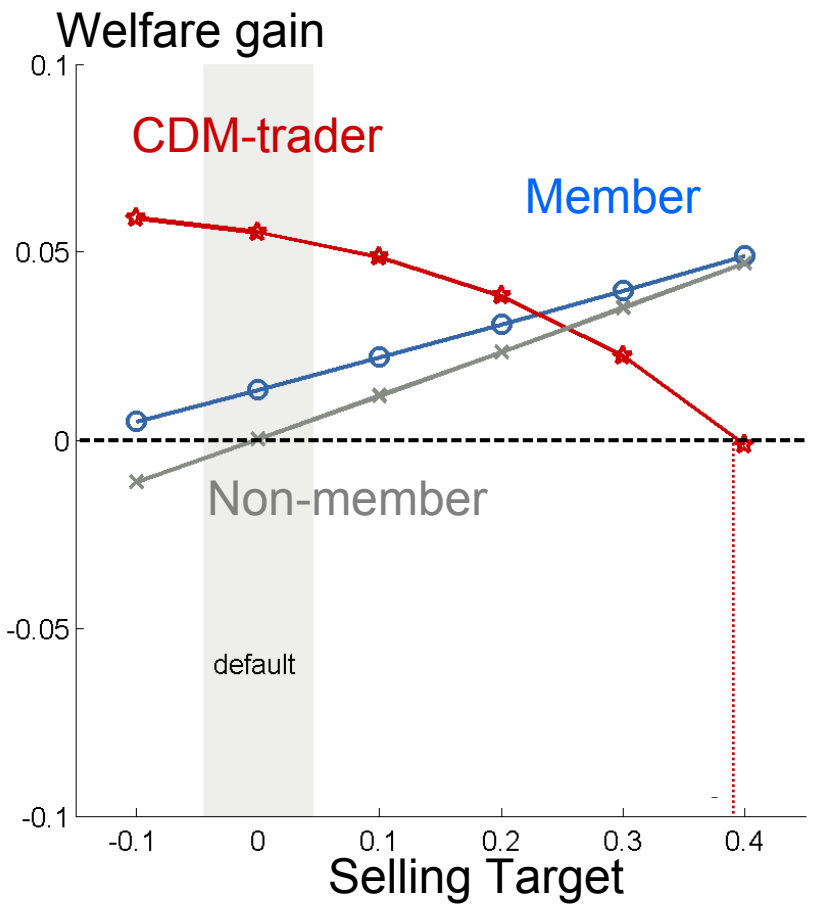
Permit trade with non-members

CDM *ex ante* – symmetric players



- Shifting gains improves member payoff
- ...but not enough to outweigh the increased free-riding incentive

CDM *ex post* – heterogeneous players



- CDM *ex post* prevents increased free-riding
- Heterogeneity increases scope for CDM credit sales

Scope for cooperation?

- Model:
  Improved cooperation via:
  - Research cooperation
  - Permit trade with non-members

  Reality:
  Open questions:
  How to induce spillovers?
  Strong effekt on participation?

- Modelling approach suggests potential to improve incentive structure

- But: „Cooperative Climate Policy“ remains difficult to achieve:
  - High stakes (rents, redistribution)
  - Strong free-riding incentive (similar to Prisoners‘ Dilemma)

Summary

- Emission trading, linking, offsetting ...

1. Emission permits create a “climate rent”
   - Size varies with assumptions on technologies, climate target, …
   - Distributional issues → high stakes in international negotiation

2. Free-riding incentives complicate negotiations
   - Linking climate negotiation with other issues (research, trade)
   - Design “flexible mechanisms” to be incentive compatible