Climate Policy and Fiscal Constraints:
Do Tax Interactions Outweigh Carbon Leakage?

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Resources for the Future and U.S. International Trade Commission

September 5, 2012
Challenges to Sustainable Development

- Public sector deficits associated with current recessions and looming demographic changes.
- Emissions associated with global climate change
- Each has such large economic implications, they should not be considered separately
Challenges for Carbon Pricing

- Pre-existing taxes distort labor (and capital) markets
  - Higher prices from regulation lower real wage, reducing labor supply and tax revenue: “Tax Interaction”
  - It matters how we use the revenues

- Incomplete regulatory coverage
  - Higher product prices can cause substitution towards unregulated goods or imports: “Carbon leakage”
  - It matters how we treat energy-intensive trade-exposed (EITE) sectors

- Other market failures
  - Imperfect competition, technology spillovers, barriers…
Revenue Potential of Climate Policy

- EIA estimated allowance values under ACESA at $160 billion in 2020 (~20% of CBO-projected budget deficit)
- In 2020, the projected EU ETS value represents roughly 0.2% of GDP
- In California, budget deficit is now $16 billion; allowance values could represent half or more of that
Main Options for Dealing with Leakage in EITE Sectors

- Output-based rebates
  - Tradeoff: less incentive for conservation, but also less tax interaction

- Border carbon adjustments
  - Give consumers consistent price signals, but may further lower the real wage

- Exemption
  - Fewer incentives for reducing emissions intensity, not only conservation, in those sectors
This Paper

- With tax interactions and leakage
- What are the implications for the relative efficiency gains of antileakage measures?
- How does the scope for cost savings from addressing leakage compare with those from reducing tax distortions?
Policy Options

- **REF**: emissions price alone
- **Tariff (Imp.)**: BCA for imported goods in the EIT and OIL sectors, based on embodied direct and indirect (electricity) emissions, with revenues retained by the coalition countries;
- **Tariff (Exp.)**: same but revenues retained by the countries of export;
- **OBR**: for EIT sectors, benchmarked to sector average direct and indirect emissions; and
- **Exempt**: EIT sectors are exempt from the carbon pricing policy.
Scenarios

- Global emissions reductions of 20% of coalition emissions (2004 base year)
- 2 default uses of revenues (after allocations)
  1. Revenue recycling
  2. Grandfathering
- Sensitivity analysis
  - 2020 projected base year
  - Global energy price response
  - Labor-leisure tradeoff
<table>
<thead>
<tr>
<th>Country or region</th>
<th>Labor tax (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>42.9</td>
</tr>
<tr>
<td>United States</td>
<td>29.8</td>
</tr>
<tr>
<td>Other Annex I countries</td>
<td>28.6</td>
</tr>
<tr>
<td>Russia</td>
<td>32.6</td>
</tr>
<tr>
<td>China</td>
<td>31.3</td>
</tr>
<tr>
<td>India</td>
<td>29.7</td>
</tr>
<tr>
<td>Energy-exporting countries</td>
<td>17.8</td>
</tr>
<tr>
<td>Middle-income countries</td>
<td>17.2</td>
</tr>
<tr>
<td>Low-income countries</td>
<td>12.4</td>
</tr>
</tbody>
</table>
Cost Savings from Anti-Leakage Measures by Coalition (in Millions of 2004 $)

**EU**

- **Tariff (Imp)**
- **OBR**
- **Exempt**

**EU-US**

- **Tariff (Imp)**
- **OBR**
- **Exempt**

**A1**

- **Tariff (Imp)**
- **OBR**
- **Exempt**

**A1+China**

- **Tariff (Imp)**
- **OBR**
- **Exempt**
Coalition Cost Savings Relative to Grandfathered Caps (2004 Base Year)

-15%
-10%
-5%
0%
5%
10%
15%
20%
25%
30%
35%

EU EU+US A1 A1+China
Recycle Tariff (Imp.) Tariff (Exp.) OBR Exempt
Global Cost Savings Relative to Grandfathered Caps (2004 Base Year)

