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An Empirical Analysis of the Impact of Congestion Charges on Public Opinion in Gothenburg

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Abstract: Despite the many social benefits of congestion pricing, it has been immensely difficult to overcome the public opposition and introduce a charging system. With the recent commencement of congestion charges in Gothenburg, this study examines what factors have contributed to the development of the attitude of car owners to the charges. More specifically, we will analyse whether the charges paid have had an impact on the attitude, even after controlling for socio-economic variables and beliefs in the effects. Relying mostly on panel data analysis, the results indicate that charges paid have had a negative and significant effect on the public opinion. However, positive expected effects and the fairness of the charges are more important determinants of attitudes. Policy-makers in Gothenburg need to address the equity concerns more vigorously while communicating the positive effects of the charges to the public, and this is especially important when the charge levels are raised in the future.

Key words: Congestion charging, public opinion, acceptability, attitudes, Gothenburg.

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1. Introduction

Much like in the Swedish capital a few years earlier, congestion charges in Gothenburg have been a widely debated topic both before and after their implementation. The highly encouraging improvements in the congestion and pollution levels in Stockholm made the new policy feasible also in the second largest city in Sweden. Moreover, the trial period for the charges in 2006 showed that it was possible to turn the public support for the charges despite the apparent doubts that were widespread prior to implementation. This background has later served as the benchmark for the planning and realisation of the congestion charging system in Gothenburg. Still, the current scheme in Gothenburg will allow the citizens of the city to decide on a referendum whether the charges are to become permanent or not, a decision that takes place in September 2014.

Despite the apparent economic efficiency improvements that follow from the introduction of congestion pricing, it has been difficult to gain public support for the policy. The main economic argument goes that congestion charges reduce congestion during peak hours as the limited road space has a higher price than earlier. As a result, only those who value their time high enough will pay the charge and travel through the cordon by car in less traffic. The diminished congestion ensures that these travellers enjoy faster commuting, whereas the residents within the cordon gain from positive externalities such as reduced pollution. Since the public sector now has an additional source of income, it may choose to compensate the car drivers and any other groups for the charges. All in all, with appropriate implementation the congestion charging system is expected to improve social welfare through increased efficiency and the possibility to compensate any possible losses through public investments (for a theoretical discussion about the net effects, see Eliasson & Mattsson, 2006).

According to standard economic theory with rational consumers, the objective (or real) effects of the congestion charges should ensure that a well-designed pricing scheme achieves public acceptability due to the increase in welfare. However, in reality this has only rarely been the case, even in cities with notable congestion problems. Earlier findings often suggest that instead of the objective effects, it is the subjective (or perceived) effects that are most capable of explaining the acceptability of the charges (Eliasson & Jonsson, 2011; Hamilton, 2012). Despite the correlation between objective and subjective effects, it is likely that consumers do not perceive the real effects of the policy on factors such as congestion and pollution as they are, but instead people are affected by different biases that affect their perceptions (Börjesson et al., 2012). Examples of such biases include local media reporting and attitudes related to the charges. Consequently, the acceptability of the charges is not necessarily defined according to standard theory and the objective effects, but instead by factors such as beliefs about how congestion is affected and any other changes that may occur.

Since beliefs can be biased in many ways, it is relevant to ask how they compare to the actual effects in explaining people's attitude towards the charges. Answering this question will be the main purpose of this study. More specifically, we will analyse how the acceptability of congestion charges in Gothenburg is affected by the charges paid when controlling for the perceived effects of the policy. Also, socio-economic factors and other variables related to the public opinion about the charges will be regulated. The analysis is conducted through the use of a panel data that has been collected from car owners in the Gothenburg region in 2012 and 2013. With the same respondents answering an almost identical survey in both years, it is possible to apply both cross-sectional and first-difference regression methods for the analysis. We find that despite the importance of beliefs and perceptions of the effects, the attitude to the charges is negatively and significantly related to the amount of charges paid. However, in line with earlier literature, perceptions are more important for the attitude than any other factors. We also find that there is a notable difference between the cross-sectional and first-difference results when it comes to the importance of the charges paid. This may either suggest omitted variable bias in the cross-sectional model, or that there is heterogeneity between the expected and actual payment of the charges that should be addressed by panel data analysis.

The study is structured as follows. Section 2 provides a short overview of the congestion charging system in Gothenburg and its first effects on traffic flows and travel habits. Section 3 goes through some earlier findings that provide guidance to this paper, with a distinctive focus on the experiences from Stockholm. Section 4 introduces the data that is used in the empirical analysis and shows some summary statistics that provide a broad idea about the topic. Section 5 presents the empirical model and regression results from the analysis. Finally, section 6 concludes and widens the perspective by considering questions that should be addressed by future research.

2. Background: Congestion Charges in Gothenburg

In January 2013, the city of Gothenburg came to follow Stockholm as the second Swedish city to implement congestion charges in the city centre on all vehicular traffic registered in Sweden. Charges are collected each time a car passes a toll station around the cordon area during the rush hours between 6:00 AM and 18:29 PM on normal working days. There are three different charge categories depending on the time of the day, as for the most congested hours the charge is 18 SEK, followed by charge levels of 13 SEK and 8 SEK. If one passes a toll station several times during a day, the maximum amount that will be charged is 60 SEK.

With approximately half a million inhabitants, the congestion problems in Gothenburg have not been nearly as severe as in Stockholm, a city of more than a million residents. Instead, the rationale for introducing congestion charges in Gothenburg was strongly guided by the need to collect funding for several large-scale infrastructure projects in Western Sweden, a plan that goes under the name the West

Swedish Agreement[1]. Consequently, decision-makers have probably been more drawn by congestion charges as a profitable tax than as a measure to reduce congestion. This has also been documented in Hysingen et al. (2014) through interviews with local politicians. The interviewees see that the charges should be considered as part of the West Swedish Agreement that they fund, but at the same time this whole package of policies will eventually lead to improvements in congestion and air quality. With respect to reduced congestion, the effect has already been noticeable (Göteborgs Stad, 2013b), although not as substantial as in Stockholm.

In order to measure the effects of the implementation of the congestion charges, the city of Gothenburg has conducted several surveys of the changes in travel behaviour both in the city and the neighbouring municipalities. Those people whose daily commute to work is most likely affected by the policy[2] have received particular attention in the surveys, since they have been more likely to be chosen to the sample of respondents. Effectively, this makes it possible to focus more on those travel relationships that are affected by the charges, and that accordingly are the ones where the changes are the most apparent.

In a summary report, Göteborgs Stad (2013a) outlines that car traffic has decreased by 7 % among those respondents who pass the toll cordon by car. In absolute numbers, this decrease translates into 21,000 trips less per day. The effect has been particularly strong on those people who commute to the central parts of the city from other municipalities, as these trips have decreased by 14 %. At the same time, the number of trips made by public transport passing the cordon has increased by 6 %, or 13,000 trips per day. The surveys used for the summary report have asked the same respondents to measure the number of trips they make during one day in either March or April, both before the introduction of the congestion charges in 2012 and after in 2013.

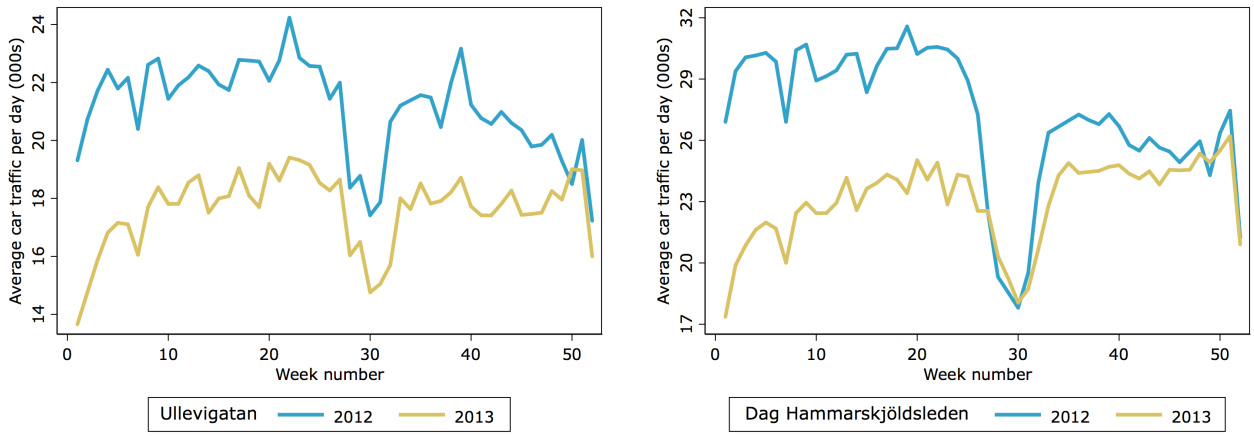
Compared to Stockholm, the short-term effects of the charging policy in Gothenburg seem expected, though the impact on car travel has been rather small. In another travel habit report for the Stockholm region during the congestion charging trial in 2006, it is estimated that the number of car trips across the cordon decreased by approximately 20 %, while the use of public transport increased by merely 5 % (Trivector, 2006). In both cities, a large share of the missing car journeys can be explained by changes in travel habits, as many respondents have started using public transport instead of private car. However, this change has probably been stronger in Stockholm with a notably wider and more developed public transport network than in Gothenburg, but at the same time there is evidence that many travellers who have earlier used some of the less common means of commuting (such as walking and bicycling) have also changed to public transport in Gothenburg.

[1] Or better know as Västsvenska paketet in Swedish. For more information see http://www.vastsvenskapaketet.se/ (available only in Swedish).

[2] The respondents most likely affected by the charges have been defined by using information about the registered place of residency and work of the respondent. This information has been used prior to the randomisation of the sample in order to form a stratified sample with a higher possibility to include respondents who are defined as "affected travellers".

Some evidence about the impact of the charges on car traffic in Gothenburg is provided in Figure 1. This figure sketches the absolute amount of car traffic at two of the busiest measurement points in the city: *Ullevigatan* is located within the cordon area in the immediate vicinity of the city centre, whereas *Dag Hammaskjöldensleden* is one of the toll stations right on the cordon to the south-east direction from the city centre. Both figures show significant differences in car traffic between 2012 and 2013. It seems that the impact of the charges has been the greatest at the very beginning, but towards the end of the year the traffic counts from 2013 have converged to the numbers from 2012. The figure also clearly shows the seasonal variation in car traffic over a year.

Figure 1. Average car traffic per day at two measurement points: Ullevigatan and Dag Hammaskjöldensleden (Source: Göteborgs Stad, 2013b)



Although Figure 1 provides a good image about how traffic has evolved at two measurement points, it does not contain enough information about overall traffic and travel patterns for us to make any further generalisations regarding the impact of the charges. If some other measurement points were chose, the development of traffic flows could seem remarkably different. Congestion charging does not affect all traffic equally, since car drivers may choose alternative routes that are charge-free. This could lead to more traffic on these particular routes, and potentially even to congestion. However, as evidence in Göteborgs Stad (2013a) shows, people do have decreased the amount of driving on average, so the aggregate effect of the charges on car traffic has been negative.

3. Earlier Findings: Attitudes and Congestion Charges

Only a small number of cities have implemented and are currently collecting congestion charges in their inner city area, and to this group belong cities such as Singapore, London and Stockholm. Due to the fierce public discussion that has often both preceded and followed the implementation of the charges, a lot of research effort has been put into understanding the factors that may affect the public acceptability (Börjesson et al., 2012 provide a good overview of the factors, whereas Schuitema et al., 2010 discuss differences in acceptability and acceptance). In this section, we will go through some general findings from the literature that will guide the empirical analysis in this study. Because of the importance of the

experiences in Stockholm to the implementation of the charges in Gothenburg, special emphasis will be laid on what has been learned in the Swedish capital.

A natural starting point for our discussion is the thesis written by Muz (2013). In her study, Muz uses data about expected effects and socio-economic variables collected in Gothenburg prior to the implementation of the congestion charges.[3] With this data, the author investigates how the two types of factors compare to each other and help determine the general attitude towards the charges prior to implementation. Earlier literature has suggested that once expected effects are controlled for, socio-economic variables do not explain much of the variation in the public opinion. Similar to the other cities with congestion charges, Muz finds that expected effects about the charges are pivotal in determining *ex ante* attitude towards the policy in Gothenburg. This leads to the conclusion that policy-makers should aim at providing more information to the citizens about the positive effects of the charges in order to achieve acceptance.

Since the congestion charges are still a very recent development in Gothenburg, there is not much other literature besides Muz (2013) regarding their effect on attitudes. As mentioned earlier, Hysing et al. (2014) have considered the policy process behind the introduction of the charges, and there is evidence that congestion as such or other factors related to congestion have not been the primary reason for the implementation of the charges. Since a more important rationale has been to fund the large-scale infrastructure projects in Western Sweden, this may also impact the public attitude to the charges if people disagree with the allocation of revenues. Many studies have discussed the importance of allocating the revenues appropriately to ensure high acceptance for the charges (Eliasson & Mattsson, 2006; Gehlert et al., 2011), because revenue allocation is the most important way to ensure that equity concerns of the policy are taken into account. This consideration is most certainly relevant also in Gothenburg.

Although there is not much additional analysis carried out in Gothenburg, the experiences from Stockholm have been widely reported in the literature. Often, it has been suggested that it is the familiarity with the actual charges that has caused the dramatic change in public support from negative to highly positive in Stockholm (Winslott-Hiselius et al., 2009). This is also the main argument proposed by Hamilton (2012) in his comparative study with Stockholm, Helsinki (Finland) and Lyon (France). With regards to congestion pricing, the decisive difference between these cities is that only Stockholm has experienced the charges, whereas in Helsinki and Lyon have not.[4] This allows the author to compare whether the experience of the charges has a considerable effect on the public acceptability, given that

[3] This very same data set is used in this study, but we now also data collected with an almost identical survey in 2013. More information about the two surveys and the sample is provided in Chapter 4 of this study.

