

A small-scale experiment on road-pricing in the research project TRANSFEED

Documentation

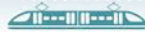
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There is a growing interest in a more sophisticated system for pricing road use than current fuel taxes and toll, both in Norway and in a number of other countries. The TRANSFEED project has conducted a small-scale experiment in which participants got installed a driving monitor in their car. The participants were divided into a control group and two treatment groups that received feedback and tips based on their driving. One treatment group received feedback on how energy efficiently they were driving. The second treatment group received feedback on the external costs they generate based on their driving, costs that will reflect an economically efficient road price. They received tips on how they can reduce the external costs they generate and thereby increase their earning of points in the experiment. Among the findings from the survey of the participants were that a small majority of participants agree that distance-based road pricing is fairer than the current road toll, and about half believe that road pricing is better than other car taxes and tolls.

Background and purpose

This report is a delivery from work package 5 in the research project TRANSFEED (ITS for sustainable TRANSport: In-vehicle FEEDback on eco-driving and external costs). The goal of TRANSFEED is to find solutions for a more sustainable transport sector. The solutions we have researched in this project all relate to how car drivers respond to feedback on their driving, e.g., information about the external costs of their driving or tips to driving more energy efficiently.

The main research in TRANSFEED has been to record driver behaviour in traffic, and to study how feedback to drivers on different aspects of the registered driving can contribute to changing behaviour and attitudes. The project has conducted a small-scale experiment with a control group and two treatment groups that received feedback and tips based on the driving recorded by an electronic driving monitor (also called the OBU – On-Board Unit) mounted in the cars. Participants were given extra incentives in the form of points that served as tickets to win cash prizes. The first




treatment group received feedback on the basis of how energy efficiently they drove, hereafter referred to as the *eco-driving group*. They got their driving compared to a benchmark for efficient driving, and got tips on how adjustments in driving behaviour could help improve their fuel efficiency (thereby increasing their score in the experiment). The second treatment group received feedback on the external costs they generated based on their driving, costs that will reflect an economically efficient road price. They also received tips on how, through adjustments in departure time- and route- and destination choices, they can reduce the external costs they generate (thereby increasing their score in the experiment).

In this report, our main focus is on road pricing, and thus on the experiences of the road pricing treatment group, hereinafter referred to as the road pricing group, compared to the other groups. A theoretically optimal road price per kilometer driven should be differentiated based on factors that reflect the costs to society that the motorists themselves do not take in, i.e. external costs. These are costs related to air pollution, noise, accidents, road wear and congestion, which in turn are linked to when and where the driving takes place. This is in theory an economically efficient means of reducing the external costs by inducing a change in the number of journeys by car, time of travel and destinations.

The purpose of this report is to present results and insights from the project related to road pricing. The focus will be on what assessments the participants in the *road pricing group* make about different aspects of road pricing after they have participated in it over a period of time. Such feedback from real user experiences from a road pricing experiment is useful in the preparatory work for a large-scale road pricing system, as it can provide some important indications of success factors and pitfalls in the implementation of such a system.

There is great interest in a more sophisticated system for pricing road use than current fuel taxes and tolls in both Norway and in a number of other countries. Much of the motivation for implementing distance-based road pricing comes from the fact that the government revenues from fuel taxes are declining as the fleet becomes more fuel efficient and the proportion of electric cars increases. This is part of the motivation in Norway (Statens vegvesen, 2021), and other places such as in Oregon (Oregon Department of Transport, 2022) or in Australia (Infrastructure Partnerships Australia, 2019). There are also expressed desires for the vehicles on the road to pay for the external costs they incur, such as congestion, local air pollution, noise, accidents and road wear.

None of the countries we have examined in this report have implemented a national or state-wide road pricing system where motorists pay per kilometer and per-km rates vary by geographic area, time of day and the environmental characteristics and size of the vehicle. Some countries have implemented relatively sophisticated road pricing systems for heavy vehicles (at least over 3.5t) where satellite technology is used to calculate the distance driven, and the per-km rates are often differentiated by car size, number of axles and environmental characteristics. In several of these countries, and several countries that do not yet have distance-based road pricing, investigations have taken place or are taking place on how to transition to a wider distance-based road pricing system for passenger cars that can be more sustainable, both financially and for



regulating the transport sector. Experiences from the TRANSFEED project and the findings documented in this report increases the knowledge on the topic that may be useful in for such studies.

Findings from a survey of the experiment participants

Participants in TRANSFEED's experiment expressed a relatively high degree of agreement that it is appropriate to charge for road use. This is a prerequisite for acceptance of any road pricing system. When we asked them about their expectations of a future road pricing system that will price congestion and environmental costs, the responses varied among the respondents, but certain tendencies could be extracted. There was a slight overweight in the expectation that road pricing will make it more expensive to drive, that people will drive less cars, that there will be better air quality and that there will be less congestion. There was a slight overweight on the side of considering that road pricing is fairer than the current toll system, but also that it will affect low-income households disproportionately. In sum, there was a slight overweight that preferring distance-based road pricing over other car taxes and tolls.

When asked about their experiences with the feedback they received on their driving, there was a relatively similar distribution between those who perceived the feedback as interesting or useful and those who did not. Respondents experienced few problems related to the feedback being disturbing or hard to understand. This is important if such a system is to be implemented on a large scale. Similarly, most participants found the OBU itself not to be disturbing. They simply forgot they had it in the car.

The participants in the road pricing group state that the information about their external costs, and the points they could earn from generating less of it, only to a minor degree led to some behavioral changes, either in where or when they drove. This may be due to the fact that a majority of them pointed out that they found it difficult to remember the feedback and tips while driving the car. Among the minority who stated that it stimulated behavioural changes, most of them responded that they were motivated by the desire to reduce emissions.

The road pricing group was faced with per-km prices that reflect the external costs calculated in TØI report 1704/2019 *External costs of transport in Norway – Estimates of marginal damage costs for passenger and freight transport*, which vary depending on the type of car being driven (i.e. emissions profile), where it is driven (higher damage costs per km in densely populated areas due to higher exposure) and time of day (higher external costs when driving on congested road links). With the prices of external costs that the participants were faced with, a small overweight answered that they found it to be expensive, but they also found that the logic behind the calculation to be understandable.

The fact that most participants consider it appropriate with road user charges does not mean that there is going to be any enthusiasm for a more sophisticated road pricing system. A small majority of participants agree that distance-based road pricing is fairer than today's tolls, and about half prefer road pricing over other car taxes and tolls. The rest either disagree, or they are uncertain or indifferent. The results cannot be



interpreted as a strong desire on the part of car owners to introduce a road pricing system. There will be both supporters and opponents of the implementation of such a road pricing system.

The research done in TRANSFEED can be improved and further developed in several ways. It faced challenges related to technical solutions, recruitment and implementation during the COVID-19 pandemic. Nevertheless, the TRANSFEED experiment has generated new knowledge that will be useful in other studies on road pricing in real traffic, hopefully at a time when the transport system is not in a particularly abnormal situation as it was during the pandemic.