



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH

Minimum Carbon Prices and Transfers in the EU ETS

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Transfers

- = Revenue redistribution
- = Initial allocation of allowances
- = Redistribution of auction revenues

Minimum Price

- = Price Floor

Pareto-improvements

- = Make one (country) better off
while the other (country) is not worse off.

EU ETS reform options based on policies of heterogeneous Member States. How to?

Agreeing on an EU ETS price floor to foster solidarity, subsidiarity and efficiency in the EU

(forthcoming)

O. Edenhofer, C. Roelfs, B. Gaitan, P. Nahmmacher, C. Flachsland

In: Ian W.H Parry, Karen Pittel, Herman Vollebergh (Eds.)
Energy Tax and Regulatory Policy in Europe. MIT press.

Reducing state-federal conflicts in public good provision policy: The role of fiscal transfer design.

C. Roelfs, B. Gaitan, O. Edenhofer

Conference paper PET, EAERE 2016

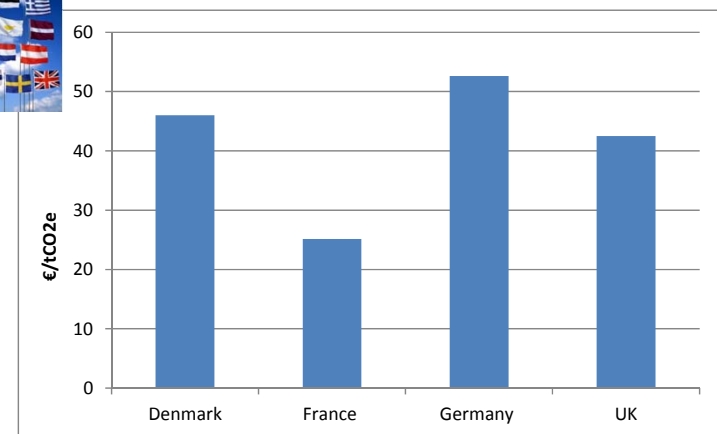
- **Design principle 1. Efficiency, transfers and solidarity**
- Design principle 2. Member States' preferences and subsidiarity
- **Implementation rule. Set a minimum price and provide appropriate transfers.**
 - **Incl. multilevel model**
- Emission-leakage cushioning effect of minimum price
- LIMES-EU application of EU ETS minimum price + German policy



The EU and EU ETS as a laboratory for Climate Policy Multilateralism

How to design a multinational climate policy which is agreeable to all participating countries?

- Implement a (minimum) uniform carbon price and provide appropriate transfers.
- Ensure that no country is worse off than by its decentralized policy.



Analysis of Edenhofer et al. based on two normative principles:

Solidarity

Transfers across Member States are implemented to **pursue a common goal**, like climate change mitigation.

Subsidiarity

Member States have different willingness-to-pay for mitigation, reflected by their policies. **EU policies** are only justifiable if they can **improve on the Member States' policies**.

Design principle 1: Efficiency, transfers and solidarity

Member States' income heterogeneity

Based on Chichilnisky and Heal, 1994

Optimality //

all States $i=1, \dots, N$. Thus:

$$p_{ETS} = MAC_i = - \frac{\sum_k \lambda_k \frac{\partial U_k}{\partial a}}{\lambda_i MUC_i}$$

If the **income-level in Member States i is lower** than in Member State j , then:

$$MUC_i > MUC_j$$

poor

rich

Requirement for allocative efficiency with ETS

- **Equalization of marg. social valuations of private consumption ($MUC_{i,j}$),**
- via optimal transfers from rich to poor countries – independent of equity or justice reasons – such that:
- E.g. by initial allocation of allowances or redistribution of auction revenues.

$$\frac{\lambda_i}{\lambda_j} = \frac{MUC_j}{MUC_i}$$

Design Principle 1

Efficiency, transfers and solidarity

To reach a common **European goal of emission reduction with an ETS**

- transfers from rich to poor Member States are crucial.
- These transfers need to significantly **alter the willingness-to-pay for mitigation in poorer Member States.**
- Otherwise, an **ETS is not efficient.**

If **significant (optimal) transfers cannot be implemented**, then

- **richer Member States shall pay higher carbon prices** than poorer Member States.