[4] However, as the author discusses, Helsinki has recently conducted an examination of potential charges, so people should be somewhat familiar with the concept. Lyon, on the other hand, has tried peak hour pricing on one specific road segment in 1997, but recently there has not been any discussion about reintroducing congestion pricing in any form.

factors found influential in earlier literature are controlled for. More specifically, Hamilton divides the factors relevant to the public opinion into (1) self-interest (i.e. charges paid and time saved), (2) fairness of the charge, (3) other general attitudes (e.g. environmental interest) and (4) beliefs about the effects of the charge.

Hamilton finds that self-interest plays a central role in attitude formation as public acceptability decreases together with out-of-pocket spending and increases with the valuation of time. This can be considered as evidence for standard microeconomic theory that makes statements about the importance of private costs and benefits. However, more important than self-interest is the belief in the effects, although the author highlights the potential reverse causality problem between the pre-determined attitude and the perception of the effects, something that has been discussed in other articles as well. Eliasson and Jonsson (2011) provide a schematic description of a *feedback loop* that prevents the proper identification of causes and effects with respect to attitudes and perceptions. Without the expected effects, Hamilton concludes that the experience of the charges is the most significant factor contributing to acceptability.

Similar to Hamilton (2012), most other studies have also analysed socio-economic factors, self-interest and perceptions comparatively with cross-sectional data. Eliasson and Jonsson (2011) investigate the decisive factors to attitude after the trial period in Stockholm. This ensures that the public is familiar with the charges and they have experienced the effects. Based on their analysis, beliefs about the effects of the charges are found to be the most important explanation for the attitude. In addition, environmental concern, or rather the self-image of how interested one is in the environment, is also a highly meaningful factor. However, due to the nature of their data, the authors cannot compare any objective effects with subjective effects. Hence, the importance of charges paid is not clear at this point.

In a highly stylistic description, Goodwin (2006) suggests that support for road pricing follows a general pattern over time. First, with a limited amount of information about the charging system, there is no or only little public support. As more information about the problem and the potential solution becomes available, support increases. Once a sufficiently high level of support is reached, the detailed planning of the charging system may begin. This development, however, will lead to a drop in support as details and costs become increasingly available to the public. Right before the implementation of the charges support slumps, only to recover once the benefits of the system become perceivable as the charges are in place. According to Goodwin, such a trajectory has described relatively well the development of attitudes in many research projects about road pricing, and Eliasson (2014) shows that this is also the case for the charging policy in Stockholm.

Goodwin (2006) and other commentators have argued that the eventual increase in the public support is due to the apparent benefits of the system that emerge over time. Eliasson (2014) reconsiders the

explanatory factors for this development in a time horizon of several years. Somewhat speculatively, the study provides an interpretation of the fundamental causes to the change in attitudes in Stockholm between 2004 and 2011. Although the analysis does not rely on a formal model, some descriptive statistics about the development of variables over time suggest that the change in attitudes cannot be explained by the beliefs in the effectiveness of the charges, nor by variables related to self-interest. Although these factors are associated with the attitude at any given point in time, the long-run relationship is more complicated. Eliasson draws on social psychology literature instead of classical economic theories in trying to explain the change in Stockholm.

As Eliasson puts it, the public discussion about congestion charges in Stockholm has been hovering between the technical-rational domain and the moral domain. This is to say that when arguments about economic efficiency were not interesting enough to bring the question to the political agenda, it was necessary to call attention to the moral grounds, such as the improvements in air quality and climate. However, once the charges had been officially accepted in a referendum, it became important again to concentrate on the objective effects on congestion for the system to survive after implementation.

The discussion in Eliasson (2014) highlights the importance of the time frame. While in a static context it is common to conclude that both the subjective and objective effects of the charges help determine the attitude, the dynamics of attitude formation may not be as clear as standard economic theory requires. Most importantly, attitudes may not be stable enough for it to be possible to explain any changes by other variables. For empirical literature this causes the problem that the analysis of public acceptability is often lacking a solid theoretical framework on which to rely. For the policy-maker, on the other hand, it becomes increasingly difficult to make well-grounded decisions when there may exist no valid normative rules for attitudes (Eliasson, 2014).

In this study, the importance of the time frame will be addressed by conducting first-difference analysis that considers changes in variables rather than absolute values at a given point in time. However, it needs to be emphasised that our time dimension only includes two years, right before and after the implementation of the charging system. Hence, even if the pattern described in Goodwin (2006) and the findings in Eliasson (2014) can be generalised to the experiences in Gothenburg, two years is not enough to capture long-run responses. Instead, the analysis in this paper shows the immediate impact of charges on attitude, and this can be of high importance to decision-makers especially when a trial period is followed by a public referendum about the charging system.

4. Data Selection

The empirical analysis in this study relies on two surveys about travel habits that were sent to household in the Gothenburg region in March 2012 and 2013. The surveys were conducted in co-operation between the University of Gothenburg and Chalmers University of Technology. The first survey in 2012 was sent to

3499 persons who had been randomly selected from the register of car owners in Sweden. For the second round in 2013, only those car owners who had responded in 2012 received a follow-up survey that was for the most part identical to the first survey. Hence, a total of 1631 car owners received both of the surveys, and of these recipients a total of 1190 answered them both. In other words, the response rate for the first survey was just above 46 %, whereas for the second survey it reached 73 %. In total, the final response rate to both surveys of all those who received the survey in the first place was 34 %.

Each survey had been addressed to that certain person in the household who was registered as a car owner. In order to combine the information collected with the two surveys into a panel data set, it must be the same person answering the survey in both years. Since there is no possibility to monitor this, we need to make the simplifying assumption that the condition is fulfilled, or otherwise the sampling procedure and statistical inference conducted with the data may be invalid. There are two questions in the survey that can reveal that the respondent changed between 2012 and 2013, namely the variables denoting the gender and age of the respondent. To correct for the likely change in the respondent with the help of these two variables, we have deleted those observations from the sample that have reported either different gender or whose age has changed by another number than 0, +1 or +2 between the two measurements. Altogether, this results deleting 188 observations in both years.

Preliminary analysis of the data also reveals that the average age of the respondents is peculiarly high and that there is a large number of retired people in the sample. This phenomena is common for postal surveys where answering is voluntary, as retired people tend to have a higher response rate due to the fact that they often have more time to answer the questionnaire. This may cause some bias in the results, but it is unlikely to be very severe. Without information on the distribution of the whole population of car owners in the Gothenburg region, it is difficult to formally assess the representativeness of the sample. Therefore, we acknowledge the problem with the data but do not pursue to analyse the issue further except for an examination of the observed heterogeneity in a later section.

4.1. Descriptive Statistics

The two surveys contain a large number of questions related to the socio-economic background, travel habits and general attitudes of the respondent as well as the expected effects of the congestion charges. Nevertheless, only a number of these variables will be useful for the empirical analysis in this study, and these variables are described in Table 1 below. Since the original surveys are in Swedish, the questions have been translated into English by the author. The original survey questions from both 2012 and 2013 can be found in Appendixes A and B.

In Table 1, the variables have been divided into appropriate categories according to the type of the variable. Also, there are two dashed lines in the lower part of the table that have an important function. These mark three groups of variables that are most likely highly correlated with each other and may

actually reflect variation in the same latent variable. In order to capture the relevant variation in these variables and at the same time decrease the number of regressors in the empirical analysis, we will conduct factor analysis in similar fashion to what has been done in Muz (2013). More information about the procedure and the created variables will be provided later in a separate section.

Table 1. Variable descriptions.

	Variable	Description
	Dependent variable	*On a scale from 1 (bad) to 7 (good), is congestion pricing a good political decision?*
Socio-economic	Man	1 if male; 0 if female.
	Age	Age of the respondent in years.
	Nr of children	Number of children (younger than 18 years) in the household.
	Nr of adults	Number of adults (18 years or older) in the household.
	Employed	1 if gainfully employed; 0 if other than gainfully employed.
	Live in cordon	1 if living in districts Centrum, Majorna-Linné, Lundby or Norra Hisingen; 0 if living elsewhere.
	Distance H-W	An approximation of the distance in kilometres between home and work.[5]
Travel-related	Car user	1 if car is the primary mode of transport; 0 if other.
	PT user	1 if public transport is the primary mode of transport; 0 if other.
	Days car	Number of days per week usually travelled by car to work during the time of the survey.
	Days PT	Number of days per week usually travelled by public transport to work during the time of the survey.
	Start time	Usual departure time in hours (0–24) when travelling from home to work.
	Travel time	Usual travel time in minutes (5–120) when travelling from home to work.
	Charge paid	Average amount of money (in SEK) paid in congestion charge during a month.
General attitudes	Switch	Perceived possibility to change to another transport mode than car: 1 = very bad, 7 = very good.
	Env. interest	Interest in environmental issues: 1 = not interested at all, 7 = very interested.
	Revenue to PT	Revenues from the charges should go to finance public transport: 1 = positive attitude, 0 = otherwise.
	Reduce driving	Driving should be reduced due to the environment and climate.*
	Pay complex	Paying congestion charges is (will be) complicated.*
	Charge unfair	Congestion charges are unfair.*
	PT1 Trust	Public transport can be trusted to be always on time.*
	PT2 Smooth	Public transport is often a flexible way for me to travel.*
	PT3 Comfortable	It is comfortable to travel by public transport.*
Expected effects	P1 Reduce congestion	Congestion will reduce (has reduced) in the cordon area thanks to congestion charges.*
	P2 Better traffic	Traffic situation in Gothenburg will improve (has improved) thanks to congestion charges.*
	P3 Less noise & poll.	Noise and air pollution will reduce (has reduced) thanks to congestion charges.*
	P4 Easier get around	It will be (has been) easier for me to get around thanks to congestion charges.*
	N1 Worse econ. sit.	My economic situation will worsen (has worsened) due to congestion charges.*
	N2 Lower life quality	Quality of my life will worsen (has worsened) due to congestion charges.*

Note: * The variable is measured on a scale 1 = do not agree at all, 7 = agree completely.

Table 2 below provides summary statistics of the all the variables described in Table 1. Since the data used is in panel format where the same individual has answered the survey in both years, we will report summary statistics for both years separately. In addition, the last three columns show what share of all individuals has changed their response for the respective variable between 2012 and 2013. For instance, we notice that there has been much more variation in the attitudes and expected effects than the socio-economic variables. Providing figures about the changes in the variables will hopefully provide some additional information about the dynamics in the data.

[5] The distance between home and work is estimated with regards to the city district where the respondent has proclaimed to live and work. Approximate distances between these two locations have been calculated using information about the most common postal codes of all respondents, as these postal code areas have denoted the approximate centre point in their respective district. Next, distances between the centre points in each district have been calculated with the help of Google Maps. This methodology entails that only a very rough approximation of the actual distance between home and work of each respondent can be defined.

The changes in attitudes and perceptions indicate that people have become notably more positive about the charges after implementation. First of all, approximately 40 % of the respondents have increased their rating of the dependent variable, which is to say that these individuals think in 2013 that congestion charges are a better policy than they thought in 2012. On the other hand, just about 10 % have become more negative about the charges, whereas almost 50 % have not changed their view. At the same time, there is notable variation in the expected effects into more positive (or less negative) opinions.

Table 2. Summary statistics.

