
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

# Minimum Carbon Prices and Transfers in the EU ETS

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Leibniz Gemeinschaft

| | |
|---|---|
| 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. Roolfs, 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. Roolfs, 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

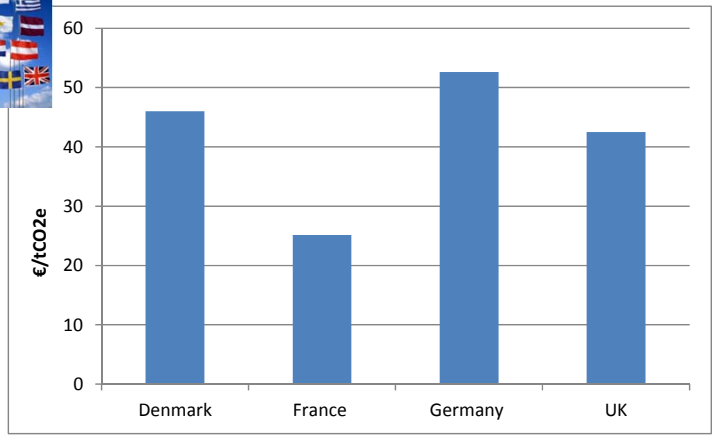
## The EU and EU ETS as a laboratory for

# 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.


Figures: Edenhofer et al. (forthcoming).

**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 // Emissions trading**

equalizes marg. abatement costs across all States $i=1,\ldots,N$. Thus:

$$p_{ETS} = MAC_i = -\frac{\sum_k \lambda_k \frac{\partial U_k}{\partial a}}{\lambda_i \; MUC_i} = -\frac{\sum_k \lambda_k \frac{\partial U_k}{\partial a}}{\lambda_{j \neq i} MUC_j}$$

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:

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

- E.g. by initial allocation of allowances or redistribution of auction revenues.

