The effect of transport policies on car use: Theory and evidence from Latin American cities

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Discussion

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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

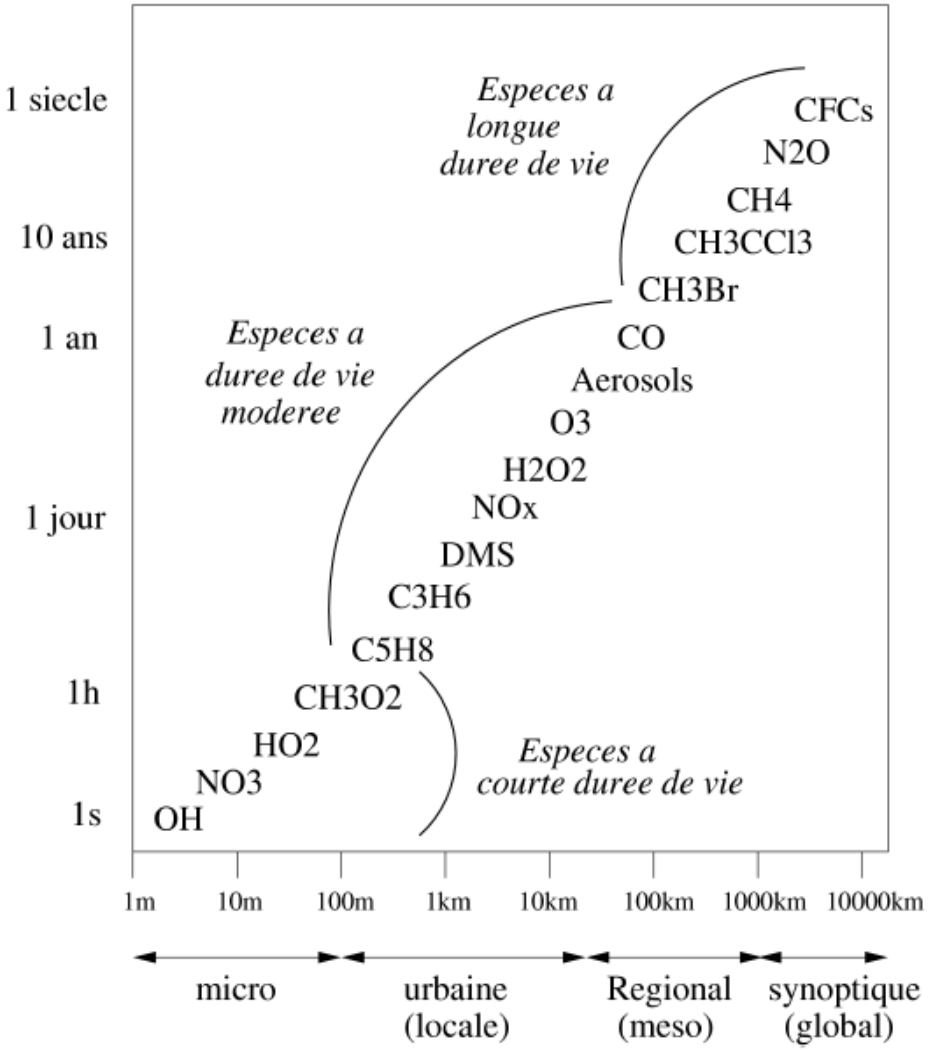
Remarks and questions (3/4)

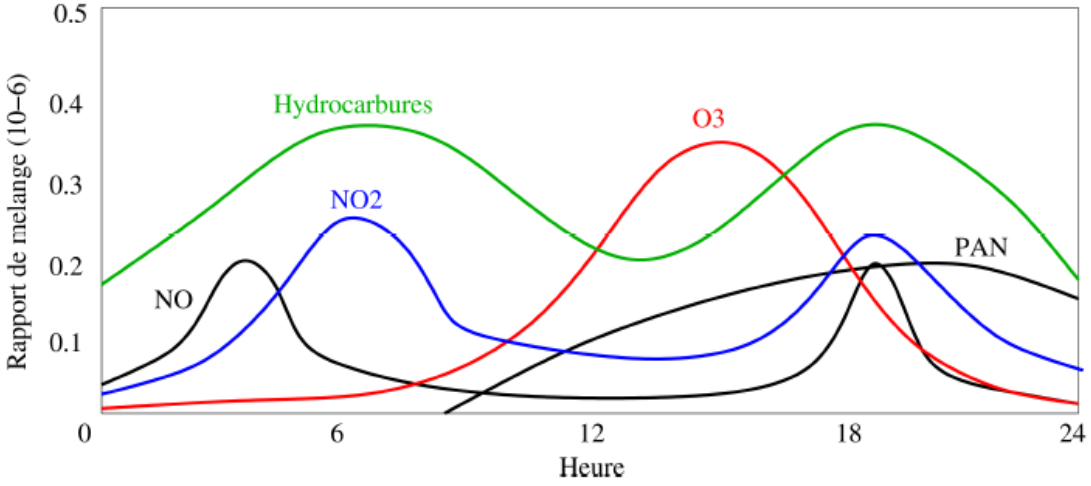
Constituant	Formule	% volume / air sec	Temps de résidence
vapeur d'eau	H_2O	variable	10 jours
diazote	N_2	78.084	15 millions d'années
dioxygene	O_2	20.948	8000 ans
dioxyde de carbone	CO_2	0.037	15 ans
méthane	CH_4	$1.7.10^{-4}$	9 ans
hydrogène	H_2	5.10^{-5}	10 ans
monoxyde de carbone	CO	$1.2\ 10^{-5}$	2 mois
ozone	O_3	2 à 200 10^{-9}	1 à 2 mois
ammoniac	NH_3	0.1 à 10^{-6}	20 jours
dioxyde d'azote	NO_2	10^{-7}	1 jour
COVs	$C_xH_yO_z$	0.1 à 10^{-6}	qques heures
dioxyde de soufre	SO_2	2.10^{-8}	1 jour
sulfure d'hydrogène	H_2S	2.10^{-8}	1 jour

Source: Menut, L. (2010)

Remarks and questions (3/4)

Temps de vie caractéristique des espèces





Source: Menut, L. (2010)

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?

Remarks and questions (4/4)

- 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?