Using Incentives as Traffic Management Tool: Empirical Results of the ‘Peak Avoidance’ Experiment

Dick Ettema\textsuperscript{a}, Jasper Knockaert\textsuperscript{b} and Erik Verhoef\textsuperscript{b}

\textsuperscript{a}. Utrecht University, Faculty of Geosciences, PO Box 80115, 3508 TC Utrecht
\textsuperscript{b}. Free University, Amsterdam
d.ettema@geo.uu.nl

The Peak Avoidance Experiment

• Rewarding desired behaviours (travelling outside the peak, or using other modes) instead of penalising undesired behaviour

Research questions

• What is the effect of rewarding in the context of repetitive behaviour?
• What is the longer term effect of rewarding?
• Which constraints affect the behavioural responses to reward policies?

Design of the experiment

Location and timing

• A12 motorway between Zoetermeer and The Hague (6000 vehicles in the morning peak).
• 340 commuters between Zoetermeer and The Hague were rewarded during 10 weeks (October-December 2006)

Incentive strategy

• Participants were rewarded if they did not travel by car in the peak period (7.30-9.30), but:
  • travel by car before or after the peak
  • travel by public transport, carpool or bicycle
  • telecommute

Two reward options

• 3 monetary reward options: 1. 3 euro to avoid the 7h30–9h30 peak hour 2. 7 euro to avoid the 7h30–9h30 peak hour 3. as 2, but 3 euro when travelling between 7h30-8h00 or 9h00-9h30
• credits to earn a Smartphone: 60% of peak periods needs to be avoided

Detection and data

• Car detection with on-board-units
• travel diary to record use of other modes, telecommuting and non-working days
• behavioural data also collected 4 weeks before and 2 weeks after the reward period

Effects of monetary reward

• without reward: 50% travels by car in the peak
• 3 EURO reward: 26% travels by car in the peak (-48%)
• 7 EURO reward or variable reward: 19-20% travels by car in the peak (-60%)
• primary behavioural response: shift to periods before and after peak
• no structural behavioural change following the reward

Situational effects

• logistic regression models of behavioural responses

Results

• flexible work hours and availability of alternative modes increase behavioural change
• being a single parent prohibits early work start
• high education increases the probability of telecommuting
• users of travel information are more likely to avoid the peak

Conclusions

• using rewards (3-7 EURO or credits for a Smartphone) reduce car use in the peak by more than 50% (but for a self-selected group)
• most car trips are rescheduled to the periods before and after the peak
• when the reward ends, participant return to their original behaviour

Detection and data

• Car detection with on-board-units
• travel diary to record use of other modes, telecommuting and non-working days
• behavioural data also collected 4 weeks before and 2 weeks after the reward period

Effects of monetary reward

• without reward: 50% travels by car in the peak
• 3 EURO reward: 26% travels by car in the peak (-48%)
• 7 EURO reward or variable reward: 19-20% travels by car in the peak (-60%)
• primary behavioural response: shift to periods before and after peak
• no structural behavioural change following the reward

Situational effects

• logistic regression models of behavioural responses

Results

• flexible work hours and availability of alternative modes increase behavioural change
• being a single parent prohibits early work start
• high education increases the probability of telecommuting
• users of travel information are more likely to avoid the peak

Conclusions

• using rewards (3-7 EURO or credits for a Smartphone) reduce car use in the peak by more than 50% (but for a self-selected group)
• most car trips are rescheduled to the periods before and after the peak
• when the reward ends, participant return to their original behaviour