

## Pricing, rewarding or a budget

### A study about the expected effectiveness and acceptability of the price measures pricing, rewarding and a budget among rush-hour drivers.



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From an economical point of view, price-measures have been mentioned for decades as a tool to influence the behaviour of car drivers. Different kind of price-measures exist. This research focuses on three kinds of price-measures, namely **pricing**, **rewarding** and a **budget**. Both ARCADIS and the Dutch Directorate-General for Public Works and Water Management (Rijkswaterstaat) are interested in more knowledge about the expected effectiveness and acceptability of these price-measures. In this study, with the concept pricing the car driver is obliged to pay four euros each time driving during rush hour. With rewarding the car driver receives four euros each time avoiding rush hour. And with a budget the car driver receives four euros each time avoiding rush hour, but is obliged to pay four euros when he or she drives more often during rush-hour. The goal of these price-measures is to encourage current rush-hour drivers to avoid the rush-hour. Hence, this study only focuses on rush-hour drivers.

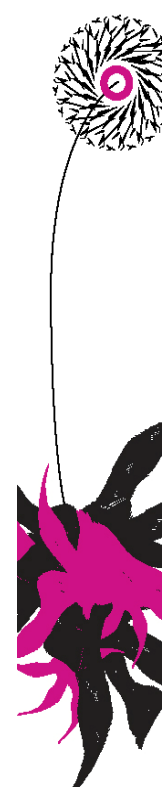
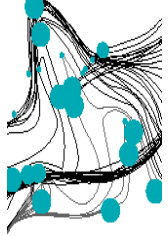
In the existing literature several factors have been mentioned that could influence the expected effectiveness and acceptability of these price-measures. These factors can be classified into two categories: characteristics of the measure and characteristics of the rush-hour driver. However, there is only limited knowledge concerning the influence of these two categories, which makes it difficult to make a well-founded decision between the different price-measures and to give advice about the way price-measures should be implemented. Therefore, the objective of this study is stated as following:

#### **STUDY OBJECTIVE**

*To gain improved insight into the expected effectiveness and acceptability of the price-measures pricing, rewarding and a budget, with the goal to provide a well-founded basis for the choice between the different price-measures and to give advice about the way price-measures should be implemented to reduce rush-hour problems.*

The existing knowledge is not sufficient as a consequence of two reasons. Firstly, the expected effectiveness and acceptability of rewarding and a budget in traffic situations has only been studied to a limited extent. Secondly, there is no agreement on the actual influence of the different characteristics of the measures and the rush-hour drivers and how these characteristics are related to each other. For those reasons, a qualitative study is performed. The results of the study can act as a basis for further quantitative research. Focus groups are chosen as the study method instead of (one-on-one) interviews. The interaction in focus groups makes it easier for the participants to talk about price-measures and to form an opinion. However, group interaction can also create bias in the results. In total four focus groups of two hours





were held with six or seven participants. Due to this limited sample size it is not possible to generalize the results for all rush-hour drivers, but as stated earlier the results can be used as a basis for further quantitative research.

All participants were users of the road network of the region Arnhem Nijmegen and most had a business or commuting motive to drive during rush hours. Compared to the average rush-hour drivers the group of participants was overrepresented by males, elderly (55-65 year), high educated, drivers with an annual kilometrage above 30.000 and drivers who live together with a partner and children. This overrepresentation of specific groups could have influenced the expected effectiveness and acceptability slightly. To the participants the following case was presented: as a consequence of large-scale maintenance to one or more bridges, a price measure will be introduced for the next half year to limit the expected increase in congestion.

From both the literature and the focus groups it appears that the size of price changes, the offer of alternatives and the time between behavior and consequences are important for the expected effectiveness of price-measures. With regard to the acceptability, equity and the expected effectiveness play an important role according to the literature and the focus groups. This leads to the following recommendations:

- Rush-hour drivers should be stimulated with price-measures to change their behavior. A price change around four euros each time is for most participants enough to avoid rush-hour.
- Alternatives need to be offered when they are not available.
- It should be anticipated that many rush-hour drivers will use alternative routes when a location-bounded price measure is introduced during rush-hours.
- The time interval between behavior and consequences need to be reduced to a minimum.
- During a long term national deployment of price-measures the current taxes for car use need to be canceled or reduced, so car user are only charged for the use of their car.
- The reward or budget needs to be financed from taxes related to car use. This should be announced via several media to let non car users know that they do not pay for the reward or budget.
- Rush-hour drivers should be informed about the expected positive effects of the price measure.

From the focus groups it appears that for the expected effectiveness as well as the acceptability there are other characteristic, than those mentioned in the literature, that are just as important. These characteristics are the following: the difference between a push- or pull-measure, the complexity, the feasibility and the visibility of the total sum of rewarded money. These new insights lead to the following recommendations:

- Further research is needed on the difference between the expected effectiveness of push-measures versus pull-measures. In contrast to earlier studies, the focus should be on pull-measures where it does not matter which alternative the car user chooses. There are participants who indicate that push-measures are more effective than pull-measures, because car users can not avoid push-measures. However, other participants indicate that pull-measures are more effective because rewarding is more effective than punishing.

- Rush-hour drivers should be encouraged to perceive the price measure as a challenge.
- A budget should not be implemented, because it is judged as to complex.
- Rush-hour drivers should be informed about the implementation of the measure and how fraud is tackled.

With sample size of the group in mind, it is advised to test these new insights on reliability via a quantitative study.

This study indicates that the acceptability of pricing and the expected effectiveness of a budget is low. On the other hand, positive effects are expected from the measure rewarding and it is acceptable as well. Therefore it is advised to implement rewarding as price measure, when a choice has to be made between the three price measures in certain situation. Remember that this decision is based on a case study in which a short term and location-bounded measure is presented.

Rewarding is probably not suited as a long-term measure and/or national implemented measure. Keeping in mind the expected low cost efficiency of rewarding and the conflict with groups that already demonstrate the favored behavior, it is estimated that pricing is more suited as a long term and/or national measure.

Finally, it is recommended to integrate a specific property of the measure budget with the rewarding measure. The property in question is the visibility of the total sum of money. It is expected that integrating this property with rewarding will result in a more effective and acceptable measure. The participants of the focus groups expect that as a consequence of the visibility of the money, a competition element arises. This new price measure will be called the rewarding-budget. With a rewarding-budget the rush-hour driver will receive a fictive budget for a certain time period. Each time the participant drives during rush-hour a fixed amount will be subtracted from the fictive budget. When the participant has budget left at the end of the period he or she can keep it. When the budget is spent at the end or before the end of the period nothing changes, so in contrast with a budget a participant can only receive money and not lose money. In order to decrease the complexity and increase the effectiveness of this new concept it is recommended to communicate frequently and via various media about the remaining rewarding-budget. For example, via a personal website, a letter, an e-mail or a text message