

The lasting impact of incentives: evidence from a peak avoidance experiment

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Introduction - background

Prevalent issue in transportation: **Congestion**

Ways to deal with this externality:

- Different taxation schemes
- Reward peak avoidance
- Tradable peak permits

Multiple *Spitsmijden* experiments in the Netherlands in recent years

Introduction - aim of this paper

Policy questions:

- To what extent is commuting behaviour affected by the incentive?
- Does it have a lasting impact?

Many claims made in policy reports

Contribution of this paper:

- 1 Identifying impact of participation on post-experiment behaviour relative to reference
- 2 Both participants & non-participants

Literature

Transportation context:

- Fujii and Kitamura (2003) research effect of one month free bus ticket on habit of driving
- Rose and Marfurt (2007) impact of ride to work event
- Ettema, Knockaert, and Verhoef (2010) suggest peak avoidances not sustained

Other context:

- Swait, Adamowicz, and Bueren (2004) provide an approach to include previous behaviour in choice of fishing site

Data - background information of experiment



Location: A12 motorway between Gouda and Zoetermeer (NL)

Timing: November 2008 - December 2009

Participants: close to 5000

Reward: €4 per *avoided* peak

Data - selection of observations

Requirement: functioning camera's (reference, reward & post-experiment periods)

Multiple starting moments

141 participants (April 2009 - December 2009)

200 randomly selected other road users

4 weeks of observations during reference period

6 weeks of observations spread over reward period

2 weeks of post-experiment observations (2 months after end)

Habits

Definition of Goodwin (1977):

'various sources of resistance to a change that on purely economic or rational grounds would be made'

(Relatively) insensitive to changes in levels of attributes once habit is formed

Swait, Adamowicz, and Bueren (2004):

Habit persistence - previous attribute levels

State dependence - previous choices that influence behaviour

Utility function

Discrete choices of 15 min. intervals between 6-10 AM

$$V_{ijt} = \beta_0 + \beta_1 TT_{jt} + \beta_2 E_{ijt} + \beta_3 L_{ijt} + \beta_4 M_{ijt} + \beta_5 Y_{it-1} + \varepsilon$$