Design principle 1. Efficiency, transfers and solidarity

One possibility of optimal EU ETS transfers

If

1. all countries $i=1, \dots, n$ are weighted the same $\lambda_1 = \dots = \lambda_n$
2. with **equal utility** functions.

Then, allocative efficiency within an ETS requires

1. **MAC equalization**

$$MAC_1 = \dots = MAC_n$$

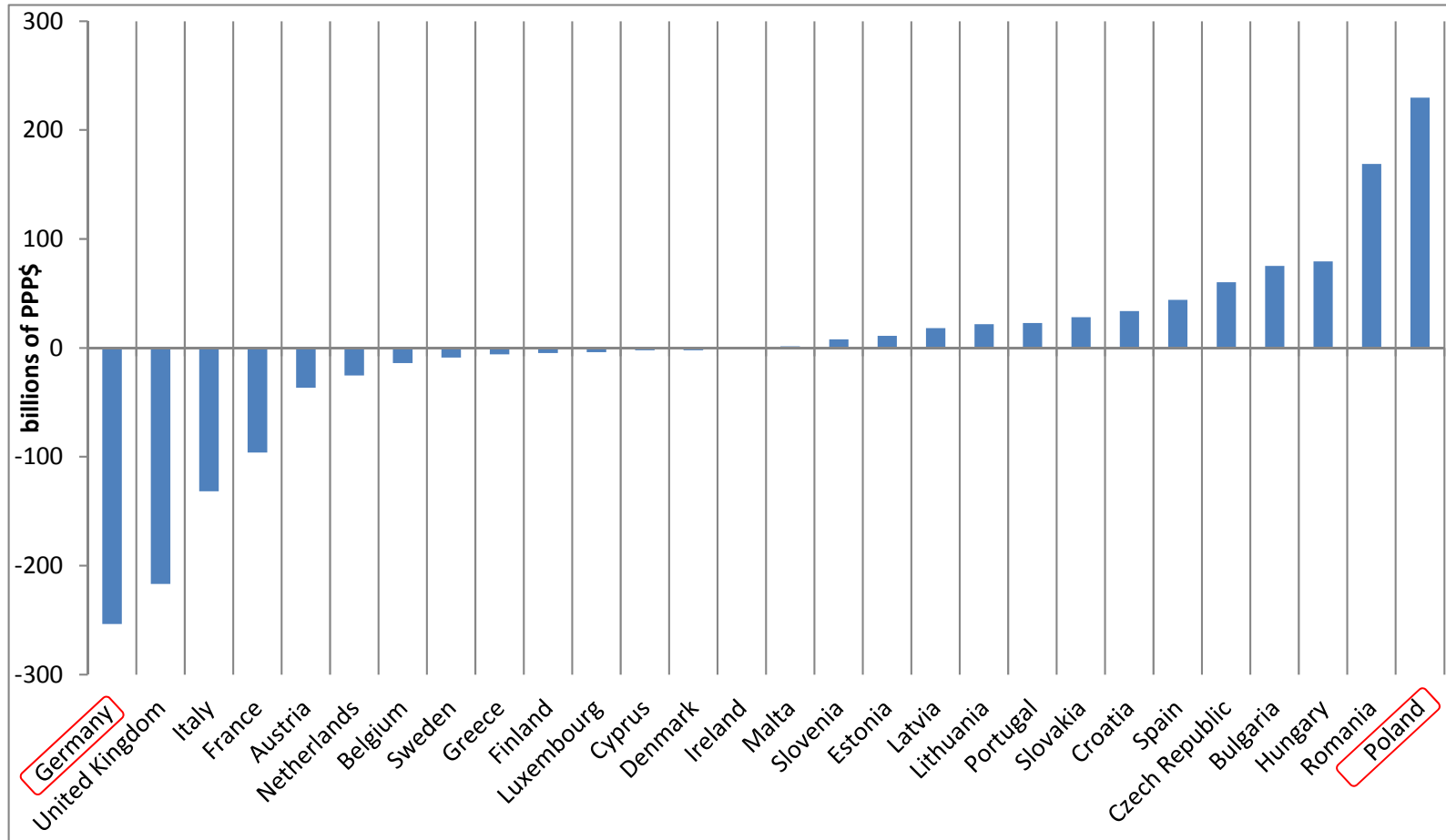
2. and **MUC equalization**

$$MUC_1 = \dots = MUC_n$$

... for which **transfers** are needed.

