“Global view”
Stef Proost

• for EU and by an economist
• Initial observation:
  – Easy estimate for cost of reducing 1 ton of CO2 in a sector is the level of current carbon taxes in a sector – for cars these are 250 to 300 $/ton of CO2 fuel taxes
  – Perceived costs by consumers, car manufacturers and environmental ministers are much lower because they reason in consumer prices and neglect the fuel tax component
3 Questions

• “Transport sector perspective”
  – What is the effect of replacing current fuel taxes by taxes more geared to the different externalities in transport?

• “National energy use view”
  – Share of transport sector in reaching an absolute national emission reduction goal in a cost effective way?

• “World economic view”
  – What is shadow value of CO2 emission permits to use in an international perspective?
1. Can we do better in the transport sector than using high fuel taxes and what would be the outcome?

• Assuming 80 Euro/ton carbon damage, what would happen if one replaced the high fuel taxes by a 80 Euro/ton CO2 carbon tax + km charges that better reflect the congestion, accident, other air pollution damage in transport?
Marginal external costs versus taxes passenger km BAU 2020
Marginal external costs versus taxes freight ton km BAU 2020

The diagram illustrates the marginal external costs for different modes of transport, specifically focusing on costs per ton kilometer. The modalities compared include IWW, HDV +32t, and Freight train. The costs are categorized into taxes, accident, congestion, and air pollution plus climate change. The graph shows a comparison of these costs across the different modalities, with IWW having the highest cost followed by HDV +32t and Freight train.
1. Can we do better in the transport sector than using high fuel taxes and what would be the outcome?

- Replacing the high fuel taxes by a 80 Euro/ton CO2 carbon tax + km charges that better reflect the congestion, accident and other externalities gives:
- GRACE (TREMOVE model): compared to reference
  - Welfare + govt revenues would increase
  - volume of traffic would decrease (all modes)
  - CO2 emissions decrease slightly
2. What sectoral mix can achieve the required national reduction of CO2 emissions (30% in 2030)?

- Using an energy model with technological cost information for all sectors
- only small contribution of transport sector in least cost mix
3. World view

- What is the global reduction we need and what is the corresponding shadow price of CO2 emissions (2020 – 2050)

- Chances of successful international negotiations?
  - Scientists: Strong action needed
  - Economists: Hard climate agreements are rather unlikely to work, typical prisoners dilemma
3. World view

- Computation with GEM-E3 (EU+world model, including trade of CO2 emissions)
- EU strategy:
  - “Cooperation” (the whole world commits):
    - Emissions: -30% in 2020 in EU and -25% for world
    - Price: 45$ to 90$/ton of CO2
    - Cost EU(without benefit CC): -2.3%
  - “Non cooperation”:
    - Emissions: -20% in 2020 in EU and -4% for world
    - Price: 6$/ton of CO2 because it is bought in China
    - Cost (without benefit CC): -0.6%
Examples of GEM-E3 application

Table 7. Costs and emission reductions of two EU climate change negotiation strategies

<table>
<thead>
<tr>
<th>% change compared to baseline with no reduction efforts</th>
<th>Cooperative scenario</th>
<th></th>
<th>Unilateral EU scenario</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
<td>2030</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Economic cost</td>
<td>Emission GHG</td>
<td>Economic cost</td>
<td>Emission GHG</td>
<td>Economic cost</td>
</tr>
<tr>
<td>USA</td>
<td>-1.4%</td>
<td>-39.5%</td>
<td>-3.4%</td>
<td>-52.4%</td>
</tr>
<tr>
<td>EU27</td>
<td>-2.3%</td>
<td>-28.1%</td>
<td>-5.7%</td>
<td>-41.6%</td>
</tr>
<tr>
<td>Brazil</td>
<td>-0.3%</td>
<td>-4.8%</td>
<td>-1.5%</td>
<td>-15.0%</td>
</tr>
<tr>
<td>India</td>
<td>-0.9%</td>
<td>-0.6%</td>
<td>-1.6%</td>
<td>-23.3%</td>
</tr>
<tr>
<td>China</td>
<td>+0.3%</td>
<td>-25.9%</td>
<td>-0.8%</td>
<td>-32.8%</td>
</tr>
<tr>
<td>World total</td>
<td>-1.2%</td>
<td>-25.9%</td>
<td>-3.4%</td>
<td>-37.2%</td>
</tr>
<tr>
<td>Price of carbon (US$/ton CO2eq)</td>
<td></td>
<td>45</td>
<td></td>
<td>93</td>
</tr>
</tbody>
</table>

Conclusions

• EU shadow carbon values are less than 90 Euro/vkm

• Best is to address the different externalities in the transport sector by replacing the high fuel taxes by km based taxes + carbon tax

• Emission standard in the EU
  – Not really needed as long as we stick to present high fuel taxes
  – Could play a signalling role if we move to 90 $/ton carbon tax