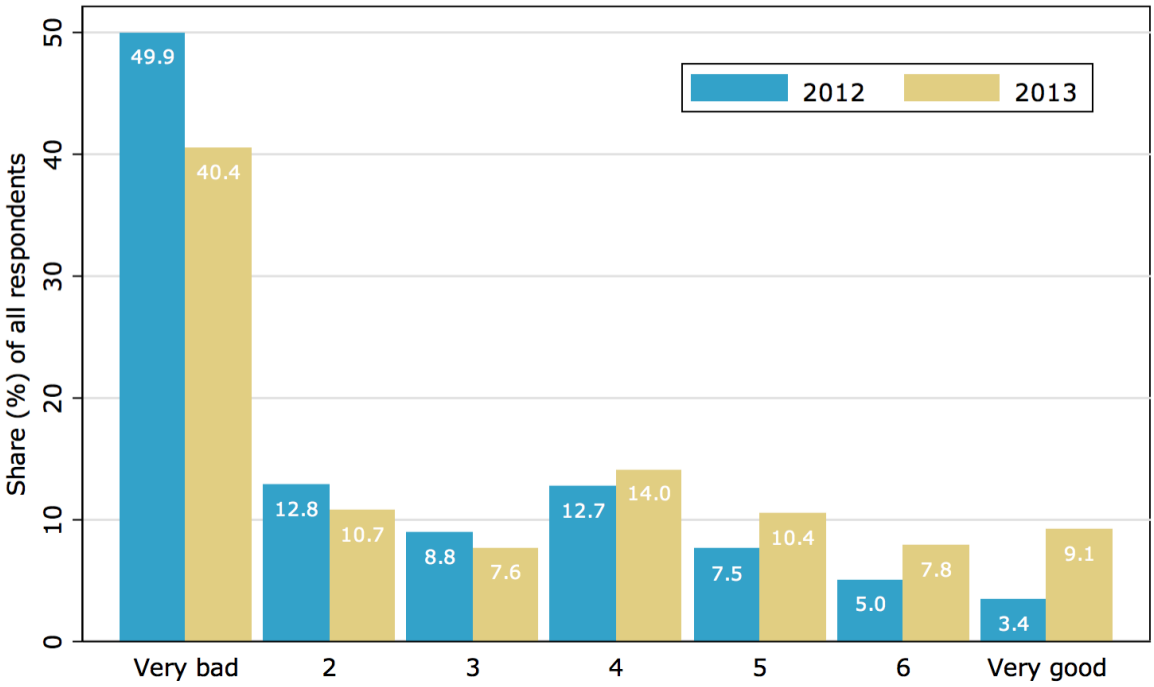
	Variable	Year	N	Range	Mean	Std.Dev.	Dec. (%)	Same (%)	Inc. (%)
	Dependent variable	*2012* *2013*	*1,066* *1,068*	*1–7* *1–7*	*2.44* *3.03*	*1.80* *2.11*	*10.14*	*49.00*	*40.86*
Socio-economic	Man	2012 2013	1,089 1,087	0–1 0–1	0.64 0.64	0.48 0.48	–	–	–
	Age	2012 2013	1,094 1,094	21–95 22–96	55.84 56.79	14.31 14.29	–	–	–
	Nr of children	2012 2013	1,092 1,074	0–4 0–5	0.51 0.51	0.87 0.88	4.38	91.23	4.39
	Nr of adults	2012 2013	1,014 1,020	1–5 1–5	1.96 1.92	0.70 0.65	10.28	81.64	8.08
	Employed	2012 2013	1,071 1,071	0–1 0–1	0.64 0.64	0.48 0.48	4.17	92.60	3.23
	Live in cordon	2012 2013	1,085 1,084	0–1 0–1	0.28 0.28	0.45 0.45	1.67	96.75	1.58
	Distance H-W	2012 2013	795 773	0–72 0–65	12.75 12.75	12.46 12.43	14.33	70.03	15.64
Travel-related	Car user	2012 2013	898 864	0–1 0–1	0.73 0.71	0.44 0.46	6.40	90.64	2.96
	PT user	2012 2013	898 864	0–1 0–1	0.14 0.16	0.35 0.36	1.85	93.47	4.68
	Days car	2012 2013	908 879	0–7 0–7	3.31 3.21	2.30 2.32	19.47	65.83	14.70
	Days PT	2012 2013	919 897	0–7 0–7	0.72 0.81	1.59 1.68	7.63	82.75	9.62
	Start time	2012 2013	837 804	0–22 0–24	7.78 7.86	2.52 2.59	34.11	33.59	32.30
	Travel time	2012 2013	825 791	5–120 5–120	30.72 31.37	21.68 22.75	32.67	32.41	34.92
	Charge paid	2012 2013	– 1,017	– 0–1,200	– 203.92	– 227.92	–	–	–
General attitudes	Switch	2012 2013	1,000 982	1–7 1–7	3.30 3.41	2.24 2.22	22.26	47.28	30.46
	Env. interest	2012 2013	1,076 1,083	1–7 1–7	5.04 5.08	1.46 1.39	24.55	46.30	29.15
	Revenue to PT	2012 2013	1,039 1,016	0–1 0–1	0.65 0.66	0.48 0.48	11.69	76.02	12.29
	Reduce driving	2012 2013	1,065 1,050	1–7 1–7	4.60 4.67	1.99 1.92	31.22	36.10	32.68
	Pay complex	2012 2013	1,061 1,039	1–7 1–7	3.27 2.42	1.96 1.85	53.39	20.06	26.55
	Charge unfair	2012 2013	1,068 1,041	1–7 1–7	5.38 5.23	2.02 2.10	31.99	44.85	23.16
	PT1 Trust	2012 2013	1,056 1,055	1–7 1–7	2.42 2.63	1.57 1.60	24.95	40.35	34.70
	PT2 Smooth	2012 2013	1,053 1,053	1–7 1–7	2.97 3.19	1.90 1.96	23.43	43.14	33.43
	PT3 Comfortable	2012 2013	1,057 1,055	1–7 1–7	3.17 3.48	1.86 1.93	22.98	37.49	39.53
Expected effects	P1 Reduce congestion	2012 2013	1,063 1,032	1–7 1–7	3.32 3.54	1.85 1.87	29.48	30.46	40.06
	P2 Better traffic	2012 2013	1,070 1,034	1–7 1–7	3.03 3.26	1.77 1.81	28.36	34.45	37.19
	P3 Less noise & poll.	2012 2013	1,063 1,019	1–7 1–7	3.16 3.26	1.74 1.68	32.16	31.96	35.88
	P4 Easier get around	2012 2013	1,061 1,024	1–7 1–7	2.51 2.95	1.74 1.85	22.16	36.13	41.71
	N1 Worse econ. sit.	2012 2013	1,070 1,042	1–7 1–7	4.55 3.52	2.34 2.36	49.22	36.65	14.13
	N2 Lower life quality	2012 2013	1,068 1,042	1–7 1–7	4.02 3.17	2.29 2.22	47.37	38.50	14.13

Note: The last three columns show the share of individuals who have reported either a lower (Dec.) or higher (Inc.) value for the respective variable in 2013 than in 2012, or alternatively the same value in both years.

Figure 2 depicts graphically the development in the general attitude towards the charges in 2012 and 2013. It seems that there have been notable changes especially in the extremes. The number of

respondents finding the charges a "very good" policy has almost tripled, whereas on the other end the number of people considering the policy "very bad" has decreased by nearly 20 %. Nevertheless, the distribution is still strongly skewed to the negative end of the scale, so at least among car owners the charges do not reach very high popularity.

Figure 2. Distribution of the attitudes to the congestion charging policy.



4.2. Factor Analysis: Perceptions and Attitudes

As Muz (2013) notes in her study with the same survey for 2012 as here, there are several statements about the expected effects of the charges that are likely to be highly correlated with each other and actually measure the same latent variable that explains most of this correlation. More specifically, we can divide the expected effects into groups of variables that are either phrased positively or negatively with regards to the perceived effect. In Tables 1 and 2, this division is marked with a dashed line in the last category of variables. For statements *P1*, *P2*, *P3* and *P4*, the value of the variable is the higher the more *positive* of a perception the respondent has about the effects. On the other hand, for statements *N1* and *N2* the variable is rated the higher the more *negative* the respondent is about the effects.

A similar problem concerns the three variables measuring the attitude to public transport. These variables are categorised as part of the general attitudes in Tables 1 and 2, and they can be found below the dashed line in this category, named as statements *PT1*, *PT2* and *PT3*. In order to deal with the latent variable problem, it is appropriate to conduct two separated factor analyses. The factor analysis procedure implies modelling the observed variables as a linear combination of the potential factors to identify the structure of the set of variables and to create new variables that capture the relevant

variation in the inter-correlated observed variables (Hair et al., 2009). After conducting such an analysis, we end up having three new variables that were created using nine observed variables: expected positive effects (*exp. pos. eff.*), expected negative effects (*exp. neg. eff.*) and attitude to public transport (*attitude PT*). Details about the different steps in the factor analysis process can be found in Appendixes C and D.

5. Empirical Analysis

5.1. Econometric Framework

The research question for the empirical analysis in this study can be specified as: "*Does the amount of charges paid affect the attitude to the congestion charging policy, even when socio-economic variables and beliefs in the effects are controlled for?*"

In order to answer this question, our econometric analysis relies mostly on two different specifications. In the cross-sectional analysis, the model may be presented as:

$$y_i = \alpha_0 + \beta_1 ln(charge)_i + \beta_2 X_i + \beta_3 Z_i + \beta_4 W_i + \epsilon_i \,, \quad i = 1, \dots, n$$

where y_i is the measure of the respondents attitude towards the charge (on an ordered scale from 1 to 7), $ln(charge)_i$ is the amount of charges paid in natural log terms, X_i is a vector of socio-economic variables, Z_i is a vector of travel-related variables, W_i is a vector of general attitudes and perceptions of the effects, and finally α_0 denotes a common constant for all individuals and ϵ_i is the error term. In other words, this setting allows us to control and compare the relevance of different factors on the overall attitude to the charges.

Since our data is in panel form where the same individuals have responded on two different time periods, it is likely that the error terms ϵ_i are correlated over the two-year period for a given individual. Therefore, when the sample is pooled so that both years are considered as one single cross section, it is necessary to use cluster-robust standard errors and cluster on the individual level. Since the time dimension is very short, the difference to the heterogeneity-robust only standard errors tends to be small, but in some cases it can still prove to be significant.

For the second part of our econometric analysis, we will first-difference the data, in other words measure all variables as absolute changes from 2012 to 2013 with respect to the individuals. With only two time periods, first-difference analysis with a continuous dependent variable can be shown to correspond to fixed effects estimation (for a general treatment of panel data modelling see Cameron & Trivedi, 2009). However, in our case the dependent variable will be either of ordered or binary nature, except when the standard ordinary least squares (OLS) estimation is applied for purposes of comparing different models. In general, we can present the first-difference specification as:

$$(y_{i,t} - y_{i,t-1}) = \gamma_1 ln(charge)_{i,t} + \gamma_2 (X_{i,t} - X_{i,t-1}) + \gamma_3 (Z_{i,t} - Z_{i,t-1}) + \gamma_4 (W_{i,t} - W_{i,t-1}) + (\epsilon_{i,t} - \epsilon_{i,t-1})$$

where all other variables expect for the charges are now treated as changes for each individual. However, since no charges were paid in 2012, we may consider the charges paid in 2013 also as a difference in the absolute value between the two years. With only two time periods, we do not need to take into account autocorrelation in the error terms, and hence $(\epsilon_{i,t} - \epsilon_{i,t-1})$ may actually be presented simply as ε_i that is measured as heterogeneity-robust standard errors.

By first-differencing the data we are effectively controlling for factors that are constant between the two years but may differ across individuals. Such factors include the gender and the age of the respondent.[6] However, as was shown in the descriptive statistics, there is very little within variation in most socio-economic variables from 2012 to 2013, even if they actually were time-variant. Therefore, it may be appropriate to exclude these variables altogether from the first-difference analysis and focus solely on changes in perceptions and the actual effects on travel behaviour. This will be done in some regressions to demonstrate the effect on the coefficients.

In the first-difference analysis we will consider two dependent variables. First, our dependent variable will be the absolute change in the response to the question whether congestion pricing is a good political decision. Since in both years this variable is measured on an ordinal scale from 1 ("a very bad policy") to 7 ("a very good policy"), the difference between these responses can receive any discrete value between –6 and +6.[7] With both negative and positive values in the dependent variables, the interpretation of the coefficients of the regressors becomes complicated. As a solution to this problem, we will limit the analysis only to those respondents who did not change their view about the charges or became more positive between 2012 and 2013. This results that the dependent variable now receives values from 0 to 6, and it allows us still to consider nearly 90 % of our original sample since those who have become more negative represent only a 10 % minority of all the respondents.

Second, to simplify even further the interpretation of the results and include all the respondents in the analysis, we will consider a binary dependent variable that is coded so that it receives the value 1 when the respondent became more positive between the two periods, and 0 when the respondent did not change her view or became more negative. Although this recoding will lead to loss of valuable information when the magnitude of the change cannot be taken into account, it provides an alternative view to the question and potentially adds to the robustness of the results.

In the cross-sectional analysis, the model will be estimated with both OLS and ordered probit (OP) estimators. The OP estimator accounts for the discrete and ordered nature of the dependent variable. In the first-difference analysis, both OLS and OP estimators are used in addition to the Tobit model when

[6] Notice that although age does increase over time, the variable is regarded as time-invariant since it increments by one from one year to the next.

[7] The variable receives the value 1 (–1) when the respondent has evaluated the policy one step higher (lower) in 2013 than in the previous year (say, the individual responded that she values the policy at 4 (5) in 2013 and at 5 (4) in 2012), whereas it receives the value 6 (–6) when the respondent has changed her view completely from one extreme to another, i.e. from "a very bad (good) policy" to "a very good (bad) policy".

the dependent variable measures the change in the attitude to the charges. The Tobit model is appropriate when the dependent variable is truncated from either end of the scale or it mostly receives an extreme value, as is in this case the value zero. On the other hand, for the first-difference analysis with a binary dependent variable, OLS and Probit models are considered the most suitable estimators.

In the empirical analysis, we make three important changes with regards to the independent variables that were presented in the descriptive statistics. As already explained, we will rely on the three different variables created with factor analysis: the expected positive effects (*exp. pos. eff.*), the expected negative effects (*exp. neg. eff.*) and the attitude to public transport (*attitude PT*). Moreover, the age of the respondent and the amount of charges paid will be transformed into natural logarithms to remove scale effects in the variables and induce symmetry in their distribution, as well as to account for their possibly convex relationship to the dependent variable. Lastly, car usage (*days car*) and public transport usage (*days pt*) will be measured on a scale from 1 to 3, where the values indicate whether the respondent uses the respective travel mode less than two days a week (value 1), between two and four days a week (value 2) and more than four days a week (value 3).

5.2. Econometric Results

5.2.1. Cross-sectional Analysis

Table 3 begins our regression analysis by showing the cross-sectional results for both 2012 and 2013 separately, as well as for the two years as a pooled sample. For 2012 alone, Muz (2013) finds that rather than socio-economic variables, it is mostly the expected effects that help explain the acceptability of congestion charges in Gothenburg prior to implementation. This *ex ante* estimate is in line with much of the literature from other cities, and despite our slightly different specification compared to Muz (2013), we find similar evidence to her conclusions in Table 3. Regressions (1), (3) and (4) all consider the cross section of respondents in 2012 only, and it can be seen how most socio-economic variables lose significance once the general attitudes and expectations are added to the specification.

Regressions (2), (5) and (6) show the same specification as in (1), (3) and (4), respectively, but for the cross section of respondents in 2013. There seem to be no striking differences between the two years, as the coefficients are in most cases comparable with each other. Without perceived effects it seems that factors such as whether one lives in the cordon area and how often one travels by car help explain the general attitude towards the charges in both 2012 and 2013. Moreover, the amount of charges paid is negatively and significantly related to the dependent variable in 2012, as expected. Since the OP model is nonlinear and measured with the standard maximum likelihood procedure, it must be noted that the relative importance of the coefficients is not directly comparable with each other, unlike in the OLS model.

