Grandfathering versus OBA: implications for the EU cement sector

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Objectives

- **Context:**
  - Emissions from cement and clinker production
  - Cement and clinker trade patterns
  - EUA cost pass-through in pilot phase ETS

- Hypotheses about competition drivers

- Implications for OBA at national/EU level
  - Benchmarked on clinker production
  - Benchmarked on cement production
1. Fuel and Process Emissions
Mass balance – blended cement

Raw materials: 1.1 Tonnes

Clinker: 0.8 Tonnes

CEM II Grade Cement: 1.0 Tonnes

Fuel-derived CO₂: 0.28 Tonnes*
plus Process-derived CO₂: 0.43 Tonnes

Additions: 0.2 Tonnes

*resulting from the combustion of 0.12 Tonnes of bituminous coal
2. Trade Patterns
Cement Production Trends
Cement Import Trends
EU15 cement imports...
... versus EU15 clinker imports
So, non-EU cement imports...
... don’t tell the whole story

Portland Cement and Clinker Imports to EU15 from Outside EU25

Million Tonnes

Turkey dominates cement trade

Gray Portland Cement Exports from non-EU into EU15

Turkey dominates cement trade with significant exports to Croatia, Tunisia, Egypt, Romania, Thailand, Morocco, China, Bulgaria, Venezuela, Saudi Arabia, Japan, India, and Israel.
... but not non-EU clinker trade

Clinker Exports from non-EU into EU15

Million Tonnes


China
Egypt
Thailand
Turkey
Venezuela
Israel
Croatia
Bulgaria
India
Morocco
Tunisia
Saudi Arabia
Romania
Japan
Italy is main importer of cement
Spain is main importer of clinker
Non-EU clinker is not dominant in all EU import markets.

Clinker Imports to Ireland

- Accession
- Non-EU
- EU15
Implications of trade patterns

- Cement and clinker are supplied from different sources, into different country markets.

- The importation of non-EU cement may have a quite different competitive impact from that of non-EU clinker.
  - Difficult to be sure, since cost pass-through in clinker is difficult to observe directly.
  - Nevertheless, this distinction raises important questions about the causes (and the financial consequences) of carbon leakage.
Tentative hypotheses

- Imports of cement should restrict cement cost pass-through in Italy
  - Genuine (albeit declining) non-EU competition?

- Imports of clinker might not restrict cost pass-through in Spain to the same degree
  - Clinker outsourcing may be deliberate?

- Investment in merchant clinker plant in N Africa could be quite risky over the longer term
  - Fear of a further wave of Chinese competition?
Rationale for OBA

- Marginal cost of (clinker) production includes opportunity cost of EUA
  - Opportunity cost with ‘pure’ grandfathering is the same as cash cost with 100% auctioning

- Under OBA, installations ‘earn’ EUAs by producing
  - Theory predicts that this reduces the opportunity cost, hence reduces the market price increase, and thereby mitigates the international competitiveness effect

- Compared with pure grandfathering, OBA provides incentives for capacity investment and a subsidy on output volume.
  - But perhaps the appropriate counterfactual is not strictly pure grandfathering
3. Cost Pass-through in EU ETS
Models based on Cournot theory

- Linear demand curve $\Delta P / \Delta C = N/(N+1)$
  - Oxera (2004) predicted 83% pass through rate in UK cement market based on 5 firms, all affected by EUA cost

- Convex demand curve $\Delta P / \Delta C > N/(N+1)$
  - Special case: iso-elastic demand $\Delta P / \Delta C > 100\%$ (would imply an even greater competitive exposure?)

- Subsequent analysis (Smale et al, 2006) included the conjecture of significantly lower pass-through rate to deter market entry
  - Entry deterrence behaviour implies a different view of the true opportunity cost of emitting CO$_2$
Empirical results

- Evidence of annual contract price negotiation between cement producers and customers
  - Prices for 2005 set using cost data at end of 2004
  - Prices for 2006 set using cost data at end of 2005
  - Hence the market price effect of high EUA prices in Q2-Q4 2005 would be seen in calendar 2006
  - Eurostat data for 2006 will not be available until late 2007, but some industry data on Q1 2006 prices has been obtained

- Results are consistent with low apparent pass through rates of EUA opportunity cost (Walker, 2006)
  - Perceived opportunity cost of emissions may be lower than the EUA price (Entry deterrence? Expected baseline updating?)
  - Or perhaps firms simply fail to appreciate the economic logic of marginal costing? (More common than you might think!)
## Q1 2006 versus Q4 2004

