The indirect price effect of environmental taxes: the case of Estonia

Helen Poltimäe, Tiiu Paas
University of Tartu
INFORUM
8.09.2009
Background

- Environmental taxes as a popular instrument to tackle environmental problems
- Opposition to environmental taxes:
  - Fear of reduced competitiveness
  - Bigger effect on low-income households
- Different models to study different effects
  - For distributional effects: microsimulation
  - As this does not capture indirect effect, other methods have to be included, most often I-O table
Estonian environmental taxes - 1

- Energy intensity of Estonian economy is very high, exceeding the EU-27 average by more than four times
- Ecological tax reform was initiated in 2005
- Raise of existing taxes and new taxes are to be imposed
- Distributional effects are studied by Poltimäe & Võrk (2008), but do not cover indirect effect
Estonian environmental taxes - 2

Environmental taxes (% of GDP)

- Estonia
- EU-25
Estonian environmental taxes - 3

- **Fuel excise**
  - forms 98% of environmental tax revenues (4.3 billion EEK in 2007)
  - mostly motor fuels are taxed
- **Resource & pollution charges** are also used
  - levied on enterprises for resource use (water, forest, mineral resources) and pollution (air, water, waste)
  - 0.84 billion EEK in 2007
  - managed by Ministry of the Environment
  - detailed data not available and therefore not covered in this paper
Objective of the paper

• To assess the effect of Estonian environmental taxes on the price of goods
• Input-Output table
• Aggregation level is high, therefore only price effects are assessed, not the distributional effects
Literature overview - 1

- Studies on the indirect effect of environmental taxes have been done in:
  - Canada (Hamilton, Cameron 1994)
  - Great Britain (Symons et al 1994)
  - Australia (Cornwell, Creedy 1996)
  - Spain (Labandeira, Labeaga 1999)
  - Denmark (Wier et al 2005)
  - the Netherlands (Kerkhof et al 2008)
Literature overview - 2

• Studies deal with hypothetical carbon tax
• I-O table to assess the effect on prices
• Results are different:
  ▫ different tax level
  ▫ different aggregation level
• Most of the studies find carbon tax being regressive
Data and the model

- Fuel use by sectors (2007) – 18 sectors
- Fuel excise rates (2007)
- Input-output table of Estonian economy (2000) – 58 sectors

\[ TAX^{indirect} = T(I - A)^{-1} \]
## Results - 1

<table>
<thead>
<tr>
<th>Sector</th>
<th>Share of fuel excise in output (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and fishing</td>
<td>3.55</td>
</tr>
<tr>
<td>Energy</td>
<td>1.94</td>
</tr>
<tr>
<td>Mining industry</td>
<td>7.12</td>
</tr>
<tr>
<td>Food- and tobacco industry</td>
<td>1.54</td>
</tr>
<tr>
<td>Textile and leather industry</td>
<td>0.68</td>
</tr>
<tr>
<td>Wood industry</td>
<td>2.45</td>
</tr>
<tr>
<td>Paper and printing industry</td>
<td>1.03</td>
</tr>
<tr>
<td>Construction</td>
<td>4.31</td>
</tr>
<tr>
<td>Land and rail transport</td>
<td>9.00</td>
</tr>
<tr>
<td>Water transport</td>
<td>4.87</td>
</tr>
<tr>
<td>Air transport</td>
<td>8.00</td>
</tr>
</tbody>
</table>
Results - 2

- Fuels used by energy sector are not taxed by fuel excise: oil shale, wood, peat not taxed, natural gas taxed since 2008
- Energy sector pays CO₂ pollution charge
- Significant tax changes in 2008, but no data yet to analyse
Conclusions

- Peculiarities of Estonian tax system hamper environmental tax burden analysis
- Due to the smallness of Estonia, I-O table is very highly aggregated
- Few enterprises in one sector: changes in technology or structural change alters I-O table significantly
- Also behavioral effects need to be considered
Thank you!