Design principle 1. Efficiency, transfers and solidarity

One possibility of optimal EU ETS transfers per country



... according to private consumption in the year 2010 in billions of \$ of purchasing power parity (PPP\$).

Design principle 1. Efficiency, transfers and solidarity

Optimal EU ETS transfers

- **Significant amounts of transfers necessary,**
 - likely to be **politically infeasible.**
- We propose the consideration of a **non-optimal world,**
- and to ensure that the **joint implementation** of climate policies creates **winners**, while also guaranteeing that there are **no losers.**

Reducing state-federal conflicts in global public good provision policy: The role of fiscal transfer design.

C. Roelfs, B. Gaitan, O. Edenhofer

Implementation rule. Minimum price and appropriate transfers
Institutional design in a non-optimal world

We start from the Member States' perspective.

Can the top-level (EU) achieve a Pareto-improvement* using

1. a **uniform** carbon price and
2. **simple** transfer** schemes?

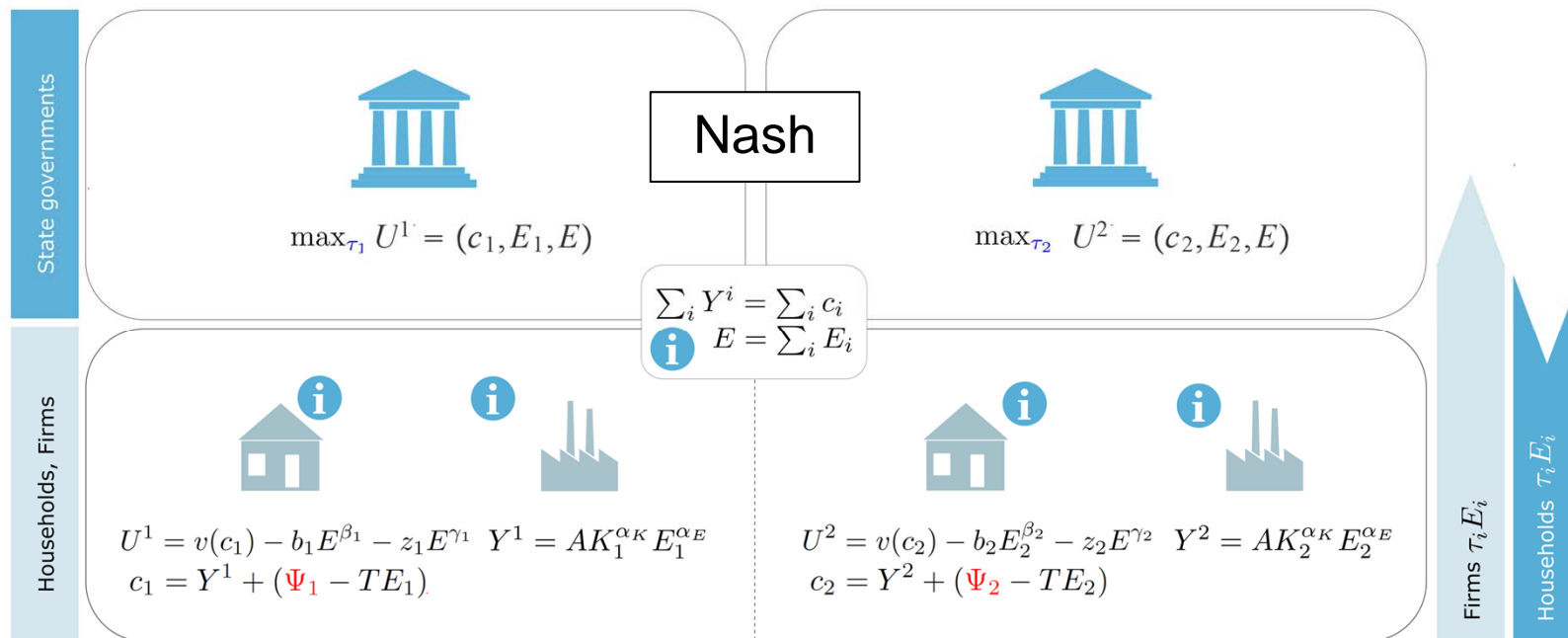
* make at least one state better off while the other state is not worse off.

