



Centre for Energy and  
Environmental Markets

UNSW  
THE UNIVERSITY OF NEW SOUTH WALES  
SYDNEY • AUSTRALIA



# Emissions trading to combat climate change:

The impact of scheme design on transaction costs

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# Motivation

Assess the validity of the statement:

"Generally emissions trading (Cap and trade) will have lower transaction costs than project-based mechanisms such as the Clean Development Mechanism (CDM)"

## Content of presentation

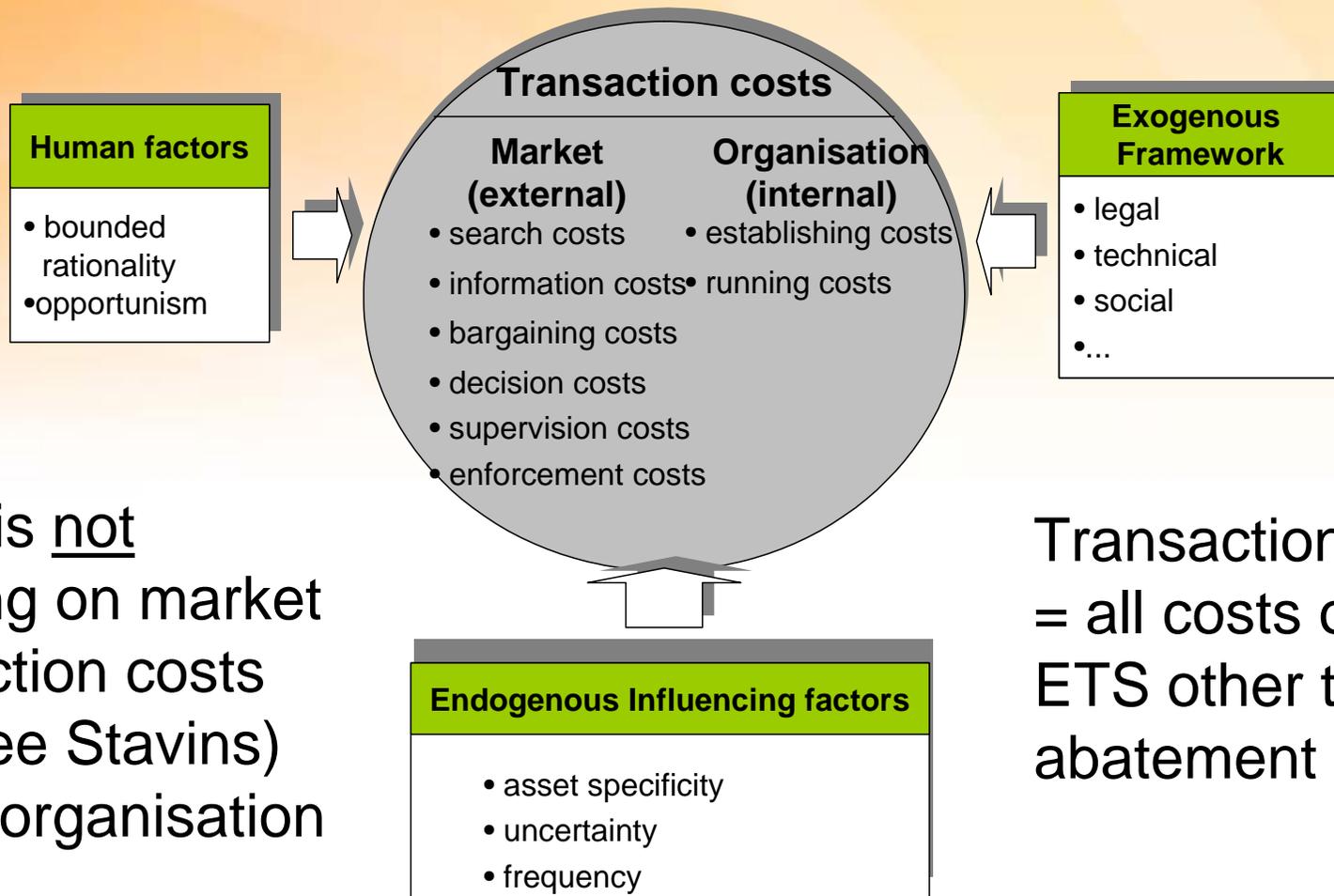
- Transaction costs in baseline & credit schemes
  - Theory & Empirical estimates (Clean Development Mechanism)
- Transaction costs in cap & trade schemes
  - Theory & Empirical estimates (EU Emissions trading scheme)
- Comparison of Transaction costs
- Conclusions



