

The Stockholm congestion pricing syndrome:
How congestion charges went from unthinkable to
uncontroversial

Jonas Eliasson
Centre for Transport Studies, KTH Royal Institute of Technology

CTS Working Paper 2014: 1

Abstract

Congestion pricing was introduced in Stockholm in 2006, first as a trial followed by a referendum, and permanently from 2007. Public attitudes to the charges became more negative during the period from the decision to the start of the system. Once the trial started, public attitudes became dramatically more positive over the following years, going from 2/3 against the charges to more than 2/3 in favour of the charges. While the traditional explanatory variables self-interest and belief in the charges' effectiveness strongly affect attitudes at any given point in time, they can only explain a minor part of the change in opinion. Moreover, self-reported changes in behaviour and attitudes considerably underestimate actual changes. About 3/4 of the decrease in car trips and more than half of the change in attitudes seem to have gone unnoticed by respondents, ex post. I discuss how the debate and the shift in attitudes can be understood as a public and political reframing of the congestion pricing over time.

Keywords: Congestion pricing, acceptability, attitudes.

JEL Codes: H23, H54, R41, R48.

1 INTRODUCTION

Urban congestion pricing has been advocated by transport planners and economists for decades as a way to strike a balance between demand for accessibility and the social costs of car mobility. The big obstacle is usually public opposition. Few cities have dared to challenge this opposition, and even fewer have managed to successfully introduce congestion pricing.

The Stockholm experience is an interesting exception. Congestion charges were introduced in Stockholm in 2006, first as a trial followed by a referendum, then permanently from 2007. The trial was forced through by the small Green party in exchange for its support for a national social-democratic government, in the face of public opposition and despite a promise of the social-democratic mayor in Stockholm not to introduce congestion charges. This ignited a heated debate, making public attitudes even more negative to congestion charges than before. But once the trial started in January 2006, the congestion reductions turned out to be enormous, and public opinion shifted quickly. The referendum resulted in a narrow majority in favour of keeping the charges. After the referendum, public support continued to increase, eventually reaching around 70% support (2011). No political parties want to abolish the charges anymore, and the debate has shifted from the system's existence to how it can be improved and how the revenues should be used.

How did this happen? How could such a controversial policy be introduced, survive a referendum and then settle down as an almost completely uncontroversial fact? The purpose of this paper is to describe this change in opinion and discuss a number of explanations. The discussion rests on analyses of six surveys of public attitudes carried out 2004-2011. Among other things, we investigate to what extent behaviour and attitudes can be explained by self-interest variables and belief in the charges' effectiveness, and to what extent people are able to predict or remember changes in attitudes or behaviour. The findings are interesting not only because congestion pricing is a potent policy measure, but also because they illustrate how attitudes to new policies are formed and change, and may hence be applicable to other reforms, in particular environmental policies.

The standard economic analysis of congestion pricing acceptability assumes that individuals' opinions are decided by their costs and benefits in terms of time gains, paid charges and the use of the revenues. The conclusion from the standard analysis is that the average driver will usually lose from the charges, since the value of the time gain will be less than the charge, but that the revenues are more than enough to compensate. In order to achieve support for congestion charges, the revenues have to be spent in such a way that a majority of the drivers think that they are better off when they weigh the charges they pay, the value of the time gain and the benefit of whatever the revenues are spent on. This model is often used by politicians, researchers and civil servants alike to understand and analyse public support for congestion charges.

In its simplest form, the model cannot explain the common phenomenon that attitudes become more positive once charges have been introduced (see Tretvik (2003) for Norway, Schade and Baum (2007) for London and below for Stockholm). This change in attitudes is often assumed to be caused by drivers underestimating the benefits *ex ante*, so that once the benefits appear, attitudes become more positive (Goodwin, 2006). This is by far the most common explanation of the shift in Stockholm opinions among political commentators. But as we will show, this cannot be the sole explanation for the

dramatic change in Stockholm attitudes, probably not even the most important one. In fact, public beliefs about the effects have changed only little over time, while support for the charges has increased considerably in *all* groups. In fact, while self-interest and beliefs about effects strongly affect attitudes in any cross-section, there turns out to be very little evidence that the *change* in attitudes is associated with changes in these variables.