*Walker et al (2007)*

<table>
<thead>
<tr>
<th>Country Market</th>
<th>Market Price Dec 2004 €/Tonne</th>
<th>Price Increase to Jan 2006 €/Tonne</th>
<th>Allowance Cost Increase* €/Tonne</th>
<th>Allowance Cost Pass-Through Rate (1)</th>
<th>Allowance Cost Pass Through Rate (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>€59.10</td>
<td>€7.90</td>
<td>€16.00</td>
<td>37%</td>
<td>24%</td>
</tr>
<tr>
<td>Italy</td>
<td>€63.00</td>
<td>€4.10</td>
<td>€16.00</td>
<td>10%</td>
<td>1%</td>
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<tr>
<td>Portugal</td>
<td>€71.40</td>
<td>€0.00</td>
<td>€16.00</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Greece</td>
<td>€68.20</td>
<td>€3.80</td>
<td>€16.00</td>
<td>11%</td>
<td>0%</td>
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<tr>
<td>UK</td>
<td>€63.20</td>
<td>€9.30</td>
<td>€16.00</td>
<td>46%</td>
<td>33%</td>
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<tr>
<td>Germany</td>
<td>€45.00</td>
<td>€12.20</td>
<td>€16.00</td>
<td>64%</td>
<td>51%</td>
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<tr>
<td>France</td>
<td>€82.00</td>
<td>€5.90</td>
<td>€16.00</td>
<td>33%</td>
<td>12%</td>
</tr>
</tbody>
</table>

* Compared with December 2004 shadow price

(1) = upper estimate, assumed 50% fuel cost pass through into prices

(2) = lower estimate, assuming 100% fuel cost pass-through into prices
4. Implications for OBA design
OBA based on clinker tonnage

- If applied EU-wide, would encourage energy efficiency and use of substitute fuels, but would **not** encourage the transition from CEM-I to CEM-II and CEM-III
- If sufficiently generous, this option could slow down (or even reverse) the recent trend in clinker outsourcing
  - But would this result in any net financial benefit to the cement industry in EU15? (Value-Added Chain analysis is needed.)
  - Impact on environment depends on whether current clinker outsourcing is from kilns utilising BAT
- Arguably, a similar effect to grandfathering that includes frequent updating, NER and the forfeiture of future allowances following installation closure
- Effects would be more complicated if OBA was implemented in some EU countries, but not EU wide
OBA based on cement tonnage

- If implemented EU-wide, would encourage energy efficiency, the use of substitute fuels, **and** the transition from CEM-I to CEM-II and CEM-III
- If sufficiently generous, would probably accelerate the trend in clinker outsourcing
  - Net industry benefit? (again, some analysis of the Value-Added Chain would be helpful)
- Possibly, similar in effect to grandfathering that *excludes* frequent updating, NER and forfeiture on closure?
- Again, rather difficult to assess the potential impacts of implementation in some, but not all EU countries
## Basis for impact assessment?

<table>
<thead>
<tr>
<th></th>
<th>OBA on clinker Tonnage EU-wide</th>
<th>OBA on cement Tonnage EU-wide</th>
<th>GF with updating, NER and forfeiture</th>
<th>GF without updating, NER or forfeiture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EU Investment:</strong></td>
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<tr>
<td>Kilns</td>
<td>Encouraged</td>
<td>Discouraged</td>
<td>Encouraged</td>
<td>Discouraged</td>
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<tr>
<td>Grinding</td>
<td>Neutral</td>
<td>Encouraged</td>
<td>Neutral?</td>
<td>Neutral?</td>
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<tr>
<td><strong>EU Output:</strong></td>
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<tr>
<td>Clinker</td>
<td>Encouraged</td>
<td>Discouraged</td>
<td>Encouraged</td>
<td>Discouraged</td>
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<tr>
<td>Cement</td>
<td>Neutral?</td>
<td>Encouraged</td>
<td>Neutral?</td>
<td>Neutral?</td>
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<td><strong>Incentives:</strong></td>
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<tr>
<td>Efficiency</td>
<td>Encouraged</td>
<td>Encouraged</td>
<td>Encouraged</td>
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<tr>
<td>Subst. fuels</td>
<td>Encouraged</td>
<td>Encouraged</td>
<td>Encouraged</td>
<td>Encouraged</td>
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<td><strong>Damage:</strong></td>
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<td>Employment</td>
<td>?</td>
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<td>?</td>
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<tr>
<td>Value-added</td>
<td>?</td>
<td>?</td>
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</tbody>
</table>
Thank you

Questions?