The effect of transport policies on car use: Theory and evidence from Latin American cities
Francisco Gallego, Juan-Pablo Montero and Christian Salas

Discussion
Vincent Breteau, CGDD/SEEIDD
Objectives of the paper

• Analyze short and long run effects of transport policies aiming at a reduction of car use

• Twofold approach:
  • Theoretical model of households' behavior towards car ownership and use
  • Empirical model testing for the effects of such policies
Context, choice of cities and indicators (1/2)

- Some transport policies implemented by Latin American cities are gradual, some are drastic
- Mexico City: Hoy-No-Circula
  - Private vehicles are banned one day per week
  - High compliance (heavy fines, police control)
- Santiago: TranSantiago
  - “Improvement” of the public transport system
  - Drastical increase in waiting time and congestion
Context, choice of cities and indicator (2/2)

- CO concentration along the day as indicator of traffic
  - Global indicator instead of local traffic indicators
  - Relatively good link between concentration and emission
Theoretical model

- Models households' behavior towards car ownership and use, in short and long run, for peak and off-peak periods

- Transport policies may be translated in terms of parameter changes in the model

- Numerical simulations give “qualitative” results
Empirical analysis

- Based on the CO concentration indicator, it confirms what the model highlights:
  - Car use increase in the long run
  - Car use decrease in the short run for car restriction policy
- Other indicators corroborate the results
  - Car ownership increase
  - Car use increase
  - Taxi use increase
Remarks and questions

- First of all:
  - A very interesting paper
  - A complex though comprehensive model
  - Very interesting use of several complementary indicators
Remarks and questions (1/4)

• In the model, it is assumed that \( \Delta p^h > \Delta p^l > 0 \)
• Road congestion and PT supply levels for peak and off-peak are likely to give \( \Delta p^l > \Delta p^h > 0 \)
• It is assumed that car use is more intense during peak than during off-peak period
  • In the Paris region in 2001, PT modal share was:
    – 46% during morning peak
    – 29% during off-peak period

→ Could you explain your choice? What are the modal shares in the city you studied?
Remarks and questions (2/4)

• In the numerical computations, several estimations of the long run effect
  • Taking into account adverse selection (lemon effect)
  • Assuming that new vehicles are dirtier than existing stock
• In Europe, pollutant emissions of new vehicles tend to decrease
  ➔ Why have you assumed that new vehicles could be dirtier? Is it because very old cars could be used as second car?
Remarks and questions (3/4)

- The indicator used in the paper is CO concentration.
- In France and in Europe, NO$_2$ concentration is generally considered a better indicator of traffic level.
  - Length of residence is shorter.
## Remarks and questions (3/4)


<table>
<thead>
<tr>
<th>Constituant</th>
<th>Formule</th>
<th>% volume / air sec</th>
<th>Temps de résidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>vapeur d'eau</td>
<td>H₂O</td>
<td>variable</td>
<td>10 jours</td>
</tr>
<tr>
<td>diazote</td>
<td>N₂</td>
<td>78.084</td>
<td>15 millions d’années</td>
</tr>
<tr>
<td>dioxygene</td>
<td>O₂</td>
<td>20.948</td>
<td>8000 ans</td>
</tr>
<tr>
<td>dioxyde de carbone</td>
<td>CO₂</td>
<td>0.037</td>
<td>15 ans</td>
</tr>
<tr>
<td>méthane</td>
<td>CH₄</td>
<td>1.7.10⁻⁴</td>
<td>9 ans</td>
</tr>
<tr>
<td>hydrogène</td>
<td>H₂</td>
<td>5.10⁻⁵</td>
<td>10 ans</td>
</tr>
<tr>
<td><strong>monoxyde de carbone</strong></td>
<td>CO</td>
<td>1.2 10⁻⁵</td>
<td>2 mois</td>
</tr>
<tr>
<td>ozone</td>
<td>O₃</td>
<td>2 à 200 10⁻⁶</td>
<td>1 à 2 mois</td>
</tr>
<tr>
<td>ammoniac</td>
<td>NH₃</td>
<td>0.1 à 10⁻⁶</td>
<td>20 jours</td>
</tr>
<tr>
<td><strong>dioxIDE d’azote</strong></td>
<td>NO₂</td>
<td>10⁻⁷</td>
<td>1 jour</td>
</tr>
<tr>
<td>COVs</td>
<td>CₓHᵧOz</td>
<td>0.1 à 10⁻⁶</td>
<td>quelques heures</td>
</tr>
<tr>
<td>dioxyde de soufre</td>
<td>SO₂</td>
<td>2.10⁻⁸</td>
<td>1 jour</td>
</tr>
<tr>
<td>sulfure d’hydrogène</td>
<td>H₂S</td>
<td>2.10⁻⁸</td>
<td>1 jour</td>
</tr>
</tbody>
</table>
Remarks and questions (3/4)

Temps de vie caractéristique des espèces

Remarks and questions (3/4)

- The indicator used in the paper is CO concentration.
- In France and in Europe, NO$_2$ concentration is considered a better indicator of traffic level.
  - Length of residence is shorter.
  - Diesel cars emit 25 times less CO than gasoline cars, where they emit twice more NO$_x$ than gasoline cars.

→ Why this choice of CO instead of NO$_2$? How is the share of diesel cars changing in Latin American cities?
Empirical estimations show that these transport policies have had the effect the model had predicted.

They are not aimed at testing the formulation of the theoretical model itself.

Have you tried to test this formulation? Do you think it could be done?