Analyses in political and welfare economics usually assume that individuals' preferences are stable, consistent and complete, and that attitudes to specific issues are a function of these preferences. In contrast, analyses in social psychology often emphasize that a single individual may have several attitudes and preferences which may be unstable, inconsistent and incomplete (i.e. there are issues where people do not have any attitude at all). When faced with a question where attitudes are weak or non-existent, a respondent's attitude is often formed by associating the question to some other, similar question where the respondent already has a strong, well-developed attitude. A political battle over a new issue where voters do not have strong pre-existing attitudes, such as congestion charges, will often be a battle over which existing attitude voters will associate the new issue to, using the existing attitude as a template for the new one. Hence the importance of terminology, e.g. "road toll" vs. "environmental charge". Depending on which term is used, voters may tend to associate congestion pricing either to attitudes to "tolls" or "taxes" (negative attitudes) or to attitudes to "charges" or "environment" (positive attitudes).

Political rationality of congestion pricing may be different from mere public acceptability. While public support certainly affects political actions, it is neither a necessary nor a sufficient criterion for political support for a policy. We will touch upon the issue of the political rationale for congestion pricing as well – what caused parties to take their initial stances, and what caused the subsequent changes. Purely technical-rational questions, without a moral dimension or interpretation, may not generate sufficient voter enthusiasm to make them worth any political risk. During the debate, congestion pricing was to a large extent proposed and opposed with moral arguments rather than technical-rational ones in a more limited sense. This line of argumentation may have been necessary to make congestion pricing politically interesting – but may simultaneously have made it a more divisive issue.

Section 2 gives an overview of the history of the Stockholm congestion charges. Section 3 summarizes some of the previous knowledge about factors affecting attitudes to congestion pricing. Section 4 explores changes in behaviour and attitudes based on six surveys 2004-2011. Section 5 discusses how the attitude formation process may be understood. Section 6 concludes.

2 THE STOCKHOLM CONGESTION CHARGES – AN OVERVIEW

Just like in many other cities, transport planners and economists had suggested that Stockholm should introduce congestion pricing for a long time, without getting either public or political support. In the early 1990's, road tolls were proposed as a way to partially finance a large infrastructure package for Stockholm, the "Dennis agreement" (named after the chief negotiator). This ignited the interest from environmentalists, who appreciated the traffic management potential of the tolls, even if they didn't approve of the revenues partially being used for new motorways. The Dennis agreement broke down in the late 1990's, but the ball had been set rolling: several stakeholders carried out analyses of congestion charging schemes, and perhaps more

important, the issue had entered the agenda of the environmental movement, in particular the Green party.

In 2002, the social-democratic national government set up a commission to negotiate a new infrastructure agreement for Stockholm. The idea was floated to use road pricing as a funding source. When the Conservative party accused the social-democrats of having secret plans to introduce "road tolls" after the election 2002, the social-democratic mayor in Stockholm promised very clearly and publicly that there would be no road tolls in Stockholm during the next election cycle. The social-democrats went on to win both the national and the Stockholm election, provided that they could ensure support from the Green party. In return for support for a social-democratic national government, the Green party demanded that a "several-year, full-scale congestion charging trial" should be carried out in Stockholm. The social-democrats obliged.

This led to an extremely heated debate. Congestion pricing was an unpopular measure from the outset, and the broken election promise made matters worse. The opposition raged, while silently celebrating what they anticipated to be a landslide victory in the next election. Both proponents and opponents of the charges used dramatic rhetoric to describe what would happen with or without congestion charges, respectively. The media picture was overwhelmingly negative: 39% of all newspaper articles on the topic were negative, compared to 3% positive (the rest were neutral) (Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009). Opponents to the charges suggested a referendum about the charges, confident that they would win. The idea was silently welcomed by the social-democrats, who saw it as a way to put some distance between them and the charges: with a separate referendum, it would be possible to vote for the social-democrats and still vote no to the charges. However, it was decided that the referendum should not be held until after the trial, in conjunction with the next regular election in September 2006. This turned out to be of crucial importance.

