Refining Climate Policy in the EU: Assessing Some Options

Ian Parry
Fiscal Affairs Department, IMF
Ecole Normale Supérieure, Paris, May 17, 2017
EU is in the vanguard of climate mitigation policy

- ETS in 2005
- Aggressive emissions pledge (40 percent below 1990 by 2030)
- Comprehensive policies

May be scope for meeting Paris pledge with

- Lower costs
- Higher revenue
- Greater domestic envir. benefits
(Complementary) Modelling Approaches

- **Disaggregated (‘structural’)**
  - EC has state-of-the-art model
  - Valuable for projections and emissions impacts of policies

- **Aggregated (‘reduced form’)**
  - Impacts of different policies/countries/parameters
  - Prioritize options worth further study
  - Welfare costs (to guide efficient policy design)
Measuring Economic Costs

- Price per unit
- Demand
- Domestic envir. benefit
- Carbon charge
- Prior tax
- Net benefits from carbon charge
- Cost of carbon charge
- Supply

Fuel reduction
Fuel consumption
Spreadsheet Model

- Previous applications: China, India

- Power, road transport, households/industry
  - Country projections using GDP, inc. elasts., tech. change, prices

- Effects of policies depend on elasticities
  - From empirical literature/other models

- Caveats
  - No trade, capital of different vintages, etc.
  - Preliminary (need more policies, countries, refine params.)
Two Exercises

▸ Start with business-as-usual projections
  ▸ Introduce envisioned policies for 2030

▸ Consider emissions-neutral refinements
Assumed Policies for 2030

- Vehicle CO₂ regs (30 percent)
- Energy effic. regs for electricity (25 percent)
- Energy effic. regs for household/indust. (30 percent)
- Further regulations for non-ETS (meeting country targets)
- ETS emissions price (€56)
CO2 and Fiscal Impacts of Assumed Policies, 2030

CO2 Reductions

- France
- Denmark
- Hungary
- Nether.
- Spain
- Poland
- Germany

% reduction in national CO2 below BAU, 2030

Vehicle reg.  | en. effic.--power  | h/h, ind. regs

Revenue

- France
- Denmark
- Hungary
- Nether.
- Spain
- Poland
- Germany

Revenue, % GDP

Vehicle reg.  | en. effic.--power  | h/h, ind. regs

Other non-ETS regs  | ETS price

Source: IMF Fiscal Affairs Department
Average Cost of Policies, 2030

Av. Cost per ton Reduced

- France
- Denmark
- Hungary
- Nether.
- Spain
- Poland
- Germany

€/ton

Av. Cost Net of Dom. Envir. Benefit

- France
- Denmark
- Hungary
- Nether.
- Spain
- Poland
- Germany

€/ton
Total Welfare Costs of Policies, 2030

Total Welfare Costs

<table>
<thead>
<tr>
<th>Country</th>
<th>% GDP</th>
<th>vehicle reg.</th>
<th>en. effic.--power</th>
<th>h/h, ind. regs</th>
<th>other non-ETS regs</th>
<th>ETS price</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nether.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Costs Net of Dom. Envir. Benefit

<table>
<thead>
<tr>
<th>Country</th>
<th>% GDP</th>
<th>vehicle reg.</th>
<th>en. effic.--power</th>
<th>h/h, ind. regs</th>
<th>other non-ETS regs</th>
<th>ETS price</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nether.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sequential Policy Refinements

- Road fuel surcharge for vehicle standards
- Carbon pricing for non-ETS emissions
- Harmonizing non-ETS carbon prices across countries
- Raising ETS prices
- Harmonizing ETS and non-ETS prices
- Full ETS allowance auctions
Cost Savings from Policy Reforms, 2030

Total Cost Savings

<table>
<thead>
<tr>
<th>Country</th>
<th>Road Fuel Surcharge</th>
<th>Non-ETS Pricing</th>
<th>Harmonized Non-ETS Pricing</th>
<th>ETS/Non-ETS Harmonization</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nether.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Cost Savings + Dom. Envir. Benefits

<table>
<thead>
<tr>
<th>Country</th>
<th>Road Fuel Surcharge</th>
<th>Non-ETS Pricing</th>
<th>Harmonized Non-ETS Pricing</th>
<th>Higher ETS Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nether.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Revenue Gains from Policy Reforms, 2030

<table>
<thead>
<tr>
<th>Country</th>
<th>Revenue Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
<tr>
<td>Denmark</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing</td>
</tr>
<tr>
<td>Hungary</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
<tr>
<td>Nether.</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
<tr>
<td>Spain</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
<tr>
<td>Poland</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
<tr>
<td>Germany</td>
<td>Road fuel surcharge, non-ETS pricing, harmonized non-ETS pricing, full ETS auctions</td>
</tr>
</tbody>
</table>
Concluding

► Significant econ./fiscal gains from greater domestic pricing
  ► Relax regs. for countries meeting emissions targets with pricing?

► Significant distrib. impacts of harmonizing non-ETS prices

► Next steps: reconcile with EC modelling