## Design choices: Cap & trade vs. Baseline & credit

| Baseline and credit                                                                                              | Cap and trade                                                                 |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Only emissions reductions compared to baseline or target are tradable                                            | Allocated allowances are tradable                                             |
| <i>Ex-post</i><br>Credits are generated after validation, verification and certification                         | <i>Ex-ante</i><br>Allowances are allocated to regulated installations         |
| Wide participation in credit generation                                                                          | Tradable surplus of allowances can only be created by regulated installations |
| <b>Examples:</b><br>Clean Development Mechanism<br>NSW Greenhouse Gas Abatement Scheme<br>Canadian Offset Scheme | <b>Examples:</b><br>EU Emissions trading<br>Article 17 of Kyoto Protocol      |

# Factors influencing transaction costs



Paper is not focusing on market transaction costs (e.g. see Stavins) but on organisation costs

Transaction costs = all costs of an ETS other than abatement cost



# Examples of Transaction Costs

| <b>Transaction costs</b>                 | <b>Baseline and Credit (CDM)</b>                                                             | <b>Cap and trade (EU ETS)</b>                                                          |
|------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Administration costs (government)</b> |                                                                                              |                                                                                        |
| <b>One-time</b>                          | Set-up costs (program and authority): development of legal framework, baseline methodologies | Set-up costs (program and authority) for e.g. development of legal framework, registry |
| <b>Ongoing</b>                           | Administration body to register projects e.g. Executive Board                                | Administration body to operate registry                                                |
| <b>Company related costs</b>             |                                                                                              |                                                                                        |
| <b>One-time</b>                          | Project preparation and approval                                                             | Establishment of internal organisation: Monitoring, reporting process                  |
| <b>Ongoing</b>                           | Project emissions monitoring, verification                                                   | Monitoring, reporting of emissions and verification                                    |



# Estimates of Transaction Costs: Baseline and Credit

| Transaction costs: Estimates in Million A\$ |                |                                                                                                    |
|---------------------------------------------|----------------|----------------------------------------------------------------------------------------------------|
| <b>Administration costs (government)</b>    |                |                                                                                                    |
| <b>One-time</b>                             | 2.032 to 5.92  | national scheme based on Canadian study                                                            |
| <b>Ongoing</b>                              | 1.065 to 1.952 | national scheme based on Canadian study                                                            |
| <b>Project related costs (per project)</b>  |                |                                                                                                    |
| <b>One-time</b>                             | 0.215 to 0.878 | CDM projects; initial <b>preparation and decision</b> costs including <b>documentation</b> highest |
| <b>Ongoing</b>                              | From 0.029     | CDM projects, little experience so far                                                             |

Registration costs of CDM projects are included under project-related costs, which finance Executive Board costs (Administration costs)



## Baseline & credit:

- Negative correlation between project size and transaction costs -> economies of scale and a high proportion of fixed costs
- No correlation so far between project type and transaction costs
- High up-front costs to standardise baseline protocols and develop guidance documents (shift between one-time up-front and ongoing costs)
- Approval and negotiation costs depend on countries institutional framework (better in Latin America than Asia)
- Transaction costs development over time:
  - Declining: CDM pilot phase experience (AIJ)
  - Increasing: Baseline and credit schemes like CDM will have higher transaction costs with increasing abatement - because projects will get smaller and more complex - compared to cap and trade schemes.