The congestion charging trial started in January 2006, when a time-differentiated cordon toll around the inner city was introduced. Traffic across the cordon dropped immediately, leading to dramatic congestion reductions all over the city. As weeks and months passed by, the decrease in traffic volumes across the cordon during the charged period stabilized around 22% compared to 2005 levels, resulting in congestion reductions around 30-50% (Eliasson, Hultkrantz, Nerhagen, & Rosqvist, 2009; Eliasson, 2008). Public attitudes gradually became more positive, while the media picture changed completely: the share of positive newspaper article increased from 3% to 42% while the share of negative articles fell from 39% to 22%. In the referendum in September, 53% of valid votes were in favour of keeping the charges¹.

All national parties had promised to follow the outcome of the Stockholm referendum. The election ended up with liberal/conservative majorities both nationally and in Stockholm, and they obligingly set out to reintroduce the congestion charges, which had been turned off before the referendum. The crux was the negotiation about the revenues. Legally, the charge was a national tax that ended up in the national

¹ Some surrounding municipalities also arranged referenda, although they had no legal influence, since the congestion charges were entirely within the border of the city of Stockholm. (Around 2/3 of the city's population live inside the cordon. It should be noted, by the way, that residents within the cordon pay on average much more in charges than residents outside the cordon, while they get less of the travel time benefits, since congestion problems mainly exist into the city in the morning and out from the city in the afternoon.) Counting the votes of all referenda that were held, there was a majority against the charges, but the selection was heavily skewed: referenda were only held in municipalities with liberal/conservative majorities and where opinion polls showed that there was a majority against the charges.

government's coffers, but the Stockholm region understandably argued that it was really their money. Eventually, the regional and national politicians brokered a huge, ten-year infrastructure package worth around 10 billion euros, where one part of the deal was that the revenues from the charges were earmarked for a new bypass around Stockholm.

As time went on, all political parties accepted and, eventually, even embraced the congestion charges. The reasons for this included the congestion reduction, the means to finance infrastructure, the possibility to get leveraged funds from the government, and the steadily increasing public support for the charges. The media interest for the charges faded, after having been in the headlines almost daily for four years. Rather than discussing the existence of the charges, the political parties and other stakeholders gradually moved on to discussing how the charges could be redesigned and how the revenues should be used. The traffic reduction has remained remarkably stable over time (Börjesson, Eliasson, Hugosson, & Brundell-Freij, 2012). At the time of writing (November 2013), the liberal/conservative majorities in the national government, the city of Stockholm and the county of Stockholm – the former opponents of the charges – have agreed to substantially increase the level of the charges and introduce a new toll on the western bypass, with the dual purpose to finance a metro extension and reduce congestion even further. The only objection from the left/green opposition is that it is too little, too slow and too late.

3 FACTORS AFFECTING ATTITUDES TO CONGESTION PRICING

There is a large literature on congestion pricing acceptability. We will not attempt a full review of this literature, but limit ourselves to identifying the most important factors that are known to affect attitudes to congestion pricing and that will be important in the discussions further on. Of particular interest for our purposes is the study by Hamilton and Eliasson (2012) which compare the influence of a number of factors in three different cities – Stockholm, Helsinki and Lyon. One of the main conclusions was that various factors affected attitudes similarly in all three cities, and that most of these factors were similar in all three cities. Despite this, attitudes to congestion pricing were much more positive in Stockholm than in the other cities. The only factor that could explain this difference was that Stockholm has had an operational congestion charging system for several years.