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

**Then, allocative efficiency within an ETS** requires

1. **MAC equalization**

$$MAC_1 = \ldots = MAC_n$$

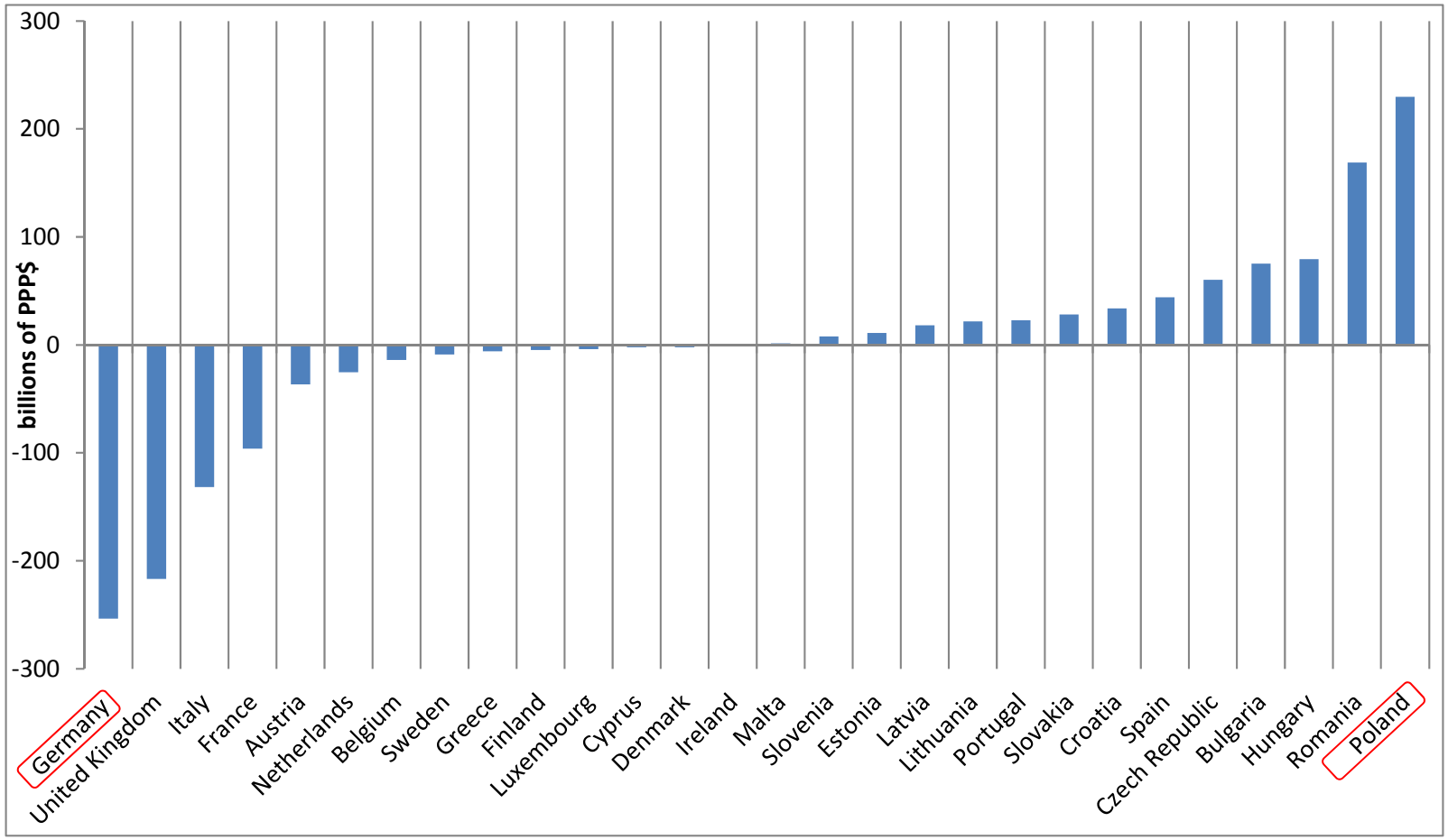
2. and **MUC equalization**

$$MUC_1 = \ldots = MUC_n$$

… 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$).

Figures: Edenhofer et al. (forthcoming).

## 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.**

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## 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