Table 3. OLS and Ordered Probit (OP) estimators with cross-sectional data: For 2012 and 2013 separately and for the pooled sample.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OP	OP	OLS	OP	OLS	OP	Pooled-OLS	Pooled-OP
Year	2012	2013	2012	2012	2013	2013	2012/2013	2012/2013
	Dependent variable: On a scale from 1 (bad) to 7 (good), is congestion pricing a good political decision?							
Man	0.026	-0.099	0.028	-0.023	0.096	0.139	0.055	0.059
	(0.086)	(0.088)	(0.102)	(0.104)	(0.126)	(0.105)	(0.090)	(0.083)
Log age	-0.130	-0.039	-0.240**	-0.295***	-0.383***	-0.382***	-0.297***	-0.334***
	(0.096)	(0.111)	(0.107)	(0.113)	(0.147)	(0.127)	(0.101)	(0.095)
Nr of children	0.076	0.155***	0.126**	0.086	0.040	0.021	0.090*	0.048
	(0.049)	(0.048)	(0.054)	(0.054)	(0.067)	(0.056)	(0.048)	(0.043)
Nr of adults	-0.068	-0.074	-0.030	-0.058	-0.079	-0.076	-0.039	-0.060
	(0.057)	(0.061)	(0.060)	(0.067)	(0.088)	(0.081)	(0.053)	(0.054)
Employed	0.226*	0.083	0.036	0.030	0.136	0.154	0.066	0.090
	(0.116)	(0.129)	(0.137)	(0.150)	(0.177)	(0.150)	(0.118)	(0.112)
Live in cordon	-0.225**	-0.254***	-0.051	-0.018	-0.087	-0.150	-0.060	-0.064
	(0.091)	(0.096)	(0.099)	(0.105)	(0.128)	(0.118)	(0.089)	(0.087)
Car user	-0.429**	-0.222	-0.427*	-0.111	0.044	0.078	-0.191	0.015
	(0.183)	(0.200)	(0.243)	(0.230)	(0.303)	(0.252)	(0.202)	(0.175)
Days car	-0.249***	-0.287***	-0.153	-0.175*	-0.243*	-0.162	-0.197**	-0.176**
	(0.084)	(0.095)	(0.098)	(0.106)	(0.134)	(0.113)	(0.085)	(0.079)
PT user	0.139	0.318	0.345	0.310	-0.026	-0.054	0.170	0.101
	(0.215)	(0.217)	(0.295)	(0.258)	(0.305)	(0.267)	(0.224)	(0.190)
Days PT	-0.025	-0.077	-0.156	-0.126	-0.043	0.035	-0.098	-0.034
	(0.110)	(0.109)	(0.154)	(0.137)	(0.165)	(0.136)	(0.118)	(0.099)
Log charge paid		-0.072***			0.054	0.049	0.026	0.028
		(0.026)			(0.039)	(0.035)	(0.035)	(0.031)
Switch			0.010	0.029	0.054	0.060**	0.027	0.043**
			(0.030)	(0.027)	(0.034)	(0.029)	(0.023)	(0.020)
Env. interest			0.040	0.016	0.068	0.057	0.045	0.027
			(0.034)	(0.038)	(0.043)	(0.043)	(0.029)	(0.031)
Reduce driving			0.037	0.079**	0.080**	0.117***	0.063***	0.101***
			(0.028)	(0.031)	(0.033)	(0.033)	(0.022)	(0.024)
Attitude PT			-0.013	0.017	0.025	0.029	0.005	0.021
			(0.047)	(0.044)	(0.051)	(0.042)	(0.037)	(0.032)
Revenue to PT			0.197*	0.293**	0.262*	0.278**	0.223**	0.289***
			(0.111)	(0.124)	(0.135)	(0.120)	(0.087)	(0.088)
Pay complex			-0.074***	-0.125***	-0.014	-0.039	-0.049**	-0.082***
			(0.025)	(0.032)	(0.033)	(0.033)	(0.020)	(0.023)
Charge unfair			-0.207***	-0.187***	-0.266***	-0.188***	-0.239***	-0.187***
			(0.031)	(0.028)	(0.039)	(0.030)	(0.026)	(0.022)
Exp. pos. eff.			0.431***	0.426***	0.494***	0.417***	0.457***	0.413***
			(0.040)	(0.039)	(0.046)	(0.041)	(0.032)	(0.030)
Exp. neg. eff.			-0.252***	-0.258***	-0.332***	-0.312***	-0.284***	-0.274***
			(0.029)	(0.029)	(0.037)	(0.037)	(0.024)	(0.024)
Year 2013							0.094	0.025
							(0.188)	(0.164)
Constant			3.713***		3.231***		3.527***	
			(0.440)		(0.592)		(0.388)	
Observations	755	670	647	647	563	563	1,210	1,210
R-squared			0.577		0.598		0.589	
Pseudo R^2	0.046	0.049		0.274		0.268		0.271

Note: Statistical significance levels denoted as follows: * significant at 10 %; ** significant at 5 %; *** significant at 1 %. Robust standard errors are in parentheses. For the pooled sample, cluster-robust standard errors are used that cluster on the individual. The cut points from the OP model are not reported.

For regression (3) through (6), the explanatory power of the model (pseudo R^2) increases notably when the perceived effects and attitudes are added to the specification. In both years, the most important variables appear to be the expected positive and negative effects together with the attitude of the fairness of the charge. On the other hand, the perception regarding the complexity of paying the charge (*pay complex*) is highly significant prior to implementation, but loses relevance once the respondents have actually experienced the charges. Of the socio-economic variables only age seems to explain some of the variation in the dependent variable, so that older people are more negative about the policy (though the relationship is possibly convex due to the log transformation). The amount of charges paid does not seem to affect the attitude once we control for general attitudes and expected effects.

All in all, the results are rather similar both *ex ante* (in 2012) and *ex post* (in 2013). Regressions (7) and (8) treate both years as one cross section, and this doubles the sample size to just above 1,200 observations. Yet again, there are no striking changes in the coefficients compared to the earlier specifications. Of the socio-economic variables car dependency (*days car*) is now negative and significant together with the age of the respondent, but the amount of charges paid remains irrelevant to the opinion about the policy. Besides, in all regressions where we control for general attitudes and perceptions, the charges paid have the "wrong" sign despite being insignificant. At this point, we find no evidence that the direct private cost of the charges had a negative impact on general acceptability, at least not when we control for perceptions.

5.2.2. First-Difference Analysis

Earlier literature has mostly considered the comparative importance of different factors for the attitude in a cross-sectional framework. However, this does not allow us to assess how changes in perceptions and in the objective effects may affect the public opinion. In order to make better use of the time dimension of the data, we will now turn to first-difference analysis where all variables are measured as changes from 2012 to 2013. By first-differencing it is possible to control for factors that are constant over the time period, so this will shift our focus to the relative impact of variables that are time-variant.

With only two time periods, most of the socio-economic variables have very little within variation between 2012 and 2013. Therefore, it may be appropriate to exclude these variables altogether from the first-difference analysis and focus solely on changes in travel-related variables, general attitudes and perceptions. This can also be supported by the findings from the cross-sectional analysis, where none of the socio-economic variables except for age were found to be consistently significant through the different specifications and samples. In Table 4 the time-variant socio-economic variable are included in the first three regressions, but dropped in the following columns.

As explained earlier, the interpretation of the coefficients in Table 4 requires that only those respondents are included in the sample who either became more positive or did not change they view about the charges from 2012 to 2013. The number of observations that is dropped due to this restriction corresponds to approximately 10 % of the sample. Another option would be to truncate the dependent variable so that those individuals who became more negative would receive the value zero together with the respondents who did not change their view. This would be acceptable especially on the grounds that we apply the Tobit model in the analysis. However, when the truncation is done instead of dropping the negative observations altogether, there is no significant change in the coefficients or their significance.

As a result, we will concentrate on the respondents with non-negative changes in the dependent variable and see what affects these changes in attitude.[8]

Table 4. First-Difference OLS, Ordered Probit (OP) and Tobit estimators: Respondents who became more negative about the charges between 2012 and 2013 are excluded from the analysis.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OP	Tobit	OLS	OP	Tobit
	Dependent variable: On a scale from 1 (bad) to 7 (good), is congestion pricing a good political decision?					
Nr of children	0.086	0.174	0.359			
	(0.099)	(0.117)	(0.238)			
Nr of adults	-0.203**	-0.250***	-0.499***			
	(0.089)	(0.095)	(0.186)			
Employed	-0.159	-0.307	-0.675			
	(0.264)	(0.288)	(0.576)			
Live in cordon	0.605***	1.069***	2.181***			
	(0.205)	(0.353)	(0.706)			
Distance H-W	-0.038	-0.016	-0.030			
	(0.087)	(0.090)	(0.178)			
Car user	0.351	0.238	0.413	0.235	0.242	0.465
	(0.338)	(0.473)	(0.962)	(0.219)	(0.285)	(0.608)
Days car	-0.105	-0.026	-0.020	-0.121	-0.094	-0.162
	(0.148)	(0.170)	(0.330)	(0.096)	(0.105)	(0.217)
PT user	-0.178	-0.393	-0.822	0.066	0.124	0.282
	(0.342)	(0.497)	(1.026)	(0.238)	(0.300)	(0.644)
Days PT	0.295*	0.388*	0.772*	0.156	0.120	0.223
	(0.173)	(0.200)	(0.411)	(0.121)	(0.140)	(0.303)
Start time	0.041	0.047	0.097			
	(0.035)	(0.033)	(0.064)			
Travel time	0.232	0.138	0.206			
	(0.206)	(0.227)	(0.436)			
Log charge paid	-0.079**	-0.109***	-0.220***	-0.049*	-0.063**	-0.136**
	(0.036)	(0.035)	(0.069)	(0.029)	(0.029)	(0.060)
Switch	0.039	0.046	0.099	0.041	0.051*	0.114*
	(0.038)	(0.037)	(0.071)	(0.030)	(0.030)	(0.063)
Env. interest	-0.021	-0.069	-0.151	-0.029	-0.052	-0.111
	(0.080)	(0.074)	(0.146)	(0.058)	(0.055)	(0.112)
Reduce driving	0.040	0.046	0.084	0.033	0.035	0.063
	(0.032)	(0.036)	(0.072)	(0.029)	(0.032)	(0.068)
Attitude PT	0.076	0.087	0.163	0.064	0.069	0.138
	(0.066)	(0.063)	(0.121)	(0.057)	(0.054)	(0.107)
Revenue to PT	-0.001	0.039	0.111	0.057	0.075	0.178
	(0.119)	(0.134)	(0.263)	(0.105)	(0.113)	(0.233)
Pay complex	0.002	0.007	0.018	-0.008	-0.002	0.000
	(0.031)	(0.033)	(0.065)	(0.024)	(0.026)	(0.053)
Charge unfair	-0.152***	-0.166***	-0.327***	-0.101***	-0.102***	-0.209***
	(0.034)	(0.035)	(0.068)	(0.027)	(0.027)	(0.055)
Exp. pos. eff.	0.106**	0.108**	0.204**	0.132***	0.142***	0.286***
	(0.052)	(0.046)	(0.088)	(0.043)	(0.039)	(0.077)
Exp. neg. eff.	-0.094**	-0.089**	-0.163*	-0.092***	-0.084**	-0.161**
	(0.043)	(0.043)	(0.084)	(0.034)	(0.034)	(0.070)
Constant	1.071***		0.565	0.893***		0.082
	(0.188)		(0.353)	(0.147)		(0.313)
Observations	333	333	333	490	490	490
R-squared	0.192			0.131		
Pseudo R^2		0.088	0.080		0.054	0.048

Note: Statistical significance levels denoted as follows: * significant at 10 %; ** significant at 5 %; *** significant at 1 %. Robust standard errors are in parentheses. The cut points from the OP model are not reported. The sample includes only those respondents who changed their view about congestions charges to more positive (427 observations) or kept it the same (512 observations) between 2012 and 2013. The respondents who became more negative (112 observations) are excluded.

Regressions (1) through (3) in Table 4 include the socio-economic variables that are varying over time, notwithstanding that this variation is very limited. The first regression is estimated with the linear OLS model, the second with the OP model, and the third with the Tobit model. For both the OP and Tobit models, the coefficients are determined with maximum likelihood and can only be interpreted with regards to their sign and significance. It is reassuring that for most of the variables, the sign and

[8] The regression results with the truncated dependent variable and the whole sample can be provided by the author upon request.

significance of the respective coefficient is consistent through the different estimators, so the conclusions drawn from the table do not necessarily depend on the estimation method.

Compared to the cross-sectional analysis, Table 4 includes three new variables that were not present before. These are the proxy of the distance between home and work/school (*distance H-W*), the usual departure time from home to work/school (*start time*) and the approximate duration of the commute from home to work/school (*travel time*). Notable changes in these variables could point to the objective effects of the congestion charges on travel times and route choices, but it is difficult to observe the direct impact of the charges as there are other factors that affect these variables (such as the possible relocation of one's home or work between the two time periods). Even more importantly, the rather imprecise measurement of the variables causes that it is unlikely that the variables can properly capture any significant changes whatsoever.[9] Since these variables are found insignificant in the first three regressions, they can be excluded from the rest of the table.

Aside from the socio-economic variables, there are considerably less general attitudes and perceptions that help determine the change in the dependent variable in all regressions in Table 4. Both variables for the expected effects continue to be important, but their coefficients and significance levels have decreased notably from earlier. Instead, the fairness of the charge is highly significant in all models and approximately of the same magnitude as before. Most interestingly, however, the amount of charges paid is now significant in all regressions and has the expected sign. Hence, it appears that the respondents paying more charges do become less positive about the policy, even when changes in beliefs in the effects and in other variables are taken into account.

Of the socio-economic variables in the first three regressions, the number of adults in the household has a significant and negative effect, whereas living inside the cordon is positively and highly significantly related to the dependent variable. Somewhat puzzling, the negative relationship between the number of adults in the household and the attitude could be explained by the higher expected future cost of the charges to the household as a whole. On the other hand, a possible explanation for the importance of residency within the cordon could be that much of the benefits accrue to the residents in the central part of the city. This is especially so once the amount of charges paid, the most significant private cost, is accounted for in the regressions. Nevertheless, it needs to be kept in mind that there is only very little variation in these and the other socio-economic variables, so these findings should be interpreted with care and the appropriate criticism.

Without the imprecise measures of time and distance travelled, regressions (4) through (6) show a drop in both the significance and the magnitude of the coefficient for the charges paid, though it remains

[9] The respondents have themselves estimated their usual departure time from home and arrival time at work/school. It is quite possible that there have been some true changes in these variables, but this may have gone unnoticed by the respondents. Explanations to this include factors such as the small scale of the changes, as well as the possible rounding of the estimated departure and arrival time.

significant in all models at least at the 10 % level, if not higher. Throughout all six regressions, the expected effects, the perceived fairness of the charges and the actual amount of charges paid are the most consistent explanatory variables to the attitude. As a result, this may be considered as evidence against the findings regarding the charges paid in the cross-sectional analysis, and it seems that the amount of charges is relevant to the attitude.

