

TRANSPORT FINDINGS

Knowledge of Local Toll-road Pricing in Oslo

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Findings

We investigated knowledge of local toll roads among Oslo residents with a valid driver's license and access to a car through a survey (N = 419; sample: e-scooter users). Knowledge of prices, rules, and rush hour times is limited. Only 0.5-3% of respondents indicate a correct price (± 1 NOK) for toll-passings. Correct answers regarding monthly and hourly payment caps are 10% and 17%, respectively. Finally, 4-44% of respondents indicated the correct time when peak hours start or stop.

1. Questions

Changing car driver's behaviour through road pricing and toll road policies relies on driver knowledge and awareness about these policies. Lower awareness (in this case: imperfect price information) would reduce the effect of policies on behaviour and distort market efficiency, since consumers (drivers) would be less informed about the correct price (Salop 1976; Stigler 1961). Designing policies that are both effective and fair often results in complex pricing schemes that can be difficult to understand.

Oslo, Norway, could be argued to have such a system: In Oslo's toll road system¹, prices are the same at all toll stations at the three cordons, that is, both at the City border, the Oslo ring, and on the Inner Oslo ring (see [Figure 1](#)). There are different prices for petrol/plug-in hybrid, diesel, battery electric, and hydrogen cars. Prices vary between off-peak and peak. AutoPASS tag users receive 20 percent rebate. See the supplementary information for the exact prices. The peak periods are between 06:30 and 09:00 and between 15:00 and 17:00 on weekdays. A "one-hour rule" means that you only pay for one toll crossing per hour on the Inner ring and the Oslo ring combined, and for one toll crossing per hour on the City border, regardless of how many crossings you make. Tolls are payable in both directions on the Inner ring and the Oslo ring, but only payable in one (inbound) direction on the City border. Two monthly price caps apply, respectively, to the City border ring where the cap kicks in after 60 passings during a month calendar and the two Oslo rings where the cap sets in after 120 passings. Toll stations

¹ See <https://web.archive.org/web/20231201184623/https://www.fjellinjen.no/bompenger> for the toll road system at the time of the study.

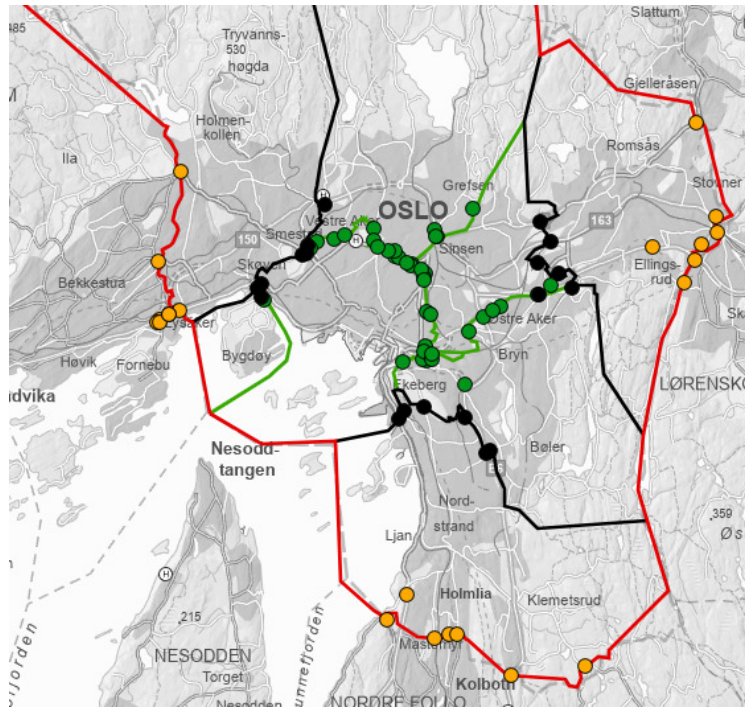


Figure 1. All toll road stations in Oslo, Norway, divided into the Inner Oslo ring (green), Oslo ring (Black), and city border (Red/Orange). Retrieved from Statens Vegvesen (2024).

operate without stopping, and charges are billed retroactively each month. Informational signs about these policies have also been removed from toll stations.