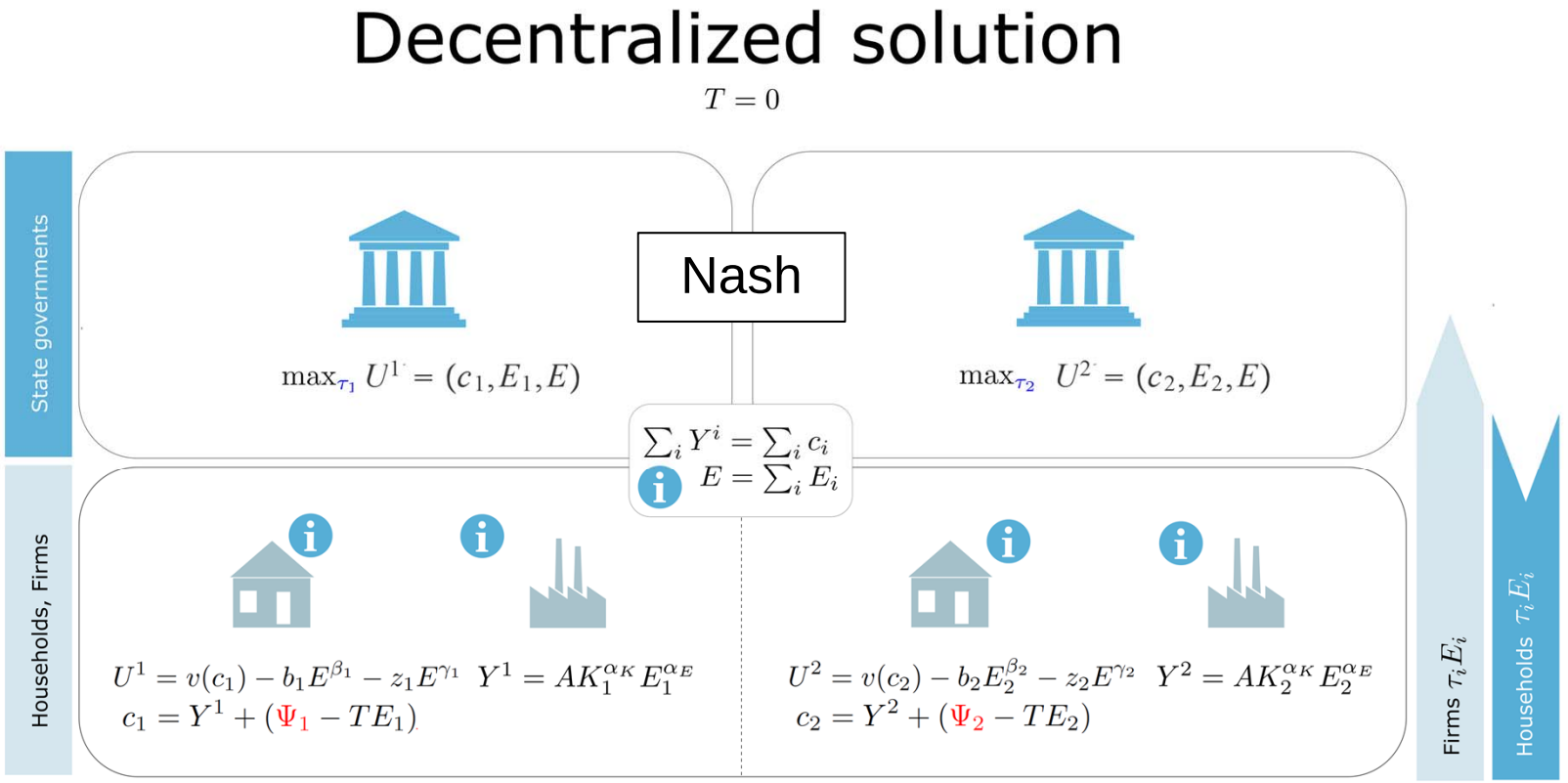
1. a **uniform** carbon price and
2. **simple**** transfer schemes?