Table 5 presents similar analysis to the previous table, but this time the dependent variable is binary and denotes whether the respondent became more positive about the charges between 2012 and 2013. Using a binary variable allows us to include all the respondents into the analysis, even those who became more negative and were excluded in Table 4. With the binary dependent variable we will use both OLS and probit models to estimate the coefficients.

Table 5. First-Difference OLS and Probit estimators with a binary dependent variable.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	OLS	Probit	OLS	Probit	OLS	Probit
	Dependent variable: Has the attitude towards the congestion charging policy become more positive? (1=yes, 0=no)					
Nr of children	-0.020	-0.050	0.026	0.104		
	(0.050)	(0.131)	(0.049)	(0.150)		
Nr of adults	-0.068**	-0.185**	-0.085**	-0.266**		
	(0.033)	(0.092)	(0.033)	(0.110)		
Employed	-0.003	-0.009	-0.114	-0.382		
	(0.086)	(0.223)	(0.106)	(0.309)		
Live in cordon	0.179*	0.511	0.293***	1.173***		
	(0.105)	(0.319)	(0.092)	(0.438)		
Distance H-W	0.012	0.032	-0.006	-0.016		
	(0.035)	(0.094)	(0.037)	(0.105)		
Car user	-0.171	-0.471	0.070	0.175	0.092	0.280
	(0.127)	(0.345)	(0.145)	(0.482)	(0.097)	(0.305)
Days car	0.003	0.010	0.005	0.051	-0.013	-0.042
	(0.053)	(0.139)	(0.056)	(0.167)	(0.039)	(0.111)
PT user	-0.131	-0.383	-0.090	-0.285	0.107	0.302
	(0.147)	(0.400)	(0.174)	(0.558)	(0.116)	(0.354)
Days PT	0.051	0.147	0.091	0.291	0.009	0.034
	(0.071)	(0.187)	(0.086)	(0.258)	(0.066)	(0.191)
Start time	0.020	0.057	0.020	0.057		
	(0.016)	(0.049)	(0.015)	(0.050)		
Travel time	0.045	0.115	0.001	-0.029		
	(0.071)	(0.183)	(0.085)	(0.248)		
Log charge paid	-0.038***	-0.098***	-0.040***	-0.124***	-0.028**	-0.079**
	(0.013)	(0.034)	(0.015)	(0.043)	(0.012)	(0.034)
Switch			0.024*	0.084*	0.023*	0.071**
			(0.014)	(0.043)	(0.012)	(0.035)
Env. interest			-0.039*	-0.127**	-0.029*	-0.093*
			(0.022)	(0.063)	(0.017)	(0.049)
Reduce driving			0.006	0.025	0.004	0.014
			(0.014)	(0.040)	(0.012)	(0.033)
Attitude PT			0.028	0.080	0.021	0.061
			(0.022)	(0.063)	(0.019)	(0.053)
Revenue to PT			0.040	0.111	0.037	0.096
			(0.048)	(0.145)	(0.042)	(0.120)
Pay complex			0.006	0.016	0.002	0.006
			(0.012)	(0.034)	(0.009)	(0.026)
Charge unfair			-0.050***	-0.161***	-0.033***	-0.103***
			(0.011)	(0.039)	(0.009)	(0.029)
Exp. pos. eff.			0.049***	0.149***	0.058***	0.177***
			(0.015)	(0.046)	(0.012)	(0.038)
Exp. neg. eff.			-0.021	-0.069	-0.019	-0.062*
			(0.015)	(0.045)	(0.012)	(0.035)
Constant	0.600***	0.261	0.565***	0.194	0.496***	-0.016
	(0.066)	(0.169)	(0.081)	(0.225)	(0.064)	(0.175)
Observations	472	472	368	368	540	540
R-squared	0.041		0.165		0.110	
Pseudo R^2		0.031		0.139		0.090

Note: Statistical significance levels denoted as follows: * significant at 10 %; ** significant at 5 %; *** significant at 1 %. Robust standard errors are in parentheses.

Regressions (1) and (2) only include the socio-economic and travel-related variables that are time-variant. Regressions (3) and (4), on the other hand, also have the general attitudes and expected effects. In all these four specifications, charges paid have a negative and a highly significant effect on the dependent variable. Furthermore, neither this coefficient nor the standard error is affected notably by the inclusion of perceptions. In regressions (5) and (6), the socio-economic variables in addition to the imprecise measures of time and distance travelled are excluded, but charges paid still remain negative and significant (although significance drops to the 5 % level). Of the attitudes and perceptions, only the fairness of the charge and the expected positive effects are highly significant through specifications. However, it seems that the perceived possibility to change to another travel mode from car (*switch*) and interest in environmental issues (*env. interest*) may also affect the public opinion among car owners.

All in all, the first-difference analysis provides strong evidence that charges paid do affect the attitude negatively, even when general attitudes and expected effects are controlled for. Nevertheless, changes in perceptions are most probably still the greatest factor explaining the changes in the attitude. But since the importance of the charges paid is not discovered in the cross-sectional analysis, it raises questions for an explanation for the difference. A commonly mentioned candidate for the dissimilarities in cross-sectional and fixed effects estimations is omitted variable bias that stems from time-invariant unobserved variables that cannot be controlled for in cross-sectional models. However, in this case it is difficult to see what such variables might be that should be included in the cross-sectional model but can be controlled by first-differencing the data.

5.2.3. Observed Heterogeneity and Predicted Effects

Table 6 separates some of the socio-economic groups in the sample in order to see whether charges paid might affect the attitude differently between groups. Due to the many missing values in some of the variables as well as the previous findings that most of the socio-economic and travel-related variables have no impact on the dependent variable, the regressions in Table 6 will only compare the amount of charges paid with the general attitudes and perceptions. Despite this restriction, the sample size in some of the subgroups turns out to be notably low, and therefore the results in the table should be considered merely as suggestive of the potential differences between the groups. That said, there seems to be variation between the groups as the charges have a significant impact on the attitude only in half of the groups. The dependent variable used in this analysis is the binary variable from Table 5 that indicates whether or not the respondent became more positive about the policy from 2012 to 2013.

In the subgroups of men, employed people, people living outside the cordon area as well as people who are younger than 60 years, the charges seem to have a rather similar impact on the attitude. In contrast, women, people not in employment, people living inside the cordon area and people who are 60 years or older, are not significantly affected by the charges. However, the groups not affected by the charges also

have considerably smaller samples (ranging from 172 to 270 observations) than the groups that are affected (ranging from 429 to 479 observations). Of the control variables, only the expected positive effects seem consistent and highly significant through all groups, whereas the fairness of the charges is important in those groups that are affected by the charge.

Table 6. First-Difference Probit estimator for different socio-economic groups.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
	Men	Women	In cordon	Out cordon	Employed	Not employed	Age <60 yr.	Age ≥60 yr.
	Dependent variable: Has the attitude towards congestion charges become more positive? (1=yes, 0=no)							
Log charge paid	-0.099***	-0.041	-0.025	-0.077**	-0.080**	-0.061	-0.091**	-0.079
	(0.037)	(0.053)	(0.060)	(0.037)	(0.036)	(0.073)	(0.038)	(0.055)
Switch	0.019	0.080*	0.086	0.019	0.050	-0.029	0.044	0.048
	(0.039)	(0.048)	(0.057)	(0.036)	(0.037)	(0.057)	(0.041)	(0.045)
Env. interest	-0.101**	-0.014	-0.076	-0.111**	-0.063	-0.102	-0.077	-0.119
	(0.051)	(0.097)	(0.081)	(0.054)	(0.054)	(0.106)	(0.054)	(0.075)
Reduce driving	-0.022	0.041	-0.053	0.033	0.027	-0.017	0.002	0.009
	(0.036)	(0.048)	(0.055)	(0.034)	(0.035)	(0.055)	(0.037)	(0.045)
Attitude PT	0.058	0.055	0.032	0.029	0.085	0.032	0.089	0.011
	(0.053)	(0.077)	(0.084)	(0.052)	(0.055)	(0.082)	(0.056)	(0.068)
Revenue to PT	0.215*	-0.080	-0.041	0.179	0.058	0.116	0.179	0.038
	(0.124)	(0.182)	(0.202)	(0.121)	(0.127)	(0.178)	(0.132)	(0.155)
Pay complex	0.036	-0.037	0.098**	-0.023	0.012	-0.067	0.043	-0.043
	(0.028)	(0.042)	(0.044)	(0.028)	(0.028)	(0.051)	(0.029)	(0.038)
Charge unfair	-0.094***	-0.081*	-0.083	-0.097***	-0.123***	-0.032	-0.128***	-0.032
	(0.031)	(0.042)	(0.056)	(0.029)	(0.033)	(0.049)	(0.033)	(0.038)
Exp. pos. eff.	0.193***	0.211***	0.219***	0.182***	0.165***	0.244***	0.198***	0.199***
	(0.043)	(0.057)	(0.071)	(0.039)	(0.040)	(0.073)	(0.042)	(0.057)
Exp. neg. eff.	-0.111***	-0.016	-0.114*	-0.067*	-0.073*	-0.077	-0.122***	-0.034
	(0.039)	(0.055)	(0.061)	(0.038)	(0.039)	(0.060)	(0.041)	(0.049)
Constant	0.045	-0.089	-0.340	0.026	0.010	-0.115	0.062	-0.075
	(0.187)	(0.272)	(0.310)	(0.182)	(0.189)	(0.316)	(0.200)	(0.252)
Observations	469	228	188	479	462	172	429	270
Pseudo R^2	0.090	0.090	0.099	0.081	0.092	0.079	0.114	0.063

Note: Statistical significance levels denoted as follows: * significant at 10 %; ** significant at 5 %; *** significant at 1 %. Robust standard errors are in parentheses.

As mentioned earlier, our sample has a peculiarly large number of old and retired people. By dividing the sample into two subgroups by age, we can see if the older people might be affected differently by the charges than other people. To some extent, this seems to be the case, and we notice that charges paid are not significant to the group of individuals over 60 years old. Since the charges are significant to the other age group, we may conclude that with a large number of retired and old people in our sample, the estimated effect of charges paid is probably underestimated. This is so when older people are on average less sensitive to the charges paid (or simply pay less charges), as seems to be the case here.

Since non-linear estimators do not allow the direct comparison of the magnitude of the coefficients, we need to consider the marginal effects of the models. This will be done through the analysis of predicted results. First, we use the probit model from Table 5, column 6 to predict how the probability that the respondent became more positive from 2012 to 2013 changes when all variables except for one are kept at their mean value. We allow one variable at a time to take the extreme values in its domain and observe how this affects the prediction. Second, we will use the ordered probit (OP) model from Table 4, column 5 and do similar predictive analysis with regards to the extremes as with the probit model. However, since in the OP model the dependent variable receives discrete values from 0 to 6, we will measure the change

in the prediction with respect to the prediction when all the variables are kept at their mean level (i.e. we will denote our predictions as percentages of this prediction at the means).

There are several reasons why the predictions should be interpreted with care when only one variable changes. As Eliasson and Jonsson (2011) summarise, the most important considerations are that (1) the variables have different scales, (2) some extremes are more unrealistic than others and (3) there is correlation between several variables. An example of an unrealistic extreme could be when the respondent answers in 2012 that she is "not interested at all" in environmental issues, whereas in 2013 she is "very interested" (less than 1 % of the sample report such a change). On the other hand, changing only one variable at a time and keeping all else constant may underestimate the effect of the variable due to the likely correlation between the regressors. Despite these issues, it can be informative to see how the predictions of the model change at the extremes.

Table 7. Model predictions for the extreme values of various variables: (A) probabilities of becoming more positive about the charges and (B) changes in the attitude to the charges from 2012 to 2013.

	(A) Probability that attitude became more positive				**(B)** Change in the attitude to the charges			
Variable	Rank	Min. prob. (%)	Max. prob. (%)	Range (%-pts.)	Rank	Min. change (% from mean)	Max. change (% from mean)	Range (%-pts.)
Car user	9	29	50	21	7	-17	16	33
Days car	11	35	42	6	11	-13	13	26
PT user	6	27	50	23	12	-8	9	17
Days PT	13	36	41	5	8	-17	16	33
Log charge paid	8**	32	53	22	9**	-21	10	31
Switch	4**	23	55	32	5*	-21	21	42
Env. interest	3*	20	61	41	4	-22	20	42
Reduce driving	12	35	42	6	10	-14	14	28
Attitude PT	7	30	51	22	6	-26	15	41
Revenue to PT	10	35	42	7	13	-5	5	10
Pay complex	14	37	40	3	14	-1	1	2
Charge unfair	2***	18	62	45	2***	-40	39	79
Exp. pos. eff.	1***	10	74	64	1***	-50	47	97
Exp. neg. eff.	5*	22	52	30	3**	-33	39	72

Note: Section (A) predicts the dependent variable using the estimated coefficients from the probit model in Table 5, column 6. Section (B) predicts the dependent variable using the estimated coefficients from the ordered probit (OP) model in Table 4, column 5. All other variables are kept at their mean except for the respective variable in each row, and this variable is measured at its extremes. The predictions in section (B) are in relation to the predicted value when all variables are at their means. When all variables are at their means, the model in section (A) predicts a probability of 38.4 % that the respondent has become more positive, whereas the model in section (B) predicts a positive increase of 0.57 units in the attitude to the charges (on a scale form 0 to 6, while excluding respondents who had become more negative). Statistical significance levels of the model coefficients are denoted as follows: * significant at 10 %; ** significant at 5 %; *** significant at 1 %.