# Estimates for Transaction Costs: Cap and trade - Germany

## Transaction costs: Estimates in million A\$

### Administration costs (financed by private sector allocation fee)

|                 |                                                                                        |
|-----------------|----------------------------------------------------------------------------------------|
| <b>One-time</b> | 12.022 (based on German Emissions Trading Authority information; labour costs highest) |
|-----------------|----------------------------------------------------------------------------------------|

|                |                                                                                        |
|----------------|----------------------------------------------------------------------------------------|
| <b>Ongoing</b> | 11.388 (based on German Emissions Trading Authority information; labour costs highest) |
|----------------|----------------------------------------------------------------------------------------|

### Company related costs per installation/site

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| <b>One-time</b> | 0.08 to 0.097 (establishing a system for monitoring, reporting emissions highest costs) |
|-----------------|-----------------------------------------------------------------------------------------|

|                |                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Ongoing</b> | 0.056 (highest costs for monitoring, reporting and verification of emissions, trading costs have not been assessed) |
|----------------|---------------------------------------------------------------------------------------------------------------------|



# Comparing transaction costs

- What is the right measure to compare?
  - Per regulated company or CDM-project?
  - Per tCO<sub>2</sub>e covered by the scheme?
  - Per tCO<sub>2</sub>e of reduction compared to historic emissions?
  - Per tCO<sub>2</sub>e of reduction compared to baseline projections?
  
- Which costs are taken into account?
  - Only administration costs – one-time or ongoing?
  - Only company costs – one-time or ongoing?
  - Administration and company costs – one-time or ongoing?
  
- Dynamic aspects?
  - How will transaction costs develop over time?
  - What kind of measures to reduce transaction costs will be introduced?