First, self-interest variables are obviously important. All else equal, individuals get more positive the less charges they pay (or expect to pay), the more time gains they get, the higher they value travel time savings, and the more satisfied they are with public transport. Individuals also become more positive if revenues are used in a way they appreciate, which can be viewed as a form of self-interest (Eliasson & Jonsson, 2011; Hamilton & Eliasson, 2012; Hårsman & Quigley, 2010; J. Schade & Schlag, 2003).

Positive attitudes to congestion charges are also strongly correlated with concerns about and engagement in environmental issues (Eliasson & Jonsson, 2011; Hamilton & Eliasson, 2012). This is particularly important since a large share of the population show strong environmental attitudes. For example, Hamilton et al. find that around 90% of the populations of Helsinki, Stockholm and Lyon agree with the statement “much more resources should be spent by the government to protect the natural environment”.

Congestion is viewed as one of the most important urban problems (65-80% of the three populations agreed). But Hamilton et al. found no significant correlation between

attitudes to congestion pricing and concerns about road congestion. On the other hand, they found a strong correlation between concerns about road congestion and being in favour of expanding road capacity. Apparently, it is not mainly concerns about congestion that is driving support for congestion pricing, despite the fact that such concerns are widespread². This is consistent with several earlier studies finding that one of the most common arguments against congestion pricing is a distrust in congestion pricing's ability to reduce congestion (Jones, 2003; Jens Schade & Schlag, 2003). On the other hand, this distrust may partially be a reflection of self-interest: Schade and Baum (2007) find that respondents who expect congestion pricing to be disadvantageous to themselves not only have more negative attitudes to it, but also perceive it as less effective and more unfair than other respondents.

Congestion pricing attitudes are related to attitudes to public interventions in general. Hamilton et al. show that negative attitudes to congestion pricing are strongly correlated with negative attitudes to taxation in general, speed enforcement cameras, and belief in a public administration's ability to distribute a scarce resource fairly. This finding may partly explain the apparent paradox that left-wing parties are often more in favour of congestion pricing than liberal/conservative parties.

Equity effects are often cited as one of the main reasons for opposition to congestion pricing. Whether congestion pricing has progressive or regressive effects depend on the design of the system and on initial travel patterns. As to Stockholm, there are several studies (Eliasson & Levander, 2006; Eliasson & Mattsson, 2006; Franklin, Eliasson, & Karlström, 2010; Karlström & Franklin, 2009). These find no regressive effects; some indicate progressive effects, while some indicate neutral effects. It should be noted that the equity argument may be used for other reasons than honest equity concerns: it may simply be perceived as a more legitimate argument than self-interest (Jens Schade & Baum, 2007). This is supported by the finding that Hamilton et al. found weak or no correlation between the attitude to congestion pricing and agreeing with the statement "More should be done to reduce the difference between rich and poor in society".

The most important factor, however, seems to be own experience of congestion pricing. When comparing Stockholm with Helsinki and Lyon, there are only small differences between them with respect to variables such as environmental concerns etc. In fact, attitudes to congestion pricing in Helsinki and Lyon are similar to attitudes in Stockholm before the trial. The main difference between Stockholm and the other two cities is simply that the Stockholm population has experienced the introduction of congestion pricing, while the others have not. This returns us to the main purpose of the paper: to try to understand what caused this change in attitudes.

4 CHANGES IN BEHAVIOUR AND ATTITUDES

The analyses in this section build on a series of surveys carried out during the period 2004-2011. The surveys have different general topics and target slightly different populations, but all deal to some extent with congestion charges, and fortunately some important questions are found in all the surveys. Table 1 gives a general summary.

² Other studies have got mixed results on this issue. While Rienstra, Rietveld and Verhoef (1999) found that respondents with more concerns about congestion were more positive towards congestion charges, Hårsman et al. (2000) and Schade et al. (1999) found the opposite.

Table 1. Overview of surveys used in the analyses.

