Market-based Instruments Applied to Transportation Issues: Swiss Heavy Vehicle Fee

Doctoral Seminar
EPFL
April 11, 2013

Franziska Borer Blindenbacher
Transport Consulting
Overview

• Full Costs of Transportation
• Externalities, External Costs
• Market-based Instruments
• Swiss Heavy Vehicle Fee (HVF)
• Conclusion and Discussion
Inefficiencies in Transportation

“... one of the important reasons why imbalances between modes of transport and inefficiencies have arisen is because transport users have not been adequately confronted with the full costs of their activities. As prices do not reflect the full social cost of transport, demand has been artificially high. If appropriate pricing and infrastructure policies were to be pursued, these inefficiencies would largely disappear over time.”

Inefficiencies in Transportation

“... one of the important reasons why imbalances between modes of transport and inefficiencies have arisen is because transport users have not been adequately confronted with the full costs of their activities. As prices do not reflect the full social cost of transport, demand has been artificially high. If appropriate pricing and infrastructure policies were to be pursued, these inefficiencies would largely disappear over time.”

Negative Impacts of Transportation

- Fatalities, injuries
- Noise, air, water pollution
- Congestion
- Greenhouse gas emissions
- Diminishing energy resources
- Biological, ecosystem damage
- Large land use
Full Social Cost of Transportation

All costs occurring due to provision and use of transport infrastructure: wear and tear of infrastructure, capital, congestion, accident, environmental costs

Private or internal costs
Directly borne by transport user: wear and tear and energy cost of vehicle use, own time costs, transport fares, taxes and charges

External costs
Difference between social costs and private costs, borne by society at large
## Classification of Costs of Transport

<table>
<thead>
<tr>
<th>Cost of categories</th>
<th>Social costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal/Private costs: borne by transport user</td>
<td>External costs: borne by society or other transport users</td>
</tr>
<tr>
<td>Fuel and vehicle costs</td>
<td>Costs paid by other users or by society</td>
</tr>
<tr>
<td>Tickets/fares</td>
<td></td>
</tr>
<tr>
<td>Infrastructure use costs</td>
<td>Costs partly uncovered</td>
</tr>
<tr>
<td>Costs covered by infrastructure charge</td>
<td></td>
</tr>
<tr>
<td>Costs covered by tickets/fares</td>
<td></td>
</tr>
<tr>
<td>Accidents costs</td>
<td>Uncovered accident costs (e.g. pain and suffering imposed on others), administrative and police costs</td>
</tr>
<tr>
<td>Costs covered by insurance, own accident costs</td>
<td></td>
</tr>
<tr>
<td>Noise costs</td>
<td>Costs borne by people exposed to noise (noise disturbance, health effects)</td>
</tr>
<tr>
<td>Own disbenefits</td>
<td></td>
</tr>
<tr>
<td>Air pollution costs</td>
<td>Costs borne by people exposed to air pollution (health effects)</td>
</tr>
<tr>
<td>Own disbenefits (depending on individual situation)</td>
<td></td>
</tr>
<tr>
<td>Climate change costs</td>
<td>Costs borne by society and by future generations</td>
</tr>
<tr>
<td>Own disbenefits (including future generation, i.e. children)</td>
<td></td>
</tr>
<tr>
<td>Congestion costs</td>
<td>Delays/time costs imposed on others</td>
</tr>
<tr>
<td>Own time costs</td>
<td></td>
</tr>
</tbody>
</table>

## External Costs CH: 9 billion CHF

<table>
<thead>
<tr>
<th>Category</th>
<th>Road (94%)</th>
<th>Rail (6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidents</td>
<td>2’076</td>
<td>24</td>
</tr>
<tr>
<td>Noise</td>
<td>1’262</td>
<td>85</td>
</tr>
<tr>
<td>Health</td>
<td>1’970</td>
<td>141</td>
</tr>
<tr>
<td>Building Damage</td>
<td>298</td>
<td>19</td>
</tr>
<tr>
<td>Climate</td>
<td>1’210</td>
<td>3</td>
</tr>
<tr>
<td>Nature-Landscape</td>
<td>747</td>
<td>121</td>
</tr>
<tr>
<td>Other Costs</td>
<td>896</td>
<td>102</td>
</tr>
<tr>
<td><strong>Total</strong> (million CHF, 2009)</td>
<td><strong>8’459</strong></td>
<td><strong>495</strong></td>
</tr>
</tbody>
</table>

Source: ARE 2013

Franziska Borer Blindenbacher Transport Consulting

11.4.2013
Prices in Transport Sector

• Little relationship between amount ‘consumed’ (distance or resources) and total price

• Mismatch between transport prices paid by users and underlying costs

• Solution: Applying ‘user-pays’ and ‘polluter-pays’ principles by using market-based instruments
Price-based Market Instruments

- User charges
- Emission charges or fees
- Changing taxes
- Giving subsidies
Market-based Instruments applied for Internalization

- Lead to more efficient use of infrastructure
- Reduce negative side effects of transport activity
- Improve fairness between transport users and transport modes
- Change behavior
- Flexible, often used in policy mix with other instruments (regulations with command/control measures)
Heavy Vehicle Fee in CH since 2001

- Shift from Road to Rail
- Protection of Environment
- Internalizing External Costs
Design of Swiss Heavy Vehicle Fee

- **Performance-related:**
  - Distance
  - Weight
  - Emissions (2009):
    - Euro 0/1/2: 3.07 Cts/tkm
    - Euro 3: 2.66 Cts/tkm
    - Euro 4/5/6: 2.26 Cts/tkm
  - Admissible Weight > 3.5t
  - Use of all Roads in CH
Use of Revenue HVF

Current Revenue CHF 1000 million/annum:

- 2/3 Government (Public Transport Fund, FinöV)
  - New Rail Links across Alps (2 base tunnels)
  - Rail 2000
  - Noise Mitigation
  - High Speed Rail Links
- 1/3 Cantons
HVF - Impact on Environment

Source: ARE, 2012

Franziska Borer Blindenbacher Transport Consulting 11.4.2013
HVF - Effect on Vehicle Kilometers

Source: ARE, 2012
HVF - Effect on Alpine Trips

Source: ARE, 2012
Road Charging Globally

- **Truck Tolling**: Austria (2004), Germany (2005), Czech Republic (2007), Slovakia (2010), Poland (2011)

- **EUROVIGNETTE** (as of 2013): External costs of air pollution, noise and congestion may be charged

Conclusions

• Consider full costs of transportation

• Internalize external costs by applying performance-related market-based instruments

• Transport users should get what they pay for and pay for what they get
Sources

Contact

Franziska Borer Blindenbacher

International Transport Consultant

Scientific Adviser, Federal Office for Spatial Development ARE

borerf@yahoo.de