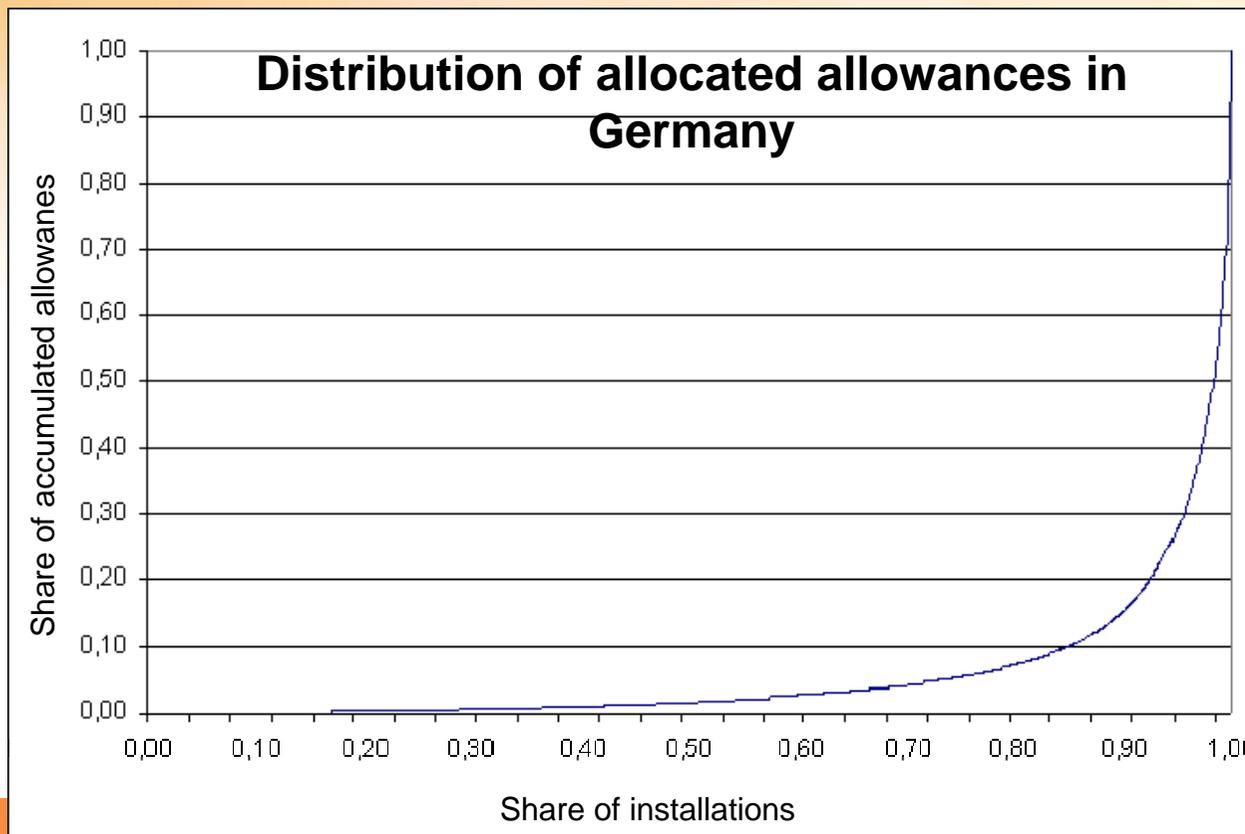


# Comparing Transaction Costs

- **Baseline and credit: CDM**
  - Average costs for large projects: 0.48-1.13 A\$/t CO<sub>2</sub>e reduced
  - Average costs for small projects: 0.65-1.77 A\$/t CO<sub>2</sub>e reduced
- **Cap and trade: EU ETS - Germany**
  - Administration costs:
    - 6,159 A\$/installation,
    - 0.023 A\$/covered tCO<sub>2</sub>,
    - 0.6 A\$/t CO<sub>2</sub> reduced compared to historic base year emissions
  - Company on-going transaction costs:
    - **5.2 t CO<sub>2</sub> reduced** compared to historic base year emissions
    - ?? t CO<sub>2</sub> reduced compared to baseline emissions -> no info in Germany
  - Total Transaction costs (admin. + company) per tonne reduced compared to historic emissions: 5.8 A\$
  - **Break-even: we need 12% reduction or costs to be more than halved!**

# Proportion of covered installations

- Germany: (1) 85% of allowances are allocated to top 10% of installations (2) 50% of small installations receive only 1.6% of total allocation
- In other EU countries similar experiences (EU without Germany): (1) 33 % of installations are responsible for 0.7 % emissions (2) 55 % of installations for 2.6 %



- High transaction costs for industry and government!
- Little additional reductions from small companies expected, since low compliance costs (buying is cheaper than mitigating)



# Measures to reduce Transaction Costs

- **Baseline & credit:**
  - bundling / pooling of projects,
  - standardisation of documentation and baseline requirements,
  - frequency of monitoring and verification,
  - length of crediting period,
  - capacity building to strengthen institutional framework.
- **Cap & trade:**
  - introduce a "de minimis rule" and include small companies through opt-in rule (cap & trade) or through "domestic projects" (baseline & credit) -> incentive by e.g. tax exemptions
  - Simplification of allocation rules (e.g. auctioning) to reduce legal and strategic costs upfront,
  - standardisation and simplification of monitoring requirements



# Conclusions and outlook

- Cap & trade schemes will not always have lower transaction costs per ton of CO<sub>2</sub>e reduced than baseline & credit schemes
- Transaction costs per reduced tonne depend on stringency of target
- Long run cap & trade to be favored since less costs if stringent targets are to be reached
- Comparing transaction costs with efficiency gains from trading -> Transaction costs will only form a fractional share of potential trading gains according to models
- Transaction Costs are only one criteria to assess different schemes: Baseline and credit schemes have other disadvantages e.g. no cap, difficulties in baseline setting/additionality, leakage, and perverse incentives from subsidising reductions may increase emissions
- Ongoing research:
  - Survey on transaction costs together with EuPDRResearch
  - Where to set the "efficient threshold" for cap and trade schemes



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