Year		2004	2005	2006	2007	2010	2011
Sampled area		Stockholm county	Stockholm county	Stockholm county	Stockholm city	Stockholm city	Urban core of Stockholm county
Topic of survey		The Stockholm trial	The Stockholm trial	The Stockholm trial	Environmental issues	Environmental issues	General transport issues
Responses		1600	1600	1600	3040	2946	1837
Respondent characteristics							
Male		50%	50%	50%	46%	46%	45%
Employed		68%	65%	66%	69%	67%	67%
Education	9 years	13%	11%	11%	14%	13%	10%
	12 years	37%	41%	38%	30%	28%	32%
	University	50%	48%	51%	56%	59%	58%
Household type	Single	19%	20%	21%	26%	23%	18%
	Two adults	33%	32%	34%	34%	36%	29%
	Two adults w children	45%	44%	42%	34%	37%	47%
	Single w children	3%	4%	4%	5%	4%	6%
Access to car in household		82%	83%	81%	(52%)	(52%)	76%
Car trip frequency	Almost every day	52%	47%	41%	n/a	n/a	31%
	1-2 per week	21%	26%	31%			39%
	Seldom/never	26%	26%	28%			30%

The first three surveys (2004, 2005, 2006) were carried out in connection with the Stockholm trial, so most of the questions dealt with the trial and its effects. Respondents were sampled without stratification from the entire Stockholm county (the city of Stockholm contains almost half the population of the county). The next two surveys (2007, 2010) covered only the city of Stockholm, and focused on environmental issues in general; the congestion charges were just a minor part of these surveys. The final survey (2011) was carried out by the author and a team of researchers (Hamilton & Eliasson, 2012), sampling respondents from the urban core of the county (which contains most of the population in the county) and focused on transport issues in general and transport pricing in particular.

Since the six surveys targeted different geographic populations, there is a risk that differences between them may be due to sample differences. All results presented below have been cross-checked in the relevant subsamples (city vs. county vs. urban core), and the differences between the subsamples are negligible. Table 1 presents some descriptive statistics, showing that the sample characteristics are reasonably stable over the years. Note, though, that the 2007 and 2010 surveys did not ask for “access to car in household” or “car trip frequency”. The closest indicator was the question “Do you have access to a car which you drive?”. This slightly strange wording yielded a substantially lower “car access” rate.

4.1 Behavioural changes

A natural first question is whether people’s behavioural response to congestion pricing is “rational”, in the sense that people react similarly to congestion charges as to other changes in travel costs and travel times. There are several reasons to suspect that this

might not be the case. After all, congestion pricing is an unusually visible travel cost, and it involves a transition from “free” to “priced” which has been shown to create disproportionately large responses in other situations. On the other hand, one of the most common arguments against congestion pricing is that it will not affect drivers’ behaviour, disregarding results from transport models and various other kinds of pricing studies.

Nevertheless, the forecast effects obtained from a standard transport model turned out to be surprisingly accurate. Such models rely on relatively simplistic utility functions to explain travellers’ behaviour, estimating the parameters of the utility functions on cross-sectional observations of travel patterns, travel times and travel costs. Eliasson et al. (2013) provide a detailed comparison between forecast and outcome, concluding that the main predictions about behavioural responses were sufficiently accurate to draw correct conclusions. For example, traffic across the cordon was predicted to decrease 17% during peak hours and 16% during the entire charged period (6:30-18:30); the actual figures were 19% and 20%. The transport model predicted that around half of the disappearing trips would switch to public transport, which would lead to a 6% increase in passenger volumes; the actual outcome turned out to be 4-5%. Hence, the standard economic concept of utility maximization based on objective variables such as travel times and costs seem to work well enough to predict aggregate behavioural responses.

In fact, the model seems to be much better at predicting changes in behaviour than the travellers themselves, both *ex ante* and *ex post*. Surveys in the fall of 2004, the fall of 2005 and the spring of 2006 asked respondents about changes in their travel patterns in response to the charges. Respondents gave reasonably consistent answers in the three surveys (see Table 2). Before the charges were introduced, 23% (2004) and 16% (2005) of respondents, respectively, stated that they would drive less frequently across the cordon. In the spring of 2006, with the charges in place, 24% of respondents stated that they drove less frequently over the cordon because of the charges.