-15%
-10%
-5%
0%
5%
10%
15%
20%
25%
30%

EU
EU+US
A1
A1+China

Recycle
Tariff (Imp.)
Tariff (Exp.)
OBR
Exempt
Noncoalition Cost Savings Relative to Grandfathered Caps (2004 Base Year)

<table>
<thead>
<tr>
<th>EU</th>
<th>EU+US</th>
<th>A1</th>
<th>A1+China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tariff (Imp.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tariff (Exp.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exempt</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-45% -35% -25% -15% -5% 5% 15%
Global Cost Savings Relative to Grandfathered Caps (2020 Base Year)

-10%  -5%  0%  5%  10%  15%  20%  25%  30%

EU EU+US A1 A1+China

Recycle
Tariff (Imp.)
Tariff (Exp.)
OBR
Exempt
Conclusions

- Tax interactions enhance the cost savings from border adjustments, while other measures like rebates or exemptions become less attractive.
- Cost savings from using emissions revenues to lower distorting taxes are significant (15% to 25%).
- Cost savings from dealing with leakage are generally smaller but also significant
  - Esp. when coalitions are small or reduction targets more binding
- Noncoalition and coalition countries both benefit:
  - Revenue recycling
  - BCA when revenues returned to exporting countries
Not so Noncontroversial

- BCAs highly contentious in trade circles
  - Hard to implement by a single region.
- Tax reform is difficult
  - Pressure to distribute emissions revenues among to gain acceptance for the policy
  - heightened if competitiveness / leakage concerns not addressed.
- In the absence of some global agreement to manage leakage arising from differentiated responsibilities, the outcome of unilateral policies may be costlier for all.
Thanks!

- For more info, see www.rff.org/fischer.cfm
- Funding from the ENTWINED Program of the Mistra Foundation gratefully acknowledged.
Numerical Model

- CGE model based on GTAPinGAMS-EG
  - Static, 2004 base year
- Key modifications
  - Labor-leisure tradeoff
  - Improvements in emissions data
    - Process emissions for energy intensive manufacturing
      - Based on U.S. EPA data; assume same intensity for RoW
    - Feedstock use of fossil fuels in chemicals, refining
    - Adjust baseline emissions to more closely match overall EIA reported levels
  - Calibrated global fuel supply elasticities
    - Crude oil is slightly inelastic, while coal and now gas are elastic
<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>EU+US</th>
<th>AI</th>
<th>AI+China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global energy markets adjusting</td>
<td>23.9</td>
<td>12.9</td>
<td>12.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Global energy prices fixed</td>
<td>8.8</td>
<td>1.3</td>
<td>2.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>
### Percentage Growth in Baseline, 2004–2020

<table>
<thead>
<tr>
<th></th>
<th>EUR</th>
<th>USA</th>
<th>RUS</th>
<th>CHN</th>
<th>IND</th>
<th>RA1</th>
<th>EEX</th>
<th>MIC</th>
<th>LIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total emissions</td>
<td>−11.9</td>
<td>−6.2</td>
<td>34.9</td>
<td>127.4</td>
<td>130.9</td>
<td>4.5</td>
<td>107.8</td>
<td>55.1</td>
<td>144.2</td>
</tr>
<tr>
<td>Total output</td>
<td>14.0</td>
<td>21.0</td>
<td>79.9</td>
<td>300.0</td>
<td>233.2</td>
<td>21.2</td>
<td>94.9</td>
<td>85.6</td>
<td>145.5</td>
</tr>
<tr>
<td>EIT output</td>
<td>21.1</td>
<td>28.4</td>
<td>−7.1</td>
<td>390.7</td>
<td>327.8</td>
<td>27.8</td>
<td>2.8</td>
<td>100.4</td>
<td>135.7</td>
</tr>
<tr>
<td>EIT intensity (kg/$)</td>
<td>−25.5</td>
<td>−27.9</td>
<td>−28.4</td>
<td>−43.9</td>
<td>−34.0</td>
<td>−20.8</td>
<td>−9.2</td>
<td>−22.5</td>
<td>17.5</td>
</tr>
</tbody>
</table>
Leakage Rates

- EU
- EU+US
- A1
- A1+China

2004 vs 2020
CO2 Prices by Coalition and Base Year (2004 $ per ton)