



The Gothenburg congestion charge scheme: A pre-post analysis of commuting behavior and travel satisfaction

LESSONS LEARNED FROM THE IMPLEMENTATION IN GOTHENBURG

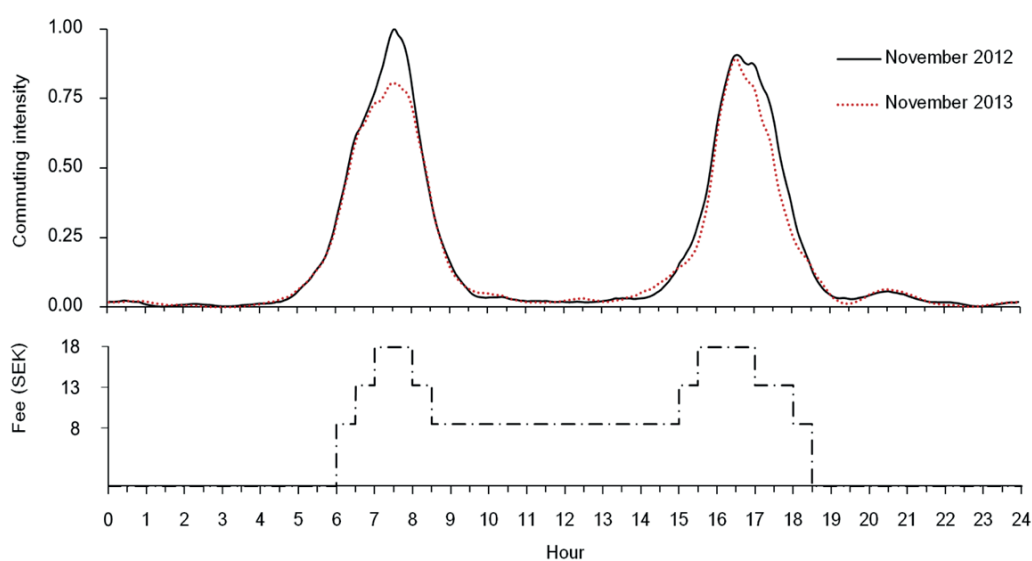
1. The introduction of the congestions charge did not affect the satisfaction with travel among citizens who were affected by the scheme.
2. Attitudes towards the congestion charge scheme were very negative before the introduction of the scheme but became more positive over time. This was the case for both respondents who chose to "adapt" by shifting modes of transport or reducing their commuting, and those who did not change behavior and paid the charge.
3. Women who commuted by car were twice as likely as men to change to another mode of transport following the introduction of the scheme, after controlling for other relevant factors.
4. The relative accessibility of different transport modes had an important effect on which adaption strategies were chosen by the respondents.

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Road pricing policies have been discussed in economic literature for almost a century by now, fueled by the question of how to provide a cost-efficient means to alleviate congestion in urban transport. A growing number of cities have also implemented congestion charges and schemes can be found in Singapore, London, Stockholm, and Milan. Nevertheless, the traffic volumes in the vast majority of the world's most congested cities remain unrestricted, with perceived lack of public support typically referred to as a major barrier for implementation. This policy brief describes lessons learned from the implementation of the congestion charge scheme in Gothenburg, Sweden's second-largest city, in 2013. Specifically, we will look at changes in travel satisfaction and attitudes for those affected/not affected by the congestion charge scheme. We also compare the adaption strategies in different socio-demographic groups.

In order to be able to analyze households affected by the Gothenburg congestion charge scheme, a survey was conducted including measures of commuting habits, attitudes (toward the congestion charge, the environment, automobility, and public transport), and satisfaction with travel, along with socio-demographic and geographical variables. The survey was distributed to a panel of 3,500 car owners in the Gothenburg region before the implementation of the scheme, with a follow-up survey to the same respondents one year later. The analysis use group comparisons and a binary logistic regression analysis and results show that the difference in accessibility of different societal functions using private versus public transport affected the propensity to reduce car travel, whereas socio-demographic variables had a low statistical significance, with the exception of women who were twice as likely to reduce their car travel than men. All studied groups reported a relatively more positive view of the scheme at follow-up. This effect was more pronounced among those adapting their commuting.



Commuting intensity (normalized) in the city of Gothenburg during the day and corresponding differences in the city's congestion charges in November 2012 (black) and November 2013 (red). The two peaks seen in the figure represent the morning and afternoon commutes and as can be seen there is a clear shift in commuting intensity in the morning peak while there are some shifts towards earlier postponed commuting during the afternoon peak. Both shifts are in line with what could be expected from the increased fee during peak hours.

