ELECTRICITY MARKETS AND CLIMATE CHANGE

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I. Single country or efficient international governance

✓ economic instruments
✓ commitment problem
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II. International governance
1. INSTRUMENTS

a) Cap-and-trade: The tale of two permits

“The tale of two permits”

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SO_{2}/NO_x & \text{ Clean Air Act Amendment (CAAA 1990)} \\
CO_2 & \text{ EU ETS 2005-2008, 2008-2012}
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I. ONE COUNTRY/EFFICIENT INTERNATIONAL GOVERNANCE

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[Some differences: a) $SO_2/NO_x$: pollution is partly local, and time-contingent \Longrightarrow complicates banking and raises issue of “exchange rates”, that were not adopted; b) initial data; c) leakages even more of an issue for $CO_2$.]
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Emissions Trading System
✓ short horizon: 2012 (CAAA : 30 years),
✓ free permits for new entrants/projects (up to a limit. FCFS!)
✓ in most countries, loss of permits when plant shuts down.
  [last two points important; e.g., European power sector has to build 862 GW capacity, for a current stock of 723 GW, by 2030.]
✓ subsidiarity, political process
✓ non credible penalties
  [next ceiling = 130 %, but renegotiation.]
Grandfathering

[auctions hardly more prevalent under CAAA: 2.8% initially]

- income loss
- does not facilitate price discovery.

Alternative: zero-income auctions. Example: stabilization objective: firm $i$ pays

\[ p (n_i - n_i^o) \]

- equilibrium price
- number of permits purchased
- initial pollution
✓ Limited banking and price volatility

[except France and Hungary]

b) Price vs quantity vs hybrid system (safety valve = price ceiling)

✓ **Weitzman 1974 classic argument**

  [cap-and-trade dominates if
  
  ● social cost of pollution has high curvature
  ● marginal cost of abatement fairly constant.]

✓ **Economics or political economy?**

Little political support for taxes.
c) **Other instruments** (costs and benefits)

✓ Norms
✓ Labels
✓ Subsidies to equipment (heat pump, insulation,...), R&D, etc.

- Index these instruments on carbon price
- Encourage R&D, not obsolete (current generation) equipment

[biofuels, photovoltaics]
2. COMMITMENT ISSUE

✓ Need for long-term visibility
  - equipments
    [20 to 60 years in power sector; buildings; transportation; forests; ....]
  - R & D
    [CSS, 4th generation nuclear, new fuels for planes, crops and technologies that are robust to climate change, etc.]
  - risk management
    [can exist under zero-net-supply, but...]

✓ Encourage R&D in private sector
- LT permits create this visibility...

  ... provided that the State has a credible commitment.
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  ... provided that the State has a credible commitment.

• Need for a (possibly flexible) price floor.

Today ($t = 1$)

✓ issuing spot ($n_1$) and future ($n_f^2$) allowance
✓ private sector
  – buys equipments
  – innovates

Tomorrow ($t = 2$)

state issues new permits ($n_2 - n_f^2$)
• LT permits create this visibility...
  ... provided that the State has a credible commitment.

• Need for a (possibly flexible) price floor.

State may want to flood market tomorrow:
  - revenue from auctions (cash-strapped government)
  - please industry
  - “expropriate” innovation: lower price of licenses
Simple option: State stands ready to buy at price floor. Criticism: uncertainty.
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Laffont-Tirole:
Optimal Policy = provide State with flexibility to react to news (for instance about impact of pollution)
Refund policy or array of put options.
Standard observations:

✓ Heterogeneity of efforts to reduce pollution
  - free rider problem
  - leakage problem (production, investment)
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→

- too much pollution
- inefficient abatement
  [but CDM]
1) Border tax adjustment

[(a) BTA; (b) compulsory purchase of regional permits.]

Incentive but

- protectionism

  [incentive compatibility?]

- measuring carbon content

  [home vs foreign benchmark; virtuous foreign firms penalized.]
Even if performed by WTO or independent agency...

Compare relative performance

- Europe: some countries more virtuous than others
- Different approaches (would be simpler if single carbon price in each country: ETS vs R&D vs...)
- Enforcement.
2) Other policies

✓ CDM (projects)

Benefits
- aid to development
- lower abatement cost.
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Drawbacks

- transaction costs; interpretation of additionality requirement (counterfactual)
- incentive to install/maintain polluting equipments? certificates
- incentives to join/ratify Kyoto?
✓ Trading/nontrading

[net supplier of permits: low effort in non trading sector]

✓ Sectorial agreements

[will need states anyway; no equalization of marginal costs.]
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✓ International

- who will receive funds?
- who pays?
3) Towards a new architecture

Standard recommendations

- allow headrow allowance and index to growth
  [use politicians’ horizons]
- use WTO or other “collateral” to incite joining.
Possible approach
International agreement on:

1) single CO$_2$ market,
2) issuing of put options by all countries
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(2) does not solve free rider problem, but creates an incentive for renegotiation.