** juste retour, equal per capita, historical emissions transfers

Implementation rule. Minimum price and appropriate transfers
Starting point provided by Member States' policies

Decentralized solution

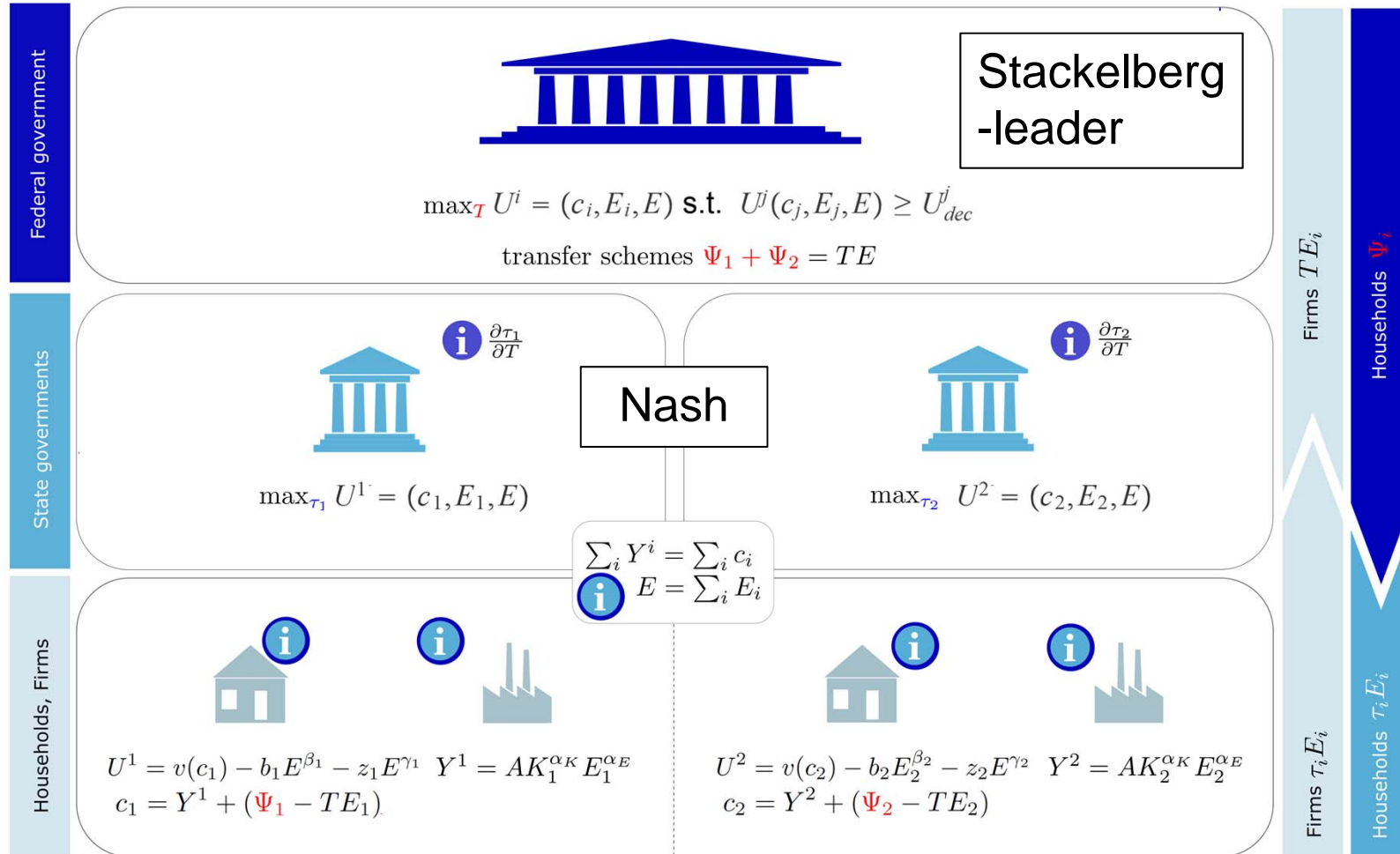