* 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

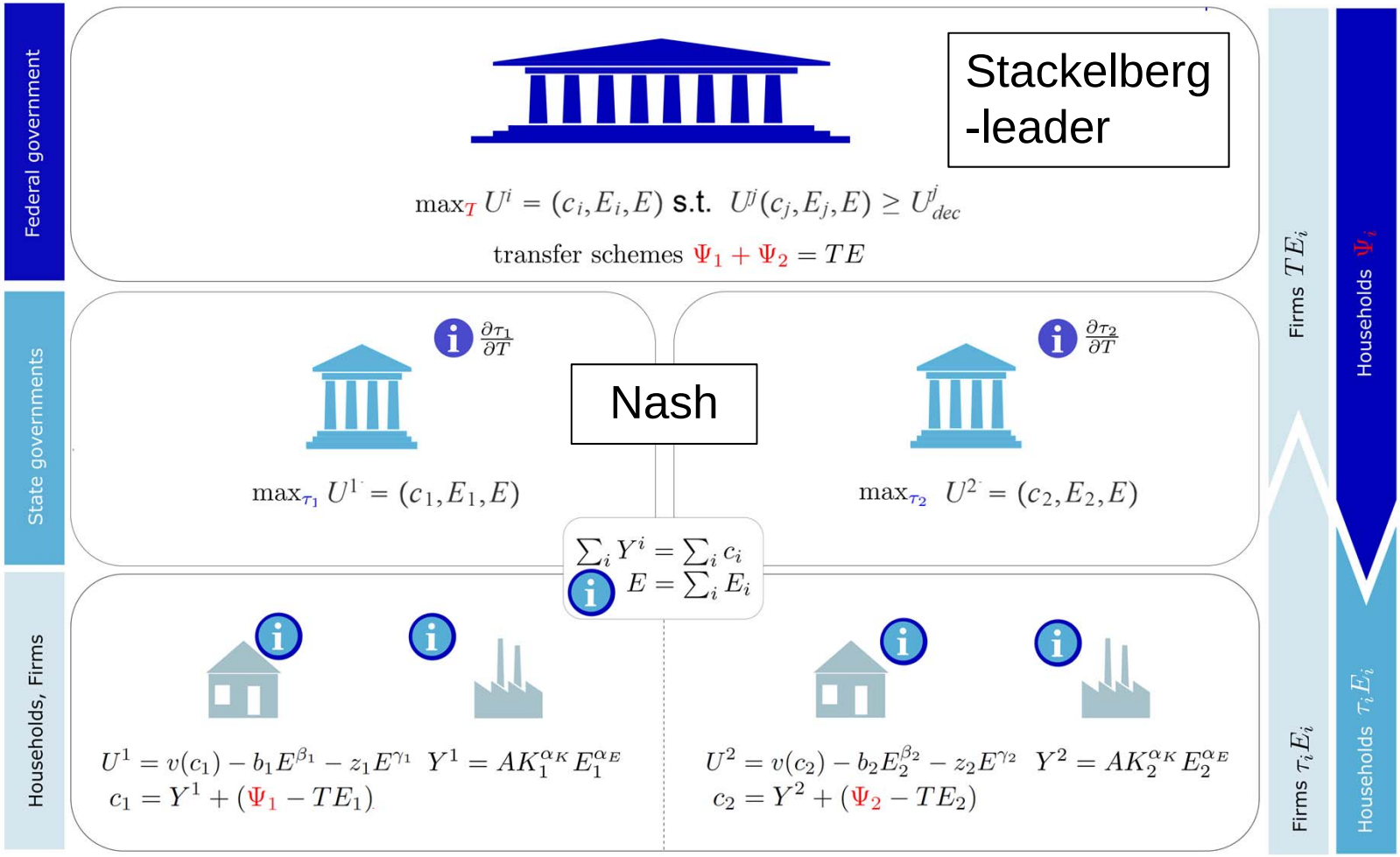
# Starting point provided by Member States‘ policies




