Competitiveness & Carbon Leakage

Focus on heavy industry

Julia Reinaud
International Energy Agency

April 11, 2008
Ad hoc meeting of the ECCP working group on emissions trading
What is carbon leakage?

a Sector’s perspective

Increase in emissions outside EU (as a result of the EU ETS)

= ________________________________

Decrease in emissions in EU (as a result of the EU ETS)

- Decrease in unitary emissions
  - Intended!
- Decrease in demand (lower production volumes)
  - Demand Elasticity
  - Intended!
- Loss of international market share (trade flows)
  - Leakage!
  - • Transport costs
  - • Capacity utilisation
  - • Barriers to trade
  - • Product differentiation
  - ….
Carbon Leakage: literature review

Ex-ante
- CO\textsubscript{2} tax: steel / aluminium / cement
- ETS: cement / steel / aluminium

Ex-post
- EU ETS: aluminium / cement / refinery

Pass-through (i.e. price increase) is a core element
- Ability or not to influence profits
  - Level of free allocation to maintain profit rates
- Impact on price competition and trade flows
  - Carbon leakage

? Is opportunity cost pricing customary in industry??
### Impact on leakage: Ex-ante literature

<table>
<thead>
<tr>
<th>Pass-through</th>
<th>Assumptions</th>
<th>Leakage rates</th>
</tr>
</thead>
</table>
| **Steel**    | Gielen and Moriguchi (2002) | 100% | CO₂ tax Japan and EU-15
- Border adjustment scenario | 35% @ 10USD/tCO₂
70% @ 42USD/tCO₂ |

| **Steel**    | OECD (2003) Maestad | Approx. 60% (endogenous) | CO₂ tax OECD or EU-13
- Several tax scenarios
- Armington elasticity | OECD-wide:
45% @25USD/tCO₂
EU-13:
60% @40USD/tCO₂ |

| **Cement**   | Demailly and Quirion (2006) * | 75% (endogenous) | EU 27
- Different allocation modes | 50% @ 20EUR/tCO₂ * |

| **Steel, cement, aluminium** | Demailly and Quirion (forthcoming) | 100% | EU-27
- Different allocation modes: incl. border adjustment
- Armington elasticity | Grandfathering/ Auctioning @17EUR/tCO₂
I&S: 30% (75% due to loss in market share)
Cement: 20% (17% due to loss in market share)
Aluminium: 30% (40% due to loss in market share) |

* Authors admit that models used are not well suited to estimate carbon leakage rates
Ex-post impact assessment

- A common methodology is emerging:
  - Primary aluminium (IEA) Reinaud (2008)
    - No structural change in trade flows since EU ETS (even starting ‘04)
    - Saturated EU production levels / No projected capacity additions
    - High profits / long term electricity contracts still running
    - No structural change in trade flows
    - Surplus of allowances
    - If impacts, high margins – difficult to "see"
  - Cement (UCD and CIRED)
    - Walker (2006) during the first year of the ETS: pass-through rates varying between 10-40% depending on countries and econometric assumptions
    - Limits to this analysis: annual prices / observation of price movements over only 1 year!
- Overall conclusion:
  - What does today really tell us about tomorrow?
  - What is the counterfactual scenario?

© OECD/IEA - 2007
Carbon leakage: Monitoring the effectiveness of the scheme?

- Higher leakage rates are expected in the steel and primary aluminium sectors
  - But even with free allocation, there may be leakage!

- How significant could this problem be?
  - Elements to monitor pass-through should not be considered in isolation
    - E.g. international competition (incl. trade restrictions), capacity availability, market structure, cost evolution, demand elasticity...

- A methodology is emerging that tracks carbon leakage:
  - Pass-through / Profitability / Trade flows / Relocation
  - Pass-through is only ONE indicator to assess potential carbon leakage!

  ➔ Do not speculate: simulate & monitor effects ➔ check theory against observations

- EU sectors are not operating in a vacuum
  - Carbon policy is only one part of the broader industry picture
    - A high price environment blurs the effect of carbon policy cost
Thank you!

- Demailly Quirion, 2006. CO₂ abatement, competitiveness and leakage in the EU cement industry under the EU ETS: Grandfathering versus output-based allocation, Climate Policy 6, 93-113
- Reinaud, forthcoming. Competitiveness and Carbon Leakage: Ex-post evaluation of the EU ETS, IEA/OECD Information paper

© OECD/IEA - 2007
Theory: competitiveness impacts & EU ETS

- Direct CO₂ cost
- Indirect CO₂ cost
- Pass-through of ETS costs

Impact on demand
Impact on profitability
Impact on trade flows (market shares)
Location of next vintage of investments

International competition
Regulatory framework (electricity)
Market structure / Market power
Price-level formation
Relative costs, demand elasticity,

- Standards
- Quality
- Available capacity
- Barriers
- Transport costs