The combination of an intricate toll and pricing system and no information at the physical toll station could lead to low consumer knowledge and hence, undesired behavioural responses. To our knowledge, no studies have explored local understanding of toll road systems. Scandinavian evidence suggests that drivers' response to time differentiated road tolls varies and is difficult to model (Börjesson and Kristoffersson 2018; Franklin et al. 2016; West, Börjesson, and Engelson 2016). This suggests that unknown factors play a role. One possible reason for unexpected behavioural response to prices may indeed be unawareness of prices. Therefore, we decided to investigate Oslo residents' knowledge of the toll road pricing scheme.

2. Methods

In early November 2023, we distributed a survey to users of e-scooters in Norway. Respondents who indicated that they both lived in Oslo, had a valid driver's licence and had access to a car, were prompted to answer some questions about the local toll road. We collected 419 responses. Because the age limit for a driving licence is 18, the functional age limit for the sample is 18. The demographics of the sample are displayed below in [Table 1](#). For comparison, we also include the same data for the inhabitants of Oslo.

Table 1. Demographic information about the sample and population of Oslo. Population data from Oslo represent all Norwegians living in Norway over the age of 18, collected from [Microdata.no](https://microdata.no). Numbers in parentheses represent standard deviations.

	Sample	Oslo
N	419	585 457
Average age	45.9 (12)	45 (18)
Gender		
• Male	71%	49%
• Female	28%	51%
Education		
• Primary school	2%	15%
• Upper secondary school, 1 to 2 years	1%	5%
• Upper secondary school, 3 years	8%	20%
• Trade or journeyman's certificate	4%	4%
• Bachelor's degree or equivalent	35%	33%
• Master's degree or higher	43%	25%
Access to car		
• Yes, I own	67%	30%
• Yes, the household has	7%	-
• Yes, through sharing arrangements (carsharing etc.)	17%	-
• Yes, in another way	9%	-

Our sample is roughly the same age as the rest of Oslo, but more male-oriented, has a considerably higher education, and more often owns cars. As our sample only includes people with a valid driving licence that has access to a car, these differences are expected. However, readers should keep in mind that the general population's knowledge regarding toll roads is probably considerably lower than our findings.

Respondents were presented with yes-no questions about local toll road regulations, asked to input the price of driving through the toll road with their vehicle, and input the time of rush-hour pricing. Respondents were instructed to respond "I don't know" if this is the case, and to not make guesses. Most likely, this led to an increase in "I don't know" answers. Finally, respondents were also asked about the type of vehicle they drive and whether they had AutoPASS discount. The correct price for a toll passing was adjusted according to this.

All questions were presented in Norwegian but are translated for this article. The full statistical log used for data processing, as well as a minimized dataset, is available as supplementary information.

3. Findings

Knowledge of local toll road regulations is displayed in [Table 2](#). The majority of responses are split between wrong answers and "I don't know," with correct answers being the least common. Estimates on the price for toll-passings are displayed in [Table 3](#). As can be seen in the supplementary material, respondents tend to underestimate the off-peak price from outside of Oslo to the city centre (figure S.1). Meanwhile, the single peak hour price tends to be overestimated (figure S.2). Knowledge regarding when rush hour pricing applies is displayed in [Figure 2](#). The supplementary information

Table 2. Responses to local toll road regulation questions. Both questions had the answer options yes, no, and I don't know.

Question	Answered correctly	Answered wrongly	I don't know	Correct answer
Is it correct that when passing toll stations at the City Border and the Oslo Ring, the hourly rule applies so that you only pay for one toll crossing?	10%	58%	31%	No
Is it correct that there is a monthly cap on the number of toll crossings you pay for?	17%	28%	54%	Yes

Table 3. Overview of responses to toll road price questions. Respondents were asked to type a price, or indicate that they do not know. Correct categories are cumulative. At the time of the study NOK10 $\approx$ USD1.

Question	Correct ± 1 NOK	Correct ± 5 NOK	Correct ± 10 NOK	Wrong > 10 NOK	I don't know
"What do you have to pay to drive your car to the Oslo city centre when the trip starts at 10:00 from outside Oslo?" ¹	0.5%	7%	12%	16%	73%
"What does a single toll passing in Oslo cost for your car during rush hour?" ²	3%	16%	23%	7%	70%

¹ For the correct toll price, ± 1 NOK corresponds to 2–4% of the actual price depending on the respondent's car type and AutoPASS rebate. Similarly, ± 5 NOK corresponds to 8–18%, and ± 10 NOK to 15–36%.

