EU ETS, phase 1: Was there abatement?

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Some background issues

- Emissions will never exactly equal the cap
  - Especially with intra-period banking/borrowing
- A constraining cap will always result in long and short positions among installations
- Reasons for being “long/short”:
  - “The” reason that motivates trading: differences in the marginal cost of abatement
  - Uncertainty (of economic activity, weather or any other factor affecting emissions)
  - Deliberate over- or under-allocation
EU ETS phase 1

- Abatement in phase 1 of particular interest, because emissions were significantly lower than cap
- But: significant CO$_2$ price for almost two years until ‘slack condition’ became recognised
- In this period, did companies reduce emissions in response to the carbon price?
  - To the extent they did, surplus was larger than it would have otherwise been
Approach

● How do 2005-07 emissions compare to historical emissions, not allowance totals?

● Level of economic activity: a major determinant of CO$_2$ emissions
  ◆ Relationship between emissions and economic activity assumed to continue as without carbon price

● Two data sources for historical data: UNFCCC CRF data, data for baselines in 1$^{st}$ period allocation
  ◆ Varying dates, but all centered on 2001-03
  ◆ Potential bias (data collection process)
  ◆ Also, some problems of comparability
## Annual rates of change in GDP, CO₂ emissions and intensity

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP</th>
<th>CO₂ Emissions</th>
<th>CO₂ Intensity</th>
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<tbody>
<tr>
<td></td>
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<td>Economy-wide</td>
<td>ETS Sectors</td>
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<tr>
<td>1995-2000</td>
<td>+ 3.00%</td>
<td>+ 0.06%</td>
<td>- 0.24%</td>
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<td>2000-2004</td>
<td>+ 1.83%</td>
<td>+ 1.00%</td>
<td>+ 0.85%</td>
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<td>2004-2006</td>
<td>+ 2.69%</td>
<td>- 0.30%</td>
<td>- 0.02%</td>
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<td>2004-2007</td>
<td>+ 2.78%</td>
<td>NA</td>
<td>+ 0.25%</td>
</tr>
</tbody>
</table>

Source: IMF, EEA, and CITL

~210 million tonnes

Source: Ellerman et al., forthcoming
The basic case for abatement

- A significant positive price is being incurred
- Rising GDP and real output
  - Taking into account also growth in ETS sectors
- Weather and relative prices of fossil fuels worked to increase emissions over 2005-07
- Emissions are lower than historical levels (even after allowing for plausible bias)

→ Probably ~120-300 Mt over 2005-2007
Where?

- In particular, abatement happened
  - mostly in EU 15
  - both in electricity sector and industrial sectors
  - mostly (but not only) through fuel switching

Sources: Ellerman et al., forthcoming; Delarue, Ellerman, and D’haeseleer (2008); McGuinness and Ellerman (2008)
Some emerging evidence

Fuel switching in the EU power sector

without CO₂ valuation (EUA at €0/tCO₂) – no fuel switching; all utilities would have constantly preferred coal over gas

CO₂ valuation gave a clear incentive for utilities to switch from coal to gas from March 2005 until October 2005

abatement between 54 and 99 Mt in 2005 and 2006 in the power sector alone

Source: Delarue, Ellerman & D’haeseleer, 2008

Source: Fortis
Bottom line

- The carbon price has induced some emissions abatement in the EU ETS.
- Exact magnitude hard to pin down to due poor data and inherent difficulties
- However, a long position in not a per se indicator of over-allocation:

  Notwithstanding some 1st period over-allocation (and the lower price), not to mention other problems, the evidence suggests that the EU ETS did reduce CO₂ emissions
References