*Based on Roolfs, Gaitan, Edenhofer*

## Implementation rule. Minimum price and appropriate transfers

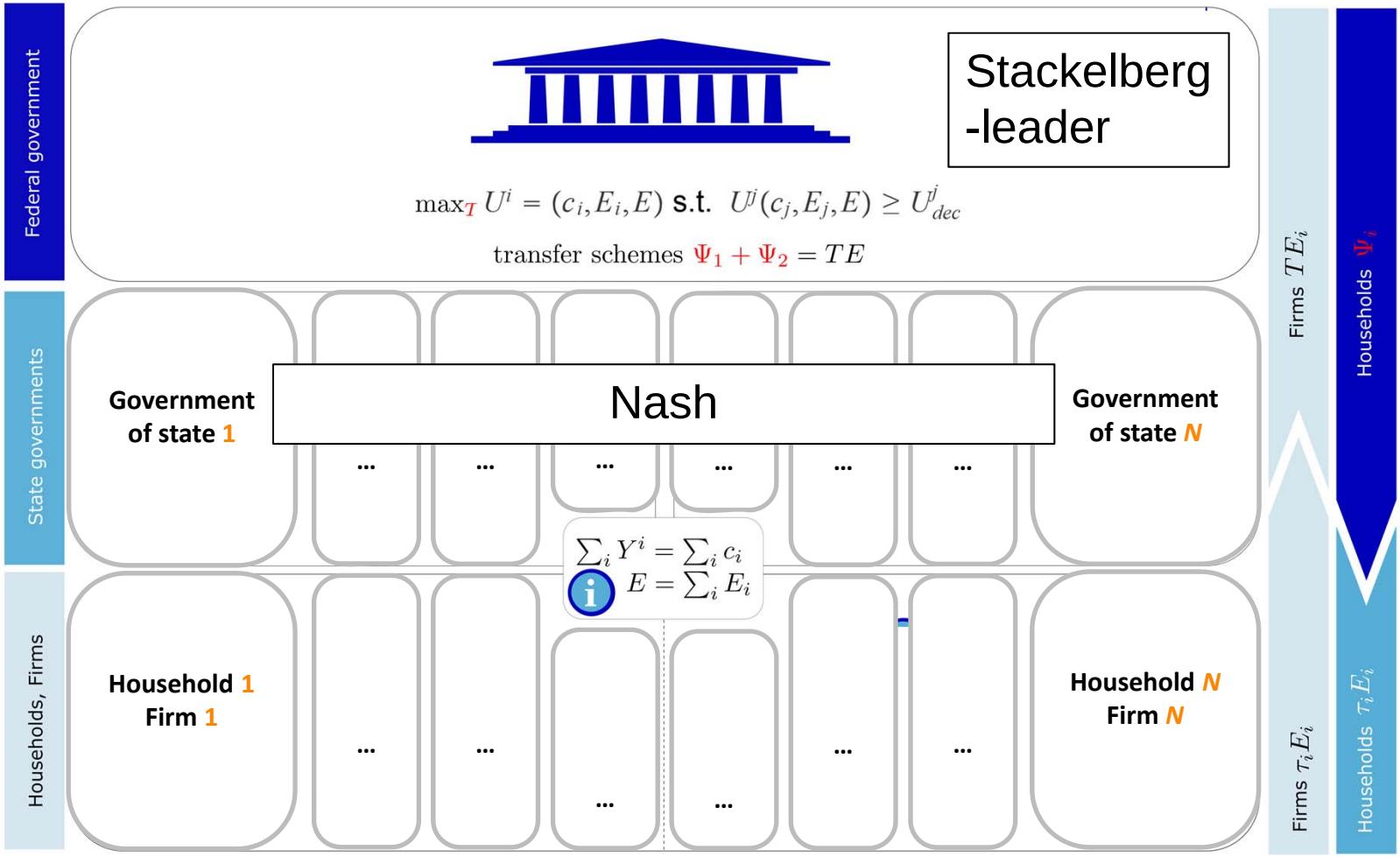
# Role of EU-level: Improve on Member States' policies




*Based on Roolfs, Gaitan, Edenhofer*

## Implementation rule. Minimum price and appropriate transfers

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




*Based on Roolfs, 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?**

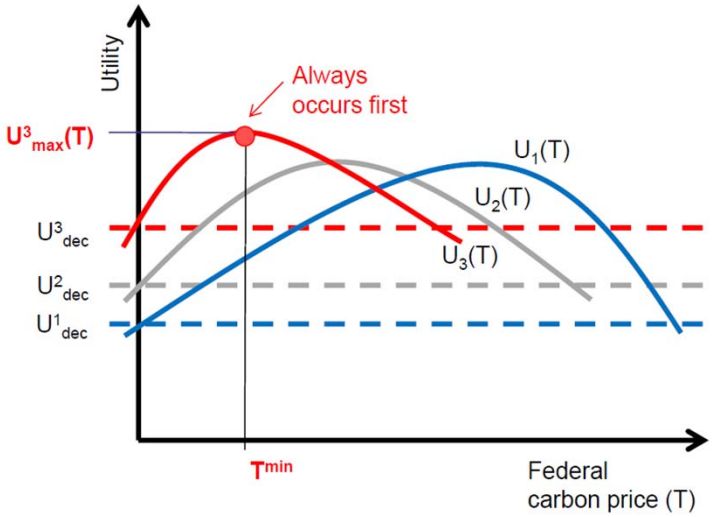
**The richest state** *($i$=3)* has the highest mitigation cost due to largest transfers, but

- 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 Roolfs, 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.**