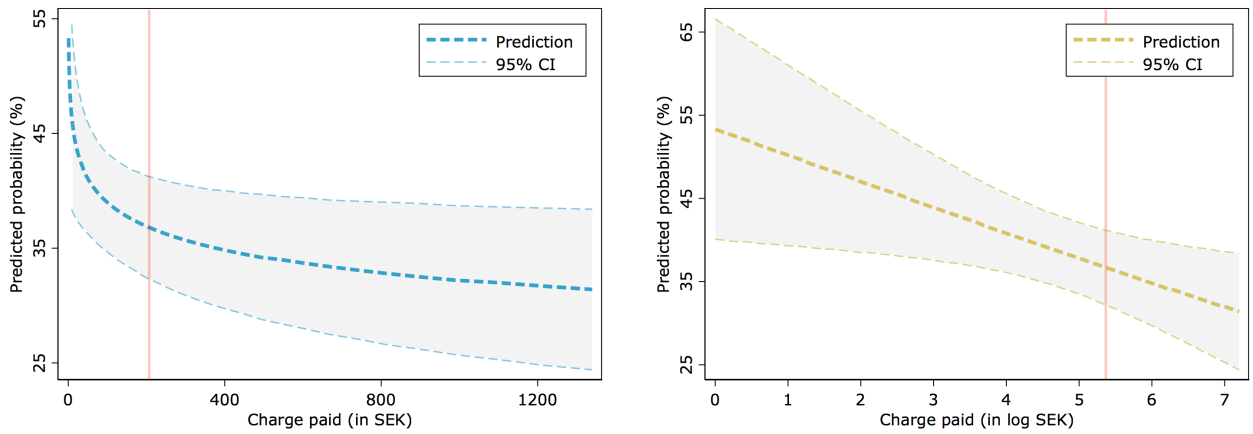
Section (A) in Table 7 shows the predicted minimum and maximum probability for a more positive attitude to the charges when only one variable varies between its extremes and all other factors are kept constant. As we notice, the range between the extremes is the highest for the expected positive effects and the variable denoting the fairness of the charges. The amount of charges paid has only the 8th widest range in the specification, although there are variables that have a longer range but were not found to have a significant coefficient in the regression analysis (the significance level of the coefficient

from the regression analysis is indicated next to the rank of the variable). The results from the predicted ranges conform rather well to the finding in the regression analysis, as the variables with the significant coefficients tend to have the biggest impact on the predicted value at their extremes.

Section (B) in Table 7 shows how the predictions change at the extremes of each variable when the dependent variable is the change in attitude from 2012 to 2013. Notice that this change is reported as a percentage change from the prediction at the means (which is found to be 0.57 units). Due to this type of measuring, the changes can be both negative (when the prediction is smaller than the prediction at the means) and positive (when the prediction is greater). The ranges between the extreme predictions are rather similar to section A, and the expected effects and the fairness of the charge continue having the largest difference between their extremes. The charge paid is ranked almost identically among all the different explanatory variables, but it needs to be noticed that there are variables with a larger range but with an insignificant coefficient.

Figure 3 illustrates the impact of the amount of charges paid on the predicted probability that the respondent becomes more positive about congestion charging. It was shown in Section (A) in Table 7 that between the two extremes of the charges paid, the respondent is predicted to become more positive with a probability ranging from 32 % to 53 %, given that all other variables are kept at their means. This can be seen in the figure as well, and the charges paid range from zero to somewhat above 1200 SEK (notice that the red line denotes the mean of the charges paid, which is approximately 200 SEK per month). The relationship between the charges and attitude is clearly negative and possibly convex, and this suggests that the greatest marginal impact of the charges is found when the charges paid are low. However, since the distribution of the charges paid is strongly skewed to the right, one needs to be careful when interpreting the right-end predictions in the figure as there are not many observations that report the upper-end values.

Figure 3. Model predicted probability of an attitude change to more positive: All other variables kept at their means, whereas the red line denotes the mean of charges paid.



6. Conclusions

The empirical analysis in this paper has shown that the amount of congestions charges paid has a negative impact on the attitude to the charges in Gothenburg. This impact persists even when we control for variables related to the general attitudes and beliefs in the effects of the charges, not to mention the socio-economic factors. However, it is an intriguing that the conclusions drawn from the first-difference analysis do not carry to the cross-sectional framework, since charges appear to be irrelevant once general attitudes and beliefs are included in the cross-sectional model. This could possibly have something to do with the fact that first-differencing the data allows us to control for unobserved variables that are time-invariant, but it is difficult to think of potential variables that fall into this category and help explain the attitude to the charges.

Another possible explanation that could help us understand this issue has to do with the beliefs people had about the amount of charges they will need to pay after the implementation of the charging system. It is possible that people who are paying a high amount of charges in 2013 did not expect this a year earlier. This higher than expected amount of charges contributes to that people did not become as positive about the charges as the positive changes in beliefs and attitudes would have suggested. Hence, it is the heterogeneity between the expected and actual payment that affects the change in attitude, and in a cross-sectional model with no changes it is not possible to account for this effect.

Besides the charges paid, we find that expected effects are still the most important factor that is related to the attitude. Although in most cases it is the changes in the perception of both the positive and negative effects that help explain opinions, our evidence suggests that the apparent positive impacts on congestion and mobility are more important for the attitude than the smaller than expected negative effects. The importance of the positive effects has been reported before (Brundell-Freij & Jonsson, 2009), and it seems that they are especially consequential in explaining attitudes after the introduction of the charges. Schuitema et al. (2010) provide a comprehensive analysis of this phenomena and also find empirical support for it.

We also find consistent evidence that the fairness of the charges is highly important in Gothenburg, but the environmental attitude does not seem to matter that much. In fact, the only occasion when environmental interest is found significant is in Table 5, but in these regressions the coefficient is negative in all cases. Although the negative sign is strongly against findings from both Muz (2013) and the many reports about the charges in Stockholm, our result may be explained by the fact that we consider the change in the environmental attitude and its relationship to the attitude to the charges. It is not clear-cut how such a relationship should be interpreted in the first-place, as the mechanism about causation and effect is not necessarily stable.

The explanation for the importance of the fairness of the charge in Gothenburg is also somewhat unclear. Studies from Stockholm have found that fairness is often an important consideration before the implementation of the charge, but as Börjesson et al. (2012) discuss, the concept of fairness tends to change after people gain more experience of the charges. One important difference related to this matter between Gothenburg and Stockholm may be the media coverage of the charges and the aspects that have been highlighted with respect to the objective effects. In Stockholm, the media has probably discussed more the environmental impacts of the charges, since it was found important from early on to brand the policy as an "environmental charge" (see, for example, the discussion in Eliasson, 2014). In Gothenburg, this has not been the case, and the public has probably paid more attention to the allocation of the revenues due to the fiercely debated infrastructure projects that go under the West Swedish Agreement.[10] Since the allocation of the revenues is strongly related to the potential compensation for the private losses, this could help explain why in Gothenburg the fairness of the charges is an important consideration.

However, it may be questioned how well different studies on the acceptability of congestion charging actually compare to each other when the survey questions differ. In our survey, the question related to the fairness of the charges is simply stated as "congestion charges are unfair", to which the respondent replies with a discrete value that falls between the values 1 ("do not agree at all") and 7 ("agree completely"). In such a simplified form, it is hard to know how the respondent understands the question and what part of the policy she may actually find unfair, if any. Drawing on Rawlsian theory of justice, Raux and Souche (2004) consider three different dimensions of equity that may affect public opinion in the transport sector and label them as the horizontal, vertical and spatial dimensions. However, since in most attitude surveys these dimensions are not properly addressed, it is difficult to formulate specific policy implications even when the question of fairness seems to be somehow important to public acceptability.

All in all, we need to be careful with drawing too definitive conclusions from the regressions with general attitudes and expectations as explanatory variables. The coefficients may be severely affected by the well-known issue of reverse causality between these variables. Nevertheless, it is reassuring that in our first-difference analysis we find consistent evidence for at least the expected positive effects and the fairness of the charge, so this increases the possibility that these two factors have a true effect on opinions among car owners. Likewise, charges paid are consistent through specifications, so it appears that both objective and subjective effects of the charges do influence the attitude.

[10] In Stockholm, the allocation of the revenues was not really an issue before or during the trial period in 2006 and the referendum in 2007. Only after the charging system was permanently implemented did the politicians agree to channel the revenues to different infrastructure project. A general description of this process can be found in almost any of the studies related to attitudes and charges in Stockholm.

Future research on this topic would benefit tremendously if better quality data became available. Especially the question about other real effects than just charges paid requires precise measures of travel times and distances on individual level, in addition to the possibility to define exactly which travel relationships are affected by the charges. It appears not to be enough to let the respondents themselves estimate their travel times and distances, as these estimates will often be rough approximations of the real changes, and prone to potential biases. People make too many mistakes when trying to report exact measures for the variables, so it is probably better to rely on technology to do the job for us.

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Appendix A

The survey from 2012.

CHALMERS | GÖTEBORGS UNIVERSITET

ENKÄT OM INFÖRANDET AV TRÄNGSELSKATT I GÖTEBORG

Först några frågor om dig själv

1. Är du man eller kvinna?
1 ☐ Man 2 ☐ Kvinna

2. Hur gammal är du? ☐☐ år

3. Hur många personer ingår i ditt hushåll?
Ange antal personer i varje åldersintervall. ***Räkna även med dig själv.***

☐ st	☐ st	☐ st	☐ st	☐ st	☐ st
0-6 år	7-12 år	13-17 år	18-64 år	65-74 år	75- år

4. I vilken typ av bostad bor du?
1 ☐ Flerfamiljshus, hyresrätt 2 ☐ Flerfamiljshus, bostadsrätt 3 ☐ Radhus/villa/enfamiljshus

5. Var bor du? *Kryssa för ett alternativ*

Stadsdel i Göteborgs kommun
01 ☐ Centrum
02 ☐ Majorna-Linné
03 ☐ Lundby
04 ☐ Norra Hisingen
05 ☐ Västra Hisingen
06 ☐ Askim-Frölunda-Högsbo
07 ☐ Västra Göteborg
08 ☐ Angered
09 ☐ Örgryte-Härlanda
10 ☐ Östra Göteborg

Annan kommun
11 ☐ Ale
12 ☐ Alingsås
13 ☐ Härryda
14 ☐ Kungsbacka
15 ☐ Kungälv
16 ☐ Lerum
17 ☐ Mölndal
18 ☐ Partille
19 ☐ Stenungsund
20 ☐ Öckerö
21 ☐ Annan ort

6. Har du körkort för bil?
1 ☐ Ja 2 ☐ Nej

7. Har du tillgång till tjänstebil?
1 ☐ Ja 2 ☐ Nej

8. Kan du i allmänhet använda dig av bil när du behöver?
1 ☐ Ja, alltid 2 ☐ Ja, för det mesta 3 ☐ Ja, ibland 4 ☐ Nej, sällan 5 ☐ Nej, aldrig

9. Har du något kort du kan använda för resor med kollektivtrafiken? *Kryssa ett eller flera alternativ*
1 ☐ Nej 2 ☐ Ja, periodkort (även skol- och seniorkort) 3 ☐ Ja, annat

10. Vilken är din högsta utbildning? *Kryssa för ett alternativ*
01 ☐ Folkskola, grundskola eller motsvarande
02 ☐ Gymnasial utbildning högst 2-årig
03 ☐ Gymnasial utbildning 3 år
11 ☐ Eftergymnasial utbildning kortare än 3 år
12 ☐ Eftergymnasial utbildning 3 år eller längre

11. Vilken är din huvudsakliga sysselsättning? *Kryssa för ett alternativ*
01 ☐ Förvärvsarbetar
02 ☐ Studerar
03 ☐ Sjukskriven
13 ☐ Föräldraledig
11 ☐ Arbetssökande
12 ☐ Pensionär
13 ☐ Annat

12. Ungefär hur stor är ditt hushålls totala månadsinkomst före skatt?
☐ kr/mån. ☐ Vet ej/vill ej svara

13. Hur många i personer i hushållet bidrar till den gemensamma månadsinkomsten? *Bortse från eventuella barn- och studiebidrag.*
☐ personer.

14. Vart åker du normalt när du åker till arbete eller skola? *Kryssa för ett alternativ.*

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16 ☐ Lerum
17 ☐ Mölndal
18 ☐ Partille
19 ☐ Stenungsund
20 ☐ Öckerö
21 ☐ Annan, nämligen:

Några frågor om ditt resande

15. Vilket är det huvudsakliga färdsättet för din resa till arbete/studier vid den här tiden på året?
Med huvudsakligt färdsätt menar vi det färdsätt du använde för längsta delen av din resa
☐ Kollektivtrafik ☐ Moped/MC
☐ Cykel/elcykel ☐ Till fots
☐ Bil ☐ Annat färdsätt

16. Ungefär vilken tid brukar du normalt sett lämna hemmet för att åka till din arbets-/studieplats och vilken tid är du framme? *Fyll i tiderna så att om du lämnar hemmet kl halv åtta på morgonen skriver du 0730.*
Lämnar hemmet: ☐☐☐☐ *Ankommer till arbete/studieplats:* ☐☐☐☐

17. Ungefär vilken tid brukar du normalt sett lämna din arbets-/studieplats och vilken tid är du hemma?
Lämnar arbete/studieplats: ☐☐☐☐ *Kommer hem:* ☐☐☐☐

18. Hur ofta åker du normalt kollektivtrafik till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

19. Hur ofta åker du normalt cykel/elcykel till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

20. Hur ofta åker du normalt bil till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

21. Hur ofta åker du normalt moped/MC till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

22. Hur ofta tar du dig normalt till fots till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

23. Hur ofta passar du på att göra andra ärenden i samband med dina resor till/från arbetet?
Exempelvis hämta på dagis, skola, handla mat o.s.v.
Aldrig ☐ ☐ ☐ ☐ ☐ ☐ ☐ Varje dag

24. Om du ibland tar bilen till arbete/studier, vilka möjligheter har du att byta färdmedel?

	Mycket små möjligheter 1	2	3	4	5	6	Mycket goda möjligheter 7
Från bil till kollektivtrafik	☐	☐	☐	☐	☐	☐	☐
Från bil till cykel	☐	☐	☐	☐	☐	☐	☐

25. Passerar du i dagsläget en betalstation (trängselskattegräns) på vägen till arbete/studier?
1 ☐ Ja 2 ☐ Nej 3 ☐ Vet ej

Frågor om ditt arbete/dina studier

26. Hur många dagar per vecka arbetar du normalt?

☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

27. Om du arbetar/studerar, hur många timmar per vecka arbetar eller studerar du vanligtvis?

☐☐ timmar per vecka

28. Har du möjlighet att själv bestämma hur dags du ska vara på din arbets-/studieplats?

1 ☐ Ja, alltid 2 ☐ Ja, för det mesta 3 ☐ Ja, ibland 4 ☐ Nej, sällan 5 ☐ Nej, aldrig

29. Har du möjlighet att (helt eller delvis) arbeta/studera på distans från hemmet?

1 ☐ Ja 2 ☐ Nej

30. Om ja, hur många dagar per vecka brukar du vanligtvis arbeta/studera på distans?

Antal dagar: ☐

Frågor om miljö och välbefinnande

31. Hur intresserad är du i allmänhet av miljöfrågor?

	1	2	3	4	5	6	7	
Inte alls intresserad	☐	☐	☐	☐	☐	☐	☐	Mycket intresserad

32. Hur nöjd är du på det hela taget med det liv du lever?

	1	2	3	4	5	6	7	
Inte alls nöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

33. Hur känner du dig i allmänhet?

	1	2	3	4	5	6	7	
Nedstämd	☐	☐	☐	☐	☐	☐	☐	På gott humör

34. Om du tänker efter hur din tid fördelas mellan bl.a. förvärvsarbete, hemarbete, restid, sömn, måltider, motion, umgänge med familj/vänner och annan fritid. Hur nöjd är du då med fördelningen av din tid under en vanlig vecka?