1. TRAVEL SATISFACTION

Introducing a congestions charge does not seem to affect the satisfaction with travel among citizens who are affected by the scheme. This is the case irrespectively if people adapt (by shifting modes of transport or reduce their commuting) or if they continue with the same commuting behavior. This finding suggests that although congestion charge schemes may be unpopular for several reasons the experienced effects need not be negative as people adapt.

2. ATTITUDES

Attitudes towards the Gothenburg congestion charge scheme was very negative before the introduction of the scheme but both adapters and stable households grew less sceptic over the study period. Since the Gothenburg congestion charge scheme was surrounded by some political turmoil, the attitudes towards the scheme may have been affected by how the issue was handled from a political perspective.

3. COMPARING SOCIO-DEMOGRAPHIC GROUPS

The findings of the study show that sociodemographic variables such as age, income and education did have any significant effect on the behavioral change. However, women who commuted by car before the implementation of the scheme were twice as likely to change to another mode of transport following the introduction of the scheme as compared to men, even after controlling for other relevant factors. Previous research has shown that women are more likely to travel by public transport and this result also shows that women seem to be more prone to modal shift than men.

4. THE IMPORTANCE OF ACCESS

The relative accessibility of different transport modes had an important effect on which adaption strategies were chosen by the respondents. Respondents with better access to public transport were more likely to shift mode of transport. This was tested by developing an index of the relative accessibility of car and public transport different transport modes. The indices were calculated as the mean travel time from each respondent's home to fourteen different types of societal functions (hospitals, job placement services, universities, regional train stations, grocery stores etc.)

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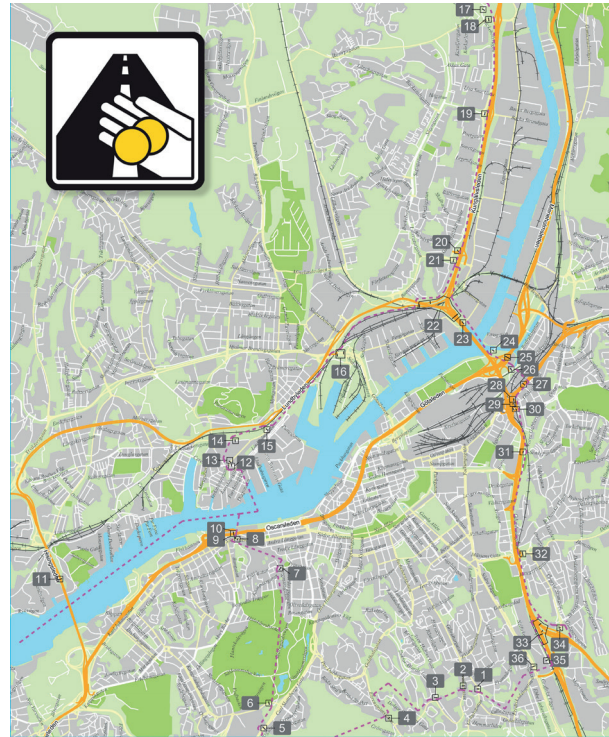
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The Gothenburg congestion charge scheme

The Gothenburg congestion charge scheme was introduced on 1 January 2013 as part of the so-called West Swedish Agreement, a larger infrastructural package intended to foster the growth, attractiveness, and environmental sustainability in the broader metropolitan region of Gothenburg. The largest investments in the package included the construction of a new train tunnel to run under the city center along with two other tunnels and a new bridge over the river running through it. The stated main purpose of the congestion charge scheme was to help finance these infrastructural investments, although it was also intended to contribute to reduced congestion and lower air pollution. The congestion charge encompasses the entire Gothenburg city center and the E6 highway connecting to it. Due to lack of natural geographical boundaries, the scheme came to encompass a total of 37 separate control stations. To prevent possibilities to circumvent the charge and thus cause secondary areas of congestion in other parts of Gothenburg, the scheme was extended with two control stations at the western bridge and northern passages.

The scheme is a time-of-day dependent cordon-based system closely resembling the congestion charge system in place in Stockholm. Electronic control points equipped with ANPR (Automatic Number Plate Recognition) technology is used at all entrances and the charge is applied when passing stations in both directions. The congestion charge varies over the time of the day in order to stimulate reduced traffic during peak hours. During the studied period, the peak charge in the morning and afternoon was SEK 18, or around EUR 2 per passage (in 2015, the charge



was increased to SEK 22). No charge is collected on Saturdays, Sundays, public holidays, during nighttime (18:30-05:59) or in July, the main vacation month. A vehicle passing through several control points within a 60-minute period will only be charged once (the highest applicable fee), and no vehicle can be charged more than SEK 60 in a single day.

The total traffic volume across the cordon during charged hours decreased by around 10% in the first year (Trafikverket 2014). Although different schemes are not directly comparable, this reduction is smaller than for some previously studied cities.