$T = 0$



Based on Rooffs, Gaitan, Edenhofer

Implementation rule. Minimum price and appropriate transfers

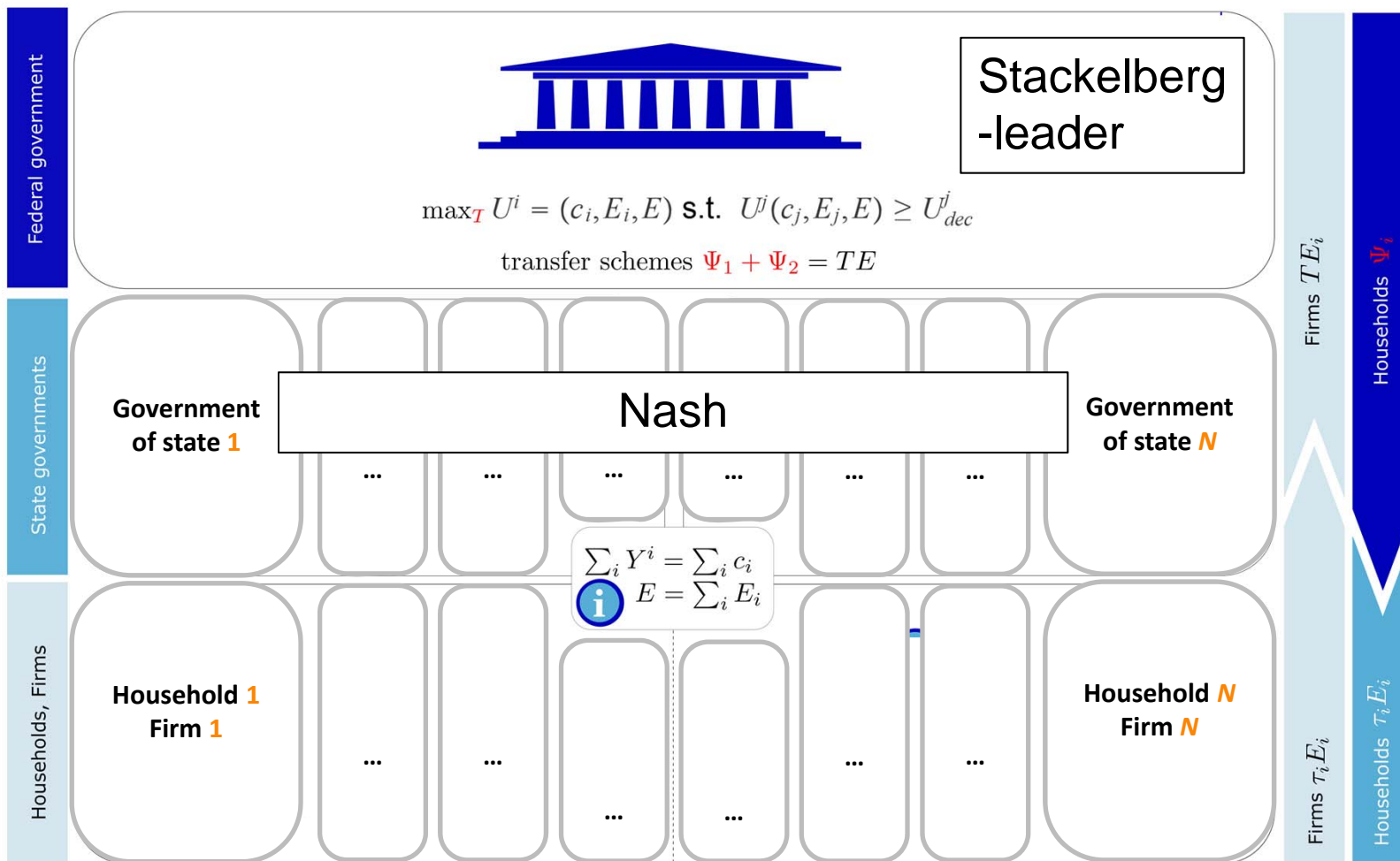
Role of EU-level: Improve on Member States' policies