	1	2	3	4	5	6	7	
Inte alls nöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

35. Om du tänker på ditt liv i stort, upplever du obehag för att du har svårt att hinna med allt som behöver göras?

	1	2	3	4	5	6	7	
Liten utsträckning	☐	☐	☐	☐	☐	☐	☐	Stor utsträckning

Frågor om din nuvarande resesituation

36. Tänk på ditt vardagliga resande under den senaste månaden som helhet (t.ex. resor du gjort till affärer, till fritidsaktiviteter, till restauranger, till arbete/skola och alla andra resor som du vanligtvis gör). Vilken är din sammantagna upplevelse av dessa resor?

	-3	-2	-1	0	1	2	3	
Mycket stressad	☐	☐	☐	☐	☐	☐	☐	Mycket avslappnad
Mycket uttråkad	☐	☐	☐	☐	☐	☐	☐	Mycket entusiastisk
Mina resor fungerade mycket dåligt	☐	☐	☐	☐	☐	☐	☐	Mina resor fungerade mycket bra
Mycket trött	☐	☐	☐	☐	☐	☐	☐	Mycket pigg
Mycket låg standard	☐	☐	☐	☐	☐	☐	☐	Mycket hög standard
Mycket orolig	☐	☐	☐	☐	☐	☐	☐	Mycket lugn
Mina resor var de sämsta tänkbara	☐	☐	☐	☐	☐	☐	☐	Mina resor var de bästa tänkbara
Mycket jäktad	☐	☐	☐	☐	☐	☐	☐	Mycket avspänd
Mycket utled	☐	☐	☐	☐	☐	☐	☐	Mycket begeistrad

37. Hur nöjd är du som helhet med ditt vardagliga resande under den senaste månaden?

	-3	-2	-1	0	1	2	3	
Mycket missnöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

38. Nedan återfinns några påståenden om olika färdmedel, ange om du håller med eller inte.

	Håller inte alls med 1	2	3	4	5	6	Håller helt med 7
Bilen ger människor frihet.	☐	☐	☐	☐	☐	☐	☐
På sikt måste bilismen minska av miljö- och klimatskäl.	☐	☐	☐	☐	☐	☐	☐
Man kan lita på att kollektivtrafiken alltid kommer i tid.	☐	☐	☐	☐	☐	☐	☐
Kollektivtrafiken är oftast ett smidigt sätt för mig att färdas.	☐	☐	☐	☐	☐	☐	☐
Det är bekvämt att åka kollektivt.	☐	☐	☐	☐	☐	☐	☐

39. Händer det att du samåker med bil till arbete/studier?

1 ☐ Ja, samåker med person/er som inte bor i det egna hushållet
2 ☐ Ja, men samåker enbart med person/er som bor i det egna hushållet
3 ☐ Nej

Frågor om din inställning till trängselskatten i Göteborg

40. Tycker du att trängselskatten är ett bra eller dåligt politiskt beslut?

	1	2	3	4	5	6	7	
Mycket dåligt	☐	☐	☐	☐	☐	☐	☐	Mycket bra

41. Nedan återfinns några olika påståenden om vilka effekter trängselskatten kan komma att få. Vi vill att du svarar genom att ange om du håller med om nedan påståenden.

	Håller inte alls med 1	2	3	4	5	6	Håller helt med 7
Trängselskatten kommer att leda till minskad trängsel innanför betalstationerna.	☐	☐	☐	☐	☐	☐	☐
Det kommer att vara krångligt att betala trängselskatt.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten kommer att förbättra trafiksituationen i Göteborg.	☐	☐	☐	☐	☐	☐	☐
Buller och luftföroreningar kommer att minska när trängselskatten införs.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten är orättvis.	☐	☐	☐	☐	☐	☐	☐
Det kommer att bli enklare för mig att ta mig fram när trängselskatten är införd.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten kommer att leda till att jag får det sämre ekonomiskt.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten kommer att påverka min livskvalitet negativt.	☐	☐	☐	☐	☐	☐	☐

42. Intäkterna från en trängselskatt kan användas till olika ändamål. Vi undrar nu vilka av nedanstående alternativ du främst tycker att pengarna borde användas till:

	Bör skatten ej användas till 1	2	3	4	5	6	Bör skatten användas till 7
Finansiera satsningar på kollektivtrafiken	☐	☐	☐	☐	☐	☐	☐
Bygga och underhålla vägar	☐	☐	☐	☐	☐	☐	☐
Sänka skatten på bensin och diesel	☐	☐	☐	☐	☐	☐	☐
Finansiera vård och skola	☐	☐	☐	☐	☐	☐	☐
Sänka skatter för medborgarna	☐	☐	☐	☐	☐	☐	☐

43. Är det viktigt för dig vad skatteintäkterna används till? Givet att intäkterna används på det sätt du angett ovan, skulle det då påverka din inställning till om trängselskatten är ett bra eller dåligt politiskt beslut?

	1	2	3	4	5	6	7	
Mycket negativ	☐	☐	☐	☐	☐	☐	☐	Mycket positiv

Frågor till dig som har tillgång till bil

44. Om du i dagsläget använder bil som ditt huvudsakliga färdsätt, skulle det vara praktiskt möjligt för dig att börja använda andra transportalternativ som kollektivtrafik eller cykel för dina dagliga resor?

	1	2	3	4	5	6	7	
Nej, inte alls	☐	☐	☐	☐	☐	☐	☐	Ja, utan problem

45. Tror du att du kommer resa mindre (i kilometer räknat) med bil efter införandet av trängselskatten?

	1	2	3	4	5	6	7	
Ja, jag kommer att resa mycket mindre	☐	☐	☐	☐	☐	☐	☐	Nej, jag kommer resa mycket mer

46. Tror du att dina vanliga bilresor kommer ta kortare tid på grund av mindre bilköer efter införandet av trängselskatten?

☐ Ja, mycket kortare tid
☐ Ja, något kortare tid
☐ Nej, lika lång tid

47. Om det finns alternativa färdvägar som är längre men där du slipper betala trängselskatt – skulle du då välja dessa?

	1	2	3	4	5	6	7	
Nej, aldrig	☐	☐	☐	☐	☐	☐	☐	Ja, alltid

48. Tror du att andra kommer att välja dessa avgiftsfria men längre alternativ?

	1	2	3	4	5	6	7	
Nej, aldrig	☐	☐	☐	☐	☐	☐	☐	Ja, alltid

49. Föreställ dig att trängselskatten är införd. Ange den summa som motsvarar det maximala belopp som du kan tänka dig att betala per dag i trängselskatt för att fortfarande ta bilen till och från jobbet. Försök ställa kostnaden i relation till vad du nu använder motsvarande belopp till och vad du eventuellt skulle behöva avstå ifrån. Tänk också på att det även kostar att använda kollektiva färdmedel. Den maximala trängselskatten för en dag är 60 kronor.

Jag kan maximalt tänka mig att betala: ☐☐☐☐ kr/dag i trängselskatt

Appendix B

The survey from 2013.

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1 ☐ Man 2 ☐ Kvinna

2. Hur gammal är du? ☐☐ år

3. Hur många personer ingår i ditt hushåll?
Ange antal personer i varje åldersintervall. ***Räkna även med dig själv.***

0-6 år	7-12 år	13-17 år	18-64 år	65-74 år	75- år
☐☐ st	☐☐ st	☐☐ st	☐☐ st	☐☐ st	☐☐ st

4. Var bor du? *Kryssa för ett alternativ*

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19 ☐ Stenungsund
20 ☐ Öckerö
21 ☐ Annan ort

5. Har du körkort för bil?
1 ☐ Ja 2 ☐ Nej

6. Har du tillgång till tjänstebil?
1 ☐ Ja 2 ☐ Nej

7. Kan du i allmänhet använda dig av bil när du behöver?
1 ☐ Ja, alltid 2 ☐ Ja, för det mesta 3 ☐ Ja, ibland 4 ☐ Nej, sällan 5 ☐ Nej, aldrig

8. Har du något kort du kan använda för resor med kollektivtrafiken? *Kryssa ett eller flera alternativ*
1 ☐ Nej 2 ☐ Ja, periodkort (även skol- och seniorkort) 3 ☐ Ja, annat

9. Vilken är din huvudsakliga sysselsättning? *Kryssa för ett alternativ*
01 ☐ Förvärvsarbetar
02 ☐ Studerar
03 ☐ Sjukskriven
13 ☐ Föräldraledig
11 ☐ Arbetssökande
12 ☐ Pensionär
13 ☐ Annat

10. Ungefär hur stor är ditt hushålls totala månadsinkomst före skatt?
☐☐☐☐☐ kr/mån. ☐ Vet ej/vill ej svara

11. Hur många i personer i hushållet bidrar till den gemensamma månadsinkomsten? *Bortse från eventuella barn- och studiebidrag.*
☐☐ personer.

12. Vart åker du normalt när du åker till arbete eller skola? *Kryssa för ett alternativ.*

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17 ☐ Mölndal
18 ☐ Partille
19 ☐ Stenungsund
20 ☐ Öckerö
21 ☐ Annan, nämligen:

Några frågor om ditt resande

13. Vilket är det huvudsakliga färdsättet för din resa till arbete/studier vid den här tiden på året?
Med huvudsakligt färdsätt menar vi det färdsätt du använde för längsta delen av din resa
☐ Kollektivtrafik ☐ Moped/MC
☐ Cykel/elcykel ☐ Till fots
☐ Bil ☐ Annat färdsätt

14. Ungefär vilken tid brukar du normalt sett lämna hemmet för att åka till din arbets-/studieplats och vilken tid är du framme? *Fyll i tiderna så att om du lämnar hemmet kl halv åtta på morgonen skriver du 0730.*
Lämnar hemmet: ☐☐☐☐ *Ankommer till arbete/studieplats:* ☐☐☐☐

15. Ungefär vilken tid brukar du normalt sett lämna din arbets-/studieplats och vilken tid är du hemma?
Lämnar arbete/studieplats: ☐☐☐☐ *Kommer hem:* ☐☐☐☐

16. Passerar du i dagsläget en betalstation (trängselskattegräns) på vägen till arbete/studier?
1 ☐ Ja 2 ☐ Nej 3 ☐ Vet ej

17. Hur ofta åker du normalt kollektivtrafik till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

18. Hur ofta åker du normalt cykel/elcykel till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

19. Hur ofta åker du normalt bil till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

20. Hur ofta åker du normalt moped/MC till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

21. Hur ofta tar du dig normalt till fots till din arbets-/studieplats vid den här tiden på året?
Ange endast ett färdsätt per dag du åker till din arbets-/studieplats
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

22. Hur ofta passar du på att göra andra ärenden i samband med dina resor till/från arbetet?
Exempelvis hämta på dagis, skola, handla mat o.s.v.
Aldrig ☐ ☐ ☐ ☐ ☐ ☐ ☐ Varje dag

23. Om du ibland tar bilen till arbete/studier, vilka möjligheter har du att byta färdmedel?

	Mycket små 1	2	3	4	5	6	Mycket goda 7
Från bil till kollektivtrafik	☐	☐	☐	☐	☐	☐	☐
Från bil till cykel	☐	☐	☐	☐	☐	☐	☐

Frågor om ditt arbete/dina studier

24. Hur många dagar per vecka arbetar du normalt?
☐ 7 dagar/vecka ☐ 4 dagar/vecka ☐ 1 dag/vecka
☐ 6 dagar/vecka ☐ 3 dagar/vecka ☐ Mer sällan
☐ 5 dagar/vecka ☐ 2 dagar/vecka ☐ Aldrig

25. Om du arbetar/studerar, hur många timmar per vecka arbetar eller studerar du vanligtvis?
☐☐ timmar per vecka

26. Har du möjlighet att själv bestämma hur dags du ska vara på din arbets-/studieplats?

1 ☐ Ja, alltid 2 ☐ Ja, för det mesta 3 ☐ Ja, ibland 4 ☐ Nej, sällan 5 ☐ Nej, aldrig

27. Har du möjlighet att (helt eller delvis) arbeta/studera på distans från hemmet?

1 ☐ Ja 2 ☐ Nej

28. Om ja, hur många dagar per vecka brukar du vanligtvis arbeta/studera på distans?

Antal dagar: ☐

Frågor om miljö och välbefinnande

29. Hur intresserad är du i allmänhet av miljöfrågor?

	1	2	3	4	5	6	7	
Inte alls intresserad	☐	☐	☐	☐	☐	☐	☐	Mycket intresserad

30. Forskare världen över blir mer och mer övertygade om att bl.a. förbränning av fossila bränslen i trafiken eller för elproduktion, ger en ökad växthuseffekt (dvs. en ökning av atmosfärens temperatur).

