Transport Policies in Wrong Direction and Climate Change Impact: Korean Cases Study

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I. Background

Soaring Domestic Gas Price

8th largest oil importer in the world

High dependency on imported oil!

Source: www.opinet.co.kr
I. Background

National and International GHG Reduction Effort

• Strong national vision to reduce transport GHG emission
  - reduction target 34% of BAU in 2020
• New international GHG reduction agreement coming
  (Durban Platform)
• Transport accounting for 13% of national GHG emission

Transport price policies in good direction?
II. Car Property Tax

Car Property Tax Scheme

<table>
<thead>
<tr>
<th>Engine size</th>
<th>Tax rate, won /cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 800cc</td>
<td>80</td>
</tr>
<tr>
<td>&lt; 1,000cc</td>
<td>100</td>
</tr>
<tr>
<td>&lt; 1,600cc</td>
<td>140</td>
</tr>
<tr>
<td>&lt; 2,000cc</td>
<td>200</td>
</tr>
<tr>
<td>&gt;= 2,000cc</td>
<td>220</td>
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Before 2011

<table>
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Since 2011

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- International trade agreement simplifying taxing scheme
- Mid-size car owner shifting to big-size car

Note: 1,000 won roughly equals to $1
II. Car Property Tax

Car Value and Fuel Economy in Market

<table>
<thead>
<tr>
<th>Car type</th>
<th>Price, mil won</th>
<th>Fuel economy, km/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMW 5 series 2,000cc gasoline</td>
<td>70</td>
<td>12</td>
</tr>
<tr>
<td>Hyundae Sonata 2,000cc gasoline</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Toyota Prius 1,800cc gasoline hybrid</td>
<td>35</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: http://auto.daum.net

- Originally property tax assuming value proportional to engine size

- Now, the tax neither property tax nor environmental protection or GHG emission penalty
II. Car Property Tax

UK like Car Tax Scenario and Effect (Hwang and Kim, 2010)

<table>
<thead>
<tr>
<th>CO2 (g/km)</th>
<th>#car (1,000)</th>
<th>Tax rate, won/year/veh</th>
<th>CO2 reduction (ton/yr)</th>
<th>Env’ benefit (mil won/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 130</td>
<td>536</td>
<td>0</td>
<td>13,161</td>
<td>412</td>
</tr>
<tr>
<td>&lt; 150</td>
<td>1,173</td>
<td>69,912</td>
<td>39,069</td>
<td>1,224</td>
</tr>
<tr>
<td>&lt; 175</td>
<td>2,996</td>
<td>134,446</td>
<td>284,285</td>
<td>8,906</td>
</tr>
<tr>
<td>&lt; 200</td>
<td>3,782</td>
<td>201,669</td>
<td>745,772</td>
<td>23,364</td>
</tr>
<tr>
<td>&lt; 225</td>
<td>2,684</td>
<td>268,892</td>
<td>653,374</td>
<td>20,469</td>
</tr>
<tr>
<td>&lt; 250</td>
<td>1,048</td>
<td>403,338</td>
<td>333,215</td>
<td>54,375</td>
</tr>
<tr>
<td>=&gt;250</td>
<td>262</td>
<td>537,784</td>
<td>189,611</td>
<td>3,806</td>
</tr>
<tr>
<td>sum</td>
<td>12,483</td>
<td></td>
<td>2,258,487</td>
<td>112,556</td>
</tr>
</tbody>
</table>

• Tax revenue decrease by 350 billion won
• GHG decrease by 2.3 million ton (2.8% of road sector total)
• Benefit from reduced environment external cost 156 billion won (including carbon reduction benefit*)
• Short term tax loss adjustable in implementation stage

* 2010 carbon price applied
### National Freeway Toll Discount Scheme

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Discount rate</th>
<th>Trip length</th>
<th>Vehicle type</th>
</tr>
</thead>
<tbody>
<tr>
<td>To work, 05:00 – 07:00</td>
<td>50%</td>
<td>&lt; 20km</td>
<td>Car</td>
</tr>
<tr>
<td>To home, 20:00–22:00</td>
<td></td>
<td></td>
<td>Van 2-axle truck</td>
</tr>
<tr>
<td>To work, 07:00 – 09:00</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To home, 18:00–20:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Price not based on demand
- Revenue loss 240 billion won, CO2 increase 84,000 ton per year

Note: Non-peak toll 1,300 won – 1,900 won
History of Toll Discount Implementation

- Left wing party (1998-2007) lost office by allegedly poor national economy
- Right wing party new in office introduced the discount to boost economy and help low income class commuter
- But peak time freeway is operated in close-to-capacity condition – low elasticity to price
- Commuters’ average saving per month is only around 20,000 won
- Low income class commutes by public transport
- Discount only loses revenue for further investment
III. Toll Discount in Peak Time

Survey by Han (2009)

- Freeway toll 10% increase in peak and decrease in other TOD
  - 33% of weekday trip shifting to other mode/time/route
  - 45% of weekend trip shifting to other mode/time/route
- 44.8% Seoul residents yes for toll level change based on demand (or peak high, non-peak low)
- 69.7% Seoul – Cunchun freeway (one of most crowded) users yes for the change
III. Toll Discount in Peak Time

Toll Scheme Suggestion by Han (2009)

- **DOW**
  - Standard
    - Weekday: 100
    - Weekday non-peak: 90
    - Weekday peak: 10% DN 99
  - Weekday peak: 10% UP 99

- **TOD**
  - Weekday non-peak: 81
  - Weekday peak: 99
  - Weekend non-peak: 110
  - Weekend peak: 121
  - Weekend: 10% DN 99
  - Weekend peak: 10% UP 121
Fuel Subsidy Implementation History

• As of 2000. 07 price of gasoline : diesel : LPG=100 : 47 : 26 by low tax rate on diesel and LPG under philosophy that diesel and LPG for business

• # of diesel and LPG private car increase causing tax revenue loss


• To make up revenue loss of truck, bus, taxi operators, subsidy to them so that tax level set to 2001 (born as temporary subsidy but lasting)

• Fund from local tax on fuel sale at gas station

- Beneficial for low income truck and taxi operators (gini coefficient decrease after implementation)
- Fraud application for subsidy
- Competitiveness of rail shipping down
- Consigner to order shipping taking advantage of subsidy due to low shipping cost
- No good for improving efficiency of logistics system

Long term suggestion

- Increase fare and shipping fee so that operators not depend on government subsidy
- → Logistics system efficiency improves to make cost down
Summary and Discussion

• Car property tax based on engine size, peak time toll discount, and fuel subsidy not good to improve energy efficiency of national transport system

• Policies in wrong direction born for many reasons

• Price policies once implemented, hard to correct or redirect due to political resistance

• Make political leadership aware of long term social loss by short term political benefit
Transport Energy Efficiency International Comparison

References


• S. Han (2009) Freeway System Efficiency Upgrade Strategy: Toll Rate Differentiation Based on Demand, Korea Transport Institute. 국내 고속도로 이용 효율성 증대방안 연구: 고속도로 차등요금제를 중심으로


• H. Gweon et al. (2012) Truck Fuel Subsidy Improvement Strategy, Korea Transport Institute, Ministry of Land Transport and Maritime. 화물자동차 유가보조금 제도 개선방안 연구