

Mobility choices toward the environment, social norms and economic incentives: an investigation through discrete choice experiments

Charles Raux (LET, University of Lyon)

Keywords: environment; long distance travel; social norms; tax; quotas; discrete choice; experiments

Transport generated 22 per cent of anthropogenic CO₂ emissions in the world in 2011 with three-quarters due to road (IEA, 2013). Moreover, emissions from road transport have increased by 52 per cent in the world between 1990 and 2011. Several countries have set their own ambitious targets of a reduction of their overall greenhouse gas emissions by four by 2050. When it comes to transport there is a broad consensus that improvement undertaken in vehicle energy efficiency will not be sufficient and that shifting from individual to public transportation or lower-emission modes per passenger-km or even a reduction of kilometers travelled is needed.

Carbon taxes and vehicle taxes are recognized as the most cost-effective instruments to foster these shifts in transport technology and travel behavior (Parry et al., 2007). However, public opinion in most countries is very sensitive if not resistant to fuel tax increases.

On another side, recent studies in the field of “behavioral economics” have shown that influences devised from social psychology may perform as well and even better than pure economic incentives in generating pro-environmental behavior for instance in the fields of domestic waste management, water or energy consumption.

The aim of the research presented here is to evaluate and compare experimentally the effectiveness of social norms and economic incentives in changing travel behavior. Social norms tested in the experiments include: information on travel mode emissions; an injunctive (or prescriptive) norm, e.g. “everybody should halve her own emissions”; and a descriptive norm e.g. “60% of people do manage daily to reduce their personal emissions”. Economic incentives include a conventional (carbon) tax and quotas of fuel consumption (in the form of “personal carbon trading”).

Methodology:

The empirical study is based on a series of “discrete choice experiments” (DCE) applied to a hypothetical context of long distance travel for leisure/holidays. These experiments are conducted on an Internet panel representative of the French urban population. A “control group” (N=300) is faced with a series of 6 exercises where price and duration of travel of four modes (air, train, bus, car) are varied according to an efficient design (Rose and Bliemer, 2013). Choice of travel mode or giving up travel is then asked to respondents. “Treatment groups” (N=100) are each faced with the same choice but also given an additional effect such as a social norm or an economic incentive as referred to above.

Results:

Currently four experiments have been conducted (the control group plus three treatment groups). These three treatment groups are submitted to respectively and cumulatively the

following three effects: 1) information on CO₂ emissions of the various travel modes; 2) an injunctive norm; 3) a descriptive norm.

The analyses with discrete choice models give the following results:

- on the control group, values of travel time according to the four modes show good accordance with revealed preference values of travel time for leisure found in the literature;
- the effect of information on CO₂ emissions of travel is highly significant (and negative) for each travel mode; it is higher (in absolute terms) for air and car than for train and bus;
- this effect of information is strengthened by the injunctive norm whose coefficient is highly significant for each travel mode and higher than the only information effect for some travel modes (air and train);
- the cumulated effect of a descriptive norm maintains a significant overall effect, but lessened in magnitude when compared with the first effect of CO₂ information.

The preliminary conclusions are that social norms are on their own highly effective in changing (stated) behavior. However, the lessening effect of the descriptive norm indicates that “too much” might be counterproductive. Further results comparing the effects of economic incentives will be presented at the time of the conference. This research makes a tangible contribution to applications of behavioral economics in travel behavior analysis, which are still rare (Gaker et al, 2010).

References:

- Frey, B., 1997. Not just for the money: An economic theory of personal motivation. Cheltenham: Edward Elgar.
- Gaker, D., Zheng, Y., Walker, J., 2010. Experimental Economics in Transportation: Focus on Social Influences and Provision of Information. *Transportation Research Record*, Travel Behavior 2010, vol. 1, Issue no. 2156, pp 47-55.
- Louviere, J.J., Hensher, D.A., Swait, J.D., 2000. *Stated Choice Methods: Analysis and Applications*. Cambridge University Press.
- Parry, I.W.H., Walls, M., Harrington, W., 2007. *Automobile Externalities and Policies*. Discussion Paper 06-26. Resources For the Future, Washington, 37 p.
- Rose, J. M., Bliemer M. C. J., 2013. Sample size requirements for stated choice experiments. *Transportation* (2013) 40:1021–1041