Based on Rooffs, Gaitan, Edenhofer

Implementation rule. Minimum price and appropriate transfers

Role of EU-level: Improve on Member States' policies



Based on Rooffs, Gaitan, Edenhofer

Implementation rule. Minimum price and appropriate transfers

Equal per capita transfer, income heterogeneity

- **States** (income **highest** $i=3$, middle $i=2$, **lowest** $i=1$)
set national carbon prices (result in U^i_{dec})
- **EU-level (Stackelberg): Pareto-improvements**
($U^i \geq U^i_{dec}$ and $U^{j \neq i} \geq U^{j \neq i}_{dec}$)

When is an equal per capita transfer and a uniform EU price (T) incentive compatible?

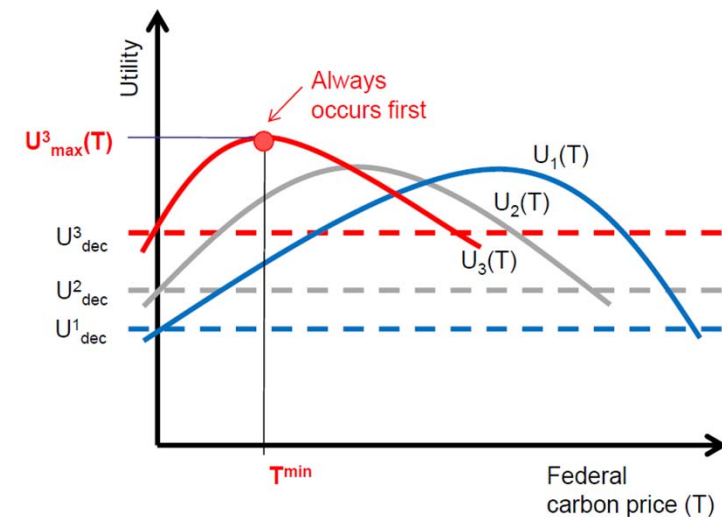
The richest state ($i=3$) has the highest mitigation cost due to largest transfers, but

- agrees on equal per capita transfers,
- as long as T^{min} maximizes its utility.

→ **Defines minimum price.**

The poorer states ($i=2,3$) **always benefit**, due to

- income increase by transfers,
- externality internalization.



Based on Rooffs, Gaitan, Edenhofer

Implementation rule

Set a minimum price and provide appropriate transfers

A minimum carbon price can help

- to address the challenges associated with the **heterogeneity of States**
- while accepting a **non-optimal world and multilevel policies.**

With an EU-wide minimum carbon price, **transfers must not necessarily be optimal to lead to welfare improvements for all states.**

Conclusion

EU and the design of multilevel climate policies

EU ETS

- Equalizes marginal abatement costs,
- Member States' heterogeneity and national ambitions for higher mitigation-levels are not per se efficiently considered.

Minimum price for the EU ETS – two advantages

- *Known argument: price stabilization effect*
- New argument: **can integrate more ambitious strategic Member States' policies** without undermining EU policy



Conclusion

Implications for an EU ETS reform

Key elements

- **The Member States' heterogeneity**
Consideration on **efficiency, solidarity and subsidiarity** grounds.
- **Companion policies: Appreciation and integration of multilevel climate policies**
 - Benefit from price (or hybrid) instruments on the EU level.
 - **Transfer design represents institutional tipping point.**

→ **Pareto-improvements are possible**

with a **minimum price, simple transfers** and strategic states.

- **If the EU's laboratory for climate policy multilateralism succeeds, it can facilitate positive signals to the global challenge.**