Table 2. “How will you change [2006: How have you changed] your number of car trips across the cordon during charged periods due to the charges?” (Respondents: car owners)

	2004	2005	2006
Quit completely	1%	1%	4%
Considerably less	4%	6%	10%
Somewhat less	18%	9%	10%
No change	74%	84%	75%
Somewhat more	2%	0%	1%
Considerably more	1%	0%	1%

Since the surveys also asked how many car trips respondents made across the cordon, these answers can be transformed to an equivalent aggregate traffic reduction, albeit with some uncertainty since “considerably less” and “somewhat less” are not very precise answers. This yields an equivalent aggregate traffic reduction of 5-10%. This can be compared to an observed reduction of private trips³ around 30%. In other words, around 3/4 of the reduction in car trips across the cordon seems to have gone unnoticed by the travellers themselves.

³ Total traffic reduction is less because professional traffic decreased much less than private traffic.

4.2 Attitude changes

Figure 1 shows how the support for congestion charges has evolved over time. The question used in all six surveys was “How would you vote in a referendum about congestion charges in Stockholm?”, choosing one out the five responses presented in Table 3. The 2010 survey was an exception, however, since the only responses were “yes”, “no” or “don’t know”. The share of “don’t know” votes is clearly affected by the referendum in September 2006: before it, more and more people form an opinion, while after the referendum, more people tick the “don’t know” box. In the following, we will use the term “support” for congestion charges to mean the share of yes votes excluding “don’t know” votes, since this appears to be the most comparable number across years.

Table 3. “How would you vote in a referendum about the Stockholm congestion charges?”

	2004	2005	2006	2007	2010	2011
Certainly yes	20%	16%	32%	26%	50%	28%
Probably yes	18%	14%	16%	26%		29%
Probably no	9%	13%	8%	12%	25%	13%
Certainly no	41%	46%	35%	16%		14%
Don't know	11%	10%	8%	19%	20%	15%
Share "yes" excl. "don't know"	43%	34%	53%	65%	67%	68%

Starting from a relatively high level of 43% in 2004, the support dropped to 34% in 2005 immediately before the start of the trial. In April 2006, after four months of congestion charges, support had increased to 53%, similar to the referendum outcome in September 2006. The next survey was carried out in December 2007, over a year after the referendum and four months after the reintroduction⁴ of the congestion charges in September 2007. The 2007 survey showed another leap in the support to 65%. Subsequent surveys in 2010 and 2011 showed marginally higher support of 67% and 68%.⁵

⁴ The charges were abolished before the referendum 2006, and were not reintroduced until an agreement had been struck between the Stockholm region and the government.

⁵ Note that the 2007 and 2010 surveys only covered the city of Stockholm. In the 2004, 2005, 2006 and 2011 surveys, the support (share of “yes” votes excl. “don’t know”) was consistently 3 percentage points higher in the city than in the county as a whole.