Vilket av följande påstående ligger närmast din uppfattning om hur du tror att vi i Sverige kommer att hantera problemet med växthuseffekten?

*Sätt kryss i den ruta som bäst motsvarar dina åsikter

1 ☐ Nya teknologier som löser problemet kommer att utvecklas
2 ☐ Vi kommer att tvingas ändra vår livsstil för att minska energiförbrukningen
3 ☐ Vi kommer inte att göra något åt problemet utan anpassa oss till ett varmare klimat
4 ☐ Vi kommer inte att göra något eftersom växthuseffekten inte är något problem
5 ☐ Växthuseffekten är ett problem men Sverige kommer inte att göra något åt det
6 ☐ Har ingen åsikt

31. Hur nöjd är du på det hela taget med det liv du lever?

	1	2	3	4	5	6	7	
Inte alls nöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

32. Hur känner du dig i allmänhet?

	1	2	3	4	5	6	7	
Nedstämd	☐	☐	☐	☐	☐	☐	☐	På gott humör

33. Om du tänker efter hur din tid fördelas mellan bl.a. förvärvsarbete, hemarbete, restid, sömn, måltider, motion, umgänge med familj/vänner och annan fritid. Hur nöjd är du då med fördelningen av din tid under en vanlig vecka?

	1	2	3	4	5	6	7	
Inte alls nöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

34. Om du tänker på ditt liv i stort, upplever du obehag för att du har svårt att hinna med allt som behöver göras?

	1	2	3	4	5	6	7	
Liten utsträckning	☐	☐	☐	☐	☐	☐	☐	Stor utsträckning

Frågor om din nuvarande resesituation

35. Händer det att du samåker med bil till arbete/studier?

1 ☐ Ja, samåker med person/er som inte bor i det egna hushållet
2 ☐ Ja, men samåker enbart med person/er som bor i det egna hushållet
3 ☐ Nej

36. Tänk på ditt vardagliga resande under den senaste månaden som helhet (t.ex. resor du gjort till affärer, till fritidsaktiviteter, till restauranger, till arbete/skola och alla andra resor som du vanligtvis gör). Vilken är din sammantagna upplevelse av dessa resor?

	-3	-2	-1	0	1	2	3	
Mycket stressad	☐	☐	☐	☐	☐	☐	☐	Mycket avslappnad
Mycket uttråkad	☐	☐	☐	☐	☐	☐	☐	Mycket entusiastisk
Mina resor fungerade mycket dåligt	☐	☐	☐	☐	☐	☐	☐	Mina resor fungerade mycket bra
Mycket trött	☐	☐	☐	☐	☐	☐	☐	Mycket pigg
Mycket låg standard	☐	☐	☐	☐	☐	☐	☐	Mycket hög standard
Mycket orolig	☐	☐	☐	☐	☐	☐	☐	Mycket lugn
Mina resor var de sämsta tänkbara	☐	☐	☐	☐	☐	☐	☐	Mina resor var de bästa tänkbara
Mycket jäktad	☐	☐	☐	☐	☐	☐	☐	Mycket avspänd
Mycket utled	☐	☐	☐	☐	☐	☐	☐	Mycket begeistrad

37. Hur nöjd är du som helhet med ditt vardagliga resande under den senaste månaden?

	1	2	3	4	5	6	7	
Mycket missnöjd	☐	☐	☐	☐	☐	☐	☐	Mycket nöjd

38. Nedan återfinns några påståenden om olika färdmedel, ange om du håller med eller inte.

	Håller inte alls med 1	2	3	4	5	6	Håller helt med 7
Bilen ger människor frihet.	☐	☐	☐	☐	☐	☐	☐
På sikt måste bilismen minska av miljö- och klimatskäl.	☐	☐	☐	☐	☐	☐	☐
Man kan lita på att kollektivtrafiken alltid kommer i tid.	☐	☐	☐	☐	☐	☐	☐
Kollektivtrafiken är oftast ett smidigt sätt för mig att färdas.	☐	☐	☐	☐	☐	☐	☐
Det är bekvämt att åka kollektivt.	☐	☐	☐	☐	☐	☐	☐

39. Händer det att du samåker med bil till arbete/studier?

1 ☐ Ja, samåker med person/er som inte bor i det egna hushållet
2 ☐ Ja, men samåker enbart med person/er som bor i det egna hushållet
3 ☐ Nej

Frågor om din inställning till trängselskatten i Göteborg

40. Tycker du att trängselskatten är ett bra eller dåligt politiskt beslut?

	1	2	3	4	5	6	7	
Mycket dåligt	☐	☐	☐	☐	☐	☐	☐	Mycket bra

41. Nedan återfinns några olika påståenden om vilka effekter trängselskatten har haft. Vi vill att du svarar genom att ange om du håller med om nedan påståenden.

	Håller inte alls med 1	2	3	4	5	6	Håller helt med 7
Trängselskatten har lett till minskad trängsel innanför betalstationerna.	☐	☐	☐	☐	☐	☐	☐
Det är krångligt att betala trängselskatt.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten har förbättrat trafiksituationen i Göteborg.	☐	☐	☐	☐	☐	☐	☐
Buller och luftföroreningar har minskat sedan trängselskatten införts.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten är orättvis.	☐	☐	☐	☐	☐	☐	☐
Det är enklare för mig att ta mig fram efter att trängselskatten infördes.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten har lett till att jag har fått det sämre ekonomiskt.	☐	☐	☐	☐	☐	☐	☐
Trängselskatten har påverkat min livskvalitet negativt.	☐	☐	☐	☐	☐	☐	☐

42. Intäkterna från en trängselskatt kan användas till olika ändamål. Vi undrar nu vilka av nedanstående alternativ du främst tycker att pengarna borde användas till:

	Bör skatten ej användas till 1	2	3	4	5	Bör skatten användas till 6	7
Finansiera satsningar på kollektivtrafiken	☐	☐	☐	☐	☐	☐	☐
Bygga och underhålla vägar	☐	☐	☐	☐	☐	☐	☐
Sänka skatten på bensin och diesel	☐	☐	☐	☐	☐	☐	☐
Finansiera vård och skola	☐	☐	☐	☐	☐	☐	☐
Sänka skatter för medborgarna	☐	☐	☐	☐	☐	☐	☐

43. Är det viktigt för dig vad skatteintäkterna används till? Givet att intäkterna används på det sätt du angett ovan, skulle det då påverka din inställning till om trängselskatten är ett bra eller dåligt politiskt beslut?

	1	2	3	4	5	6	7	
Mycket negativ	☐	☐	☐	☐	☐	☐	☐	Mycket positiv

Frågor till dig som har tillgång till bil

44. Om du i dagsläget använder bil som ditt huvudsakliga färdsätt, skulle det vara praktiskt möjligt för dig att börja använda andra transportalternativ som kollektivtrafik eller cykel för dina dagliga resor?

	1	2	3	4	5	6	7	
Nej, inte alls	☐	☐	☐	☐	☐	☐	☐	Ja, utan problem

45. Upplever du att du har rest mindre (i kilometer räknat) med bil efter införandet av trängselskatten?

	1	2	3	4	5	6	7	
Ja, jag har rest mycket mindre	☐	☐	☐	☐	☐	☐	☐	Nej, jag har rest mycket mer

46. Upplever du att dina vanliga bilresor har tagit kortare tid på grund av mindre bilköer efter införandet av trängselskatten?

☐ Ja, mycket kortare tid
☐ Ja, något kortare tid
☐ Nej, lika lång tid

47. Om det går, väljer du alternativa färdvägar som är längre för att slippa betala trängselskatt?

	1	2	3	4	5	6	7	
Nej, aldrig	☐	☐	☐	☐	☐	☐	☐	Ja, alltid

48. Ange den genomsnittliga summa per månad som du betalar i trängselskatt.

Jag betalar i genomsnitt: ☐☐☐☐ kr per månad i trängselskatt

49. Nedan följer några olika frågor kopplade till miljö och bilanvändning. Vi vill att du svarar genom att ange om du håller med om nedan påståenden.

	Håller inte alls med 1	2	3	4	5	6	Håller helt med 7
Mina val och beteenden har stor betydelse för miljön	☐	☐	☐	☐	☐	☐	☐
Jag tror att många göteborgare vill minska sin bilanvändning	☐	☐	☐	☐	☐	☐	☐
De flesta jag känner använder huvudsakligen bil för sina resor	☐	☐	☐	☐	☐	☐	☐

50. En folkomröstning om trängselskatten kommer att hållas i samband med valet 2014. Om det var folkomröstning om trängselskatten idag, hur hade du då röstat?

☐ Behåll trängselskatten
☐ Ta bort trängselskatten
☐ Vet ej/hade inte röstat

Appendix C

Factor analysis with variables related to the expected positive and negative effects. The variables used in the analysis are listed in below. The new variables created will be named *exp. pos. eff.* and *exp. neg. eff.*

Variable	Description
P1 Reduce congestion	Congestion will reduce (has reduced) in the cordon area thanks to congestion charges.*
P2 Better traffic	Traffic situation in Gothenburg will improve (has improved) thanks to congestion charges.*
P3 Less noise & poll.	Noise and air pollution will reduce (has reduced) thanks to congestion charges.*
P4 Easier get around	It will be (has been) easier for me to get around thanks to congestion charges.*
N1 Worse econ. sit.	My economic situation will worsen (has worsened) due to congestion charges.*
N2 Lower life quality	Quality of my life will worsen (has worsened) due to congestion charges.*

* The variable is measured on a scale 1 = do not agree at all, 7 = agree completely.

Polychoric correlation matrix

	P1	P2	P3	P4	N1	N2
P1	1					
P2	.81385417	1				
P3	.74176655	.84319252	1			
P4	.62134268	.68393389	.61468745	1		
N1	-.33474632	-.39956394	-.3369973	-.27938824	1	
N2	-.39304995	-.49391546	-.41202475	-.39306223	.80798696	1

Factor analysis/correlation — Number of obs = 2026
Method: principal factors — Retained factors = 2
Rotation: (unrotated) — Number of params = 11

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3.45870	2.56368	0.8513	0.8513
Factor2	0.89502	0.90551	0.2203	1.0716
Factor3	-0.01049	0.03362	-0.0026	1.0690
Factor4	-0.04411	0.04251	-0.0109	1.0582
Factor5	-0.08662	0.06312	-0.0213	1.0369
Factor6	-0.14973	.	-0.0369	1.0000

LR test: independent vs. saturated: chi2(15) = 8855.93 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
P1	0.8102	0.2498	0.2812
P2	0.9098	0.2214	0.1232
P3	0.8301	0.2536	0.2466
P4	0.6962	0.1773	0.4839
N1	-0.5899	0.6117	0.2779
N2	-0.6728	0.5601	0.2335

Factor analysis/correlation — Number of obs = **2026**
Method: principal factors — Retained factors = **2**
Rotation: orthogonal varimax (Kaiser on) — Number of params = **11**

Factor	Variance	Difference	Proportion	Cumulative
Factor1	**2.76969**	**1.18566**	**0.6817**	**0.6817**
Factor2	**1.58403**	**.**	**0.3899**	**1.0716**

LR test: independent vs. saturated: chi2(**15**) = **8855.93** Prob>chi2 = **0.0000**

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
P1	**0.8223**		**0.2812**
P2	**0.8928**		**0.1232**
P3	**0.8413**		**0.2466**
P4	**0.6872**		**0.4839**
N1		**0.8289**	**0.2779**
N2		**0.8278**	**0.2335**

(blanks represent abs(loading)<**.5**)

Factor rotation matrix

	Factor1	Factor2
Factor1	**0.8551**	**-0.5184**
Factor2	**0.5184**	**0.8551**

Scoring coefficients (method = regression;
based on varimax rotated factors)

Variable	Factor1	Factor2
P1	**0.22201**	**0.05374**
P2	**0.53095**	**0.05666**
P3	**0.24731**	**0.06408**
P4	**0.11206**	**0.01957**
N1	**0.12596**	**0.46231**
N2	**0.10870**	**0.53746**

Appendix D

Factor analysis with variables related to the attitude to public transport. The variables used in the analysis are listed in below. The new variable created will be named *attitude PT*.

Variable	Description
PT1 Trust	Public transport can be trusted to be always on time.*
PT2 Smooth	Public transport is often a flexible way for me to travel.*
PT3 Comfortable	It is comfortable to travel by public transport.*

* The variable is measured on a scale 1 = do not agree at all, 7 = agree completely.

Polychoric correlation matrix

	PT1	PT2	PT3
PT1	**1**		
PT2	**.53896442**	**1**	
PT3	**.53866169**	**.77294354**	**1**

Factor analysis/correlation — Number of obs = **2092**
Method: principal factors — Retained factors = **1**
Rotation: (unrotated) — Number of params = **3**

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	**1.78882**	**1.85866**	**1.1433**	**1.1433**
Factor2	**-0.06984**	**0.08457**	**-0.0446**	**1.0987**
Factor3	**-0.15441**	**.**	**-0.0987**	**1.0000**

LR test: independent vs. saturated: chi2(**3**) = **2731.16** Prob>chi2 = **0.0000**

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
PT1	**0.6184**	**0.6176**
PT2	**0.8387**	**0.2967**
PT3	**0.8385**	**0.2969**

Factor analysis/correlation — Number of obs = **2092**
Method: principal factors — Retained factors = **1**
Rotation: orthogonal varimax (Kaiser on) — Number of params = **3**

Factor	Variance	Difference	Proportion	Cumulative
Factor1	**1.78882**	.	**1.1433**	**1.1433**

LR test: independent vs. saturated: chi2(**3**) = **2731.16** Prob>chi2 = **0.0000**

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
PT1	**0.6184**	**0.6176**
PT2	**0.8387**	**0.2967**
PT3	**0.8385**	**0.2969**

(blanks represent abs(loading)<**.5**)

Factor rotation matrix

	Factor1
Factor1	**1.0000**

Scoring coefficients (method = regression;
based on varimax rotated factors)

Variable	Factor1
PT1	**0.16163**
PT2	**0.42413**
PT3	**0.42359**