² For the correct toll price, ± 1 NOK corresponds to 3–7% of the actual price depending on the energy source and AutoPASS rebate. Similarly, ± 5 NOK corresponds to 13–37%, and ± 10 NOK to 26–74%.

includes Sankey plots of the same results. In summary, only 0.5-3% of respondents indicate a correct price ± 1 NOK for toll-passings. Less than half of respondents can indicate the correct time when rush hours start or stop. In general, Oslo residents with access to cars have remarkably limited knowledge of toll road pricing and regulations, indicating that the policies could be ineffective at affecting behaviour.

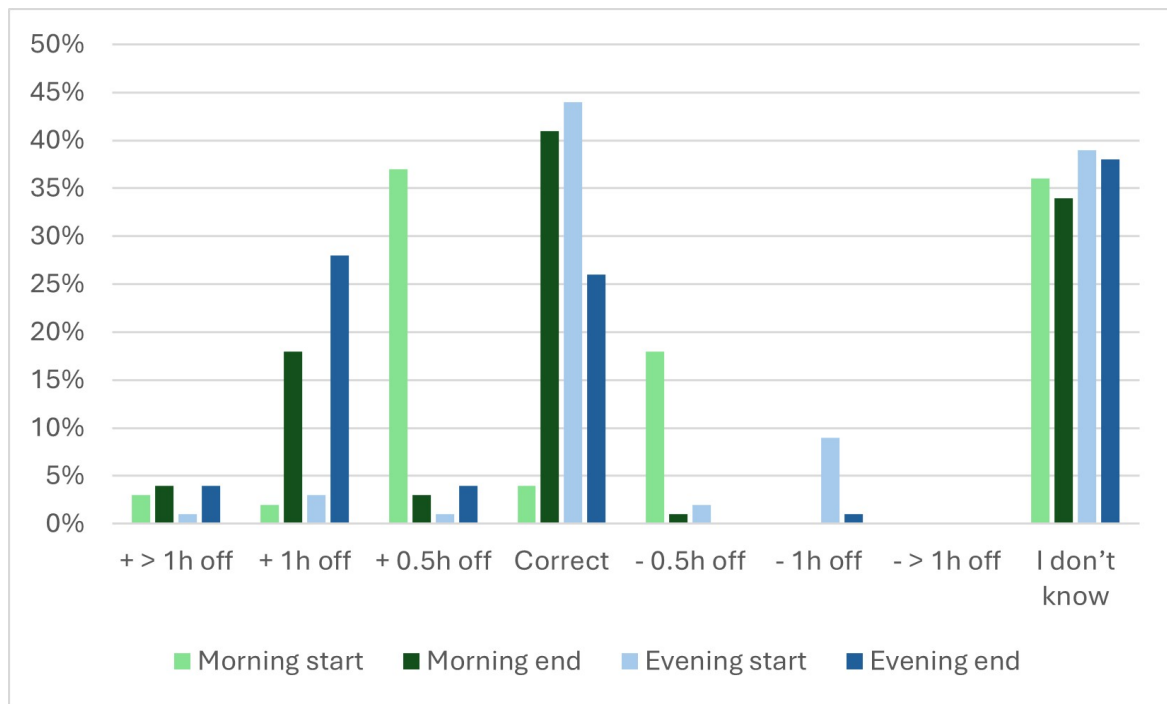


Figure 2. Overview of responses to the question “On weekdays, when in the morning/evening is there “rush hour pricing” in the toll rings in Oslo?”. Results displayed relative to the correct hour. For example, 3% of respondents indicated morning rush hour prices start that was more than 1 hour later than the correct time. Correct answers are 06:30 – 09:00 and 15:00 – 17:00.

Disclosure and conflicts of interest

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SUPPLEMENTARY MATERIALS

Supplementary information

Download: <https://findingspress.org/article/128171-knowledge-of-local-toll-road-pricing-in-oslo/attachment/261280.pdf>

Minimized dataset

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Statistical script

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