TT_{jt} = travel time at alternative j on day t

E_{ijt} = early relative to preferred moment

L_{ijt} = late relative to preferred moment

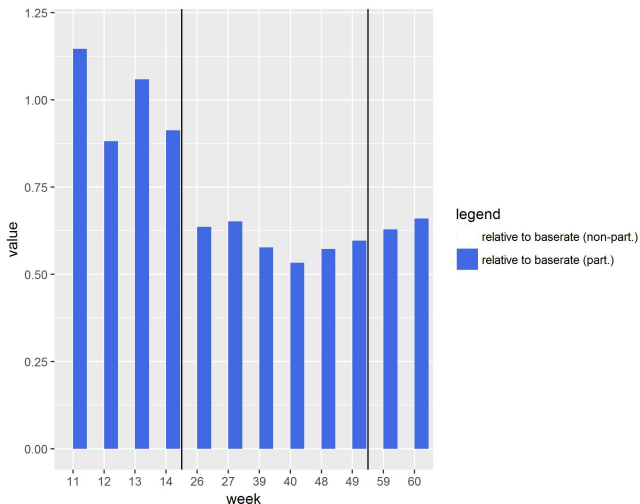
M_{ijt} = dummy for reward

Y_{it-1} = choice of individual i at day $t - 1$

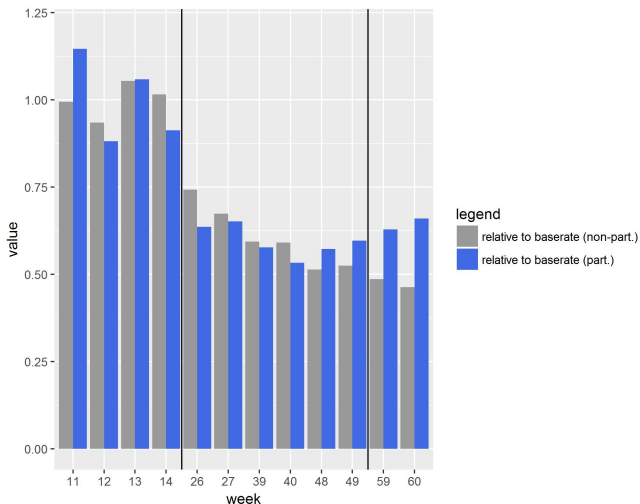
$$H_0: \beta_5 = 0$$

$$H_1: \beta_5 > 0$$

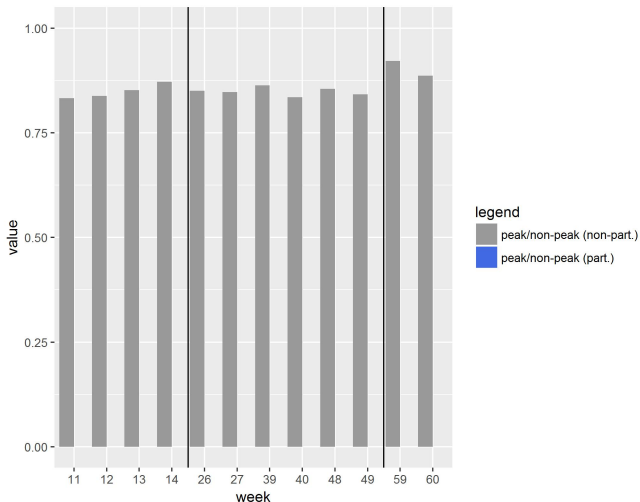
Data patterns



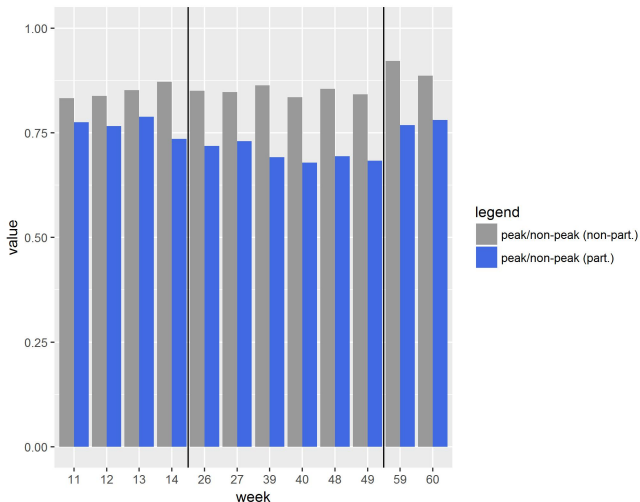
Data patterns



Data patterns



Data patterns



Next steps:

- Data of other participants, starting at different moments
- Determine possible different reference groups
- Estimation (!)

Take away:

- Important to consider non-participants
- Lasting impact?

-  Ettema, Dick, Jasper Knockaert, and Erik Verhoef (2010). “Using incentives as traffic management tool: empirical results of the” peak avoidance” experiment”. In: *Transportation Letters* 2(1), pp. 39–51.
-  Fujii, Satoshi and Ryuichi Kitamura (2003). “What does a one-month free bus ticket do to habitual drivers? An experimental analysis of habit and attitude change”. In: *Transportation* 30(1), pp. 81–95.
-  Goodwin, Phil B (1977). “Habit and hysteresis in mode choice”. In: *Urban studies* 14(1), pp. 95–98.
-  Rose, Geoff and Heidi Marfurt (2007). “Travel behaviour change impacts of a major ride to work day event”. In: *Transportation Research Part A: Policy and Practice* 41(4), pp. 351–364.
-  Swait, Joffre, Wiktor Adamowicz, and Martin van Bueren (2004). “Choice and temporal welfare impacts: incorporating history into discrete choice models”. In: *Journal of Environmental Economics and Management* 47(1), pp. 94–116.