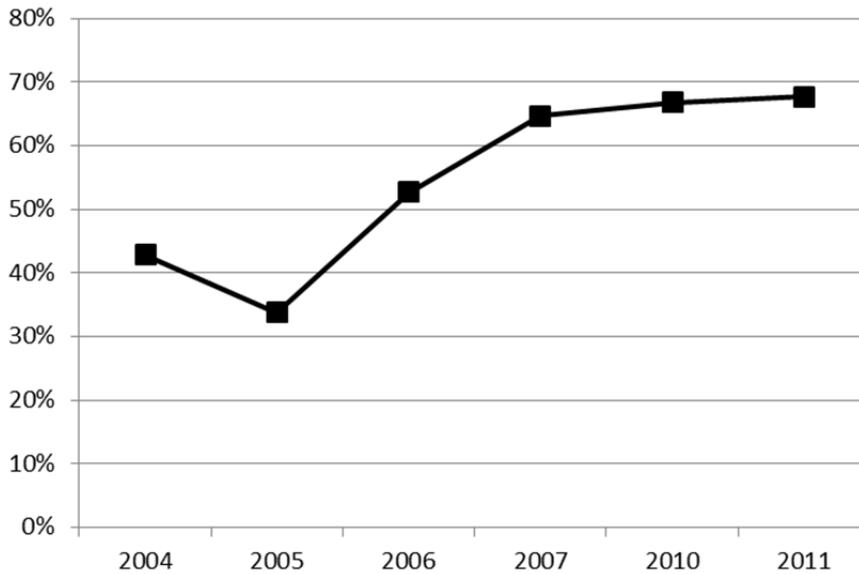


Figure 1. Would vote "yes" in referendum about congestion pricing (excl. "Don't know").

Is the change in support caused by increased beliefs in the effects?

The development of attitudes is remarkably close to the general pattern described in Goodwin (2006), reproduced in Figure 2. Drawing on "many separate research projects, experience in Edinburgh, London and many other places", Goodwin argues that public opinion follows a certain trajectory. At first, the general idea gets decent support, but when the "devil of the detail emerges", support falls. But as the system starts, and the "promises of improvement are actually, more or less, delivered", there is a "building up of support, perhaps over many years".

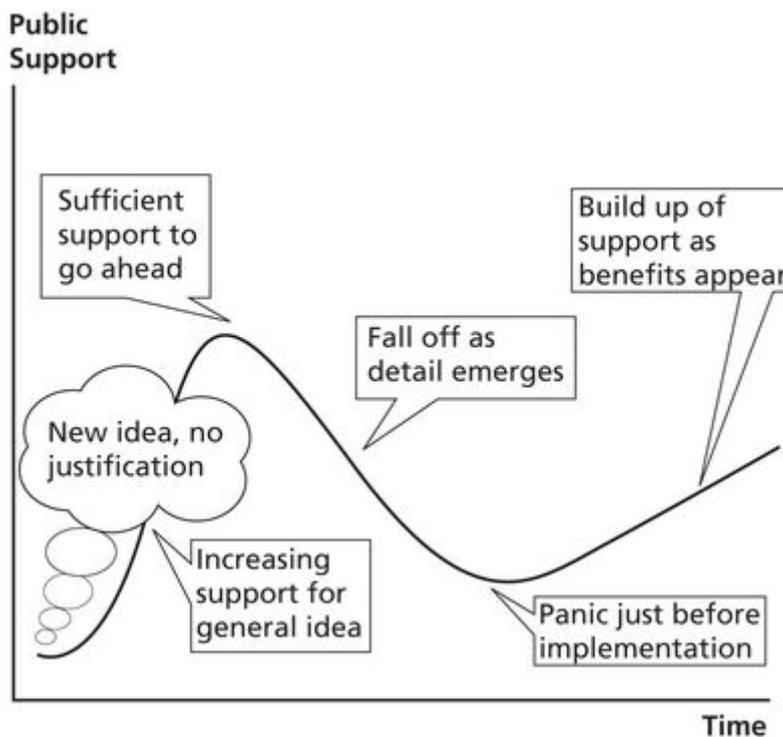


Figure 2. "The gestation process for road pricing schemes" - reproduced from Goodwin (2006).

Goodwin hence hypothesizes that the increase in support can be attributed to the benefits that appear in the form of traffic and congestion reductions. This is indeed by far the most common explanation among commentators for the change in opinion. It is also established that there is a strong link between support for congestion charges and belief in their effectiveness (see e.g. Eliasson and Jonsson (2011)).

However, Figure 3 shows the Stockholm population's beliefs in the congestion charges' effects (more details are presented in the Appendix, Table 4). As the figure shows, there is very little support for the hypothesis that the dramatic increase in support is caused by an increased belief in the effectiveness and benefits of the charges. In fact, beliefs about the charges' effects have remained surprisingly constant over time. The number of people believing that the charges had beneficial effects increased when the charges were introduced in 2006, but the change was rather small, considering how visible and well-publicized the effects were. In fact, the change seems too small to explain the jump of almost 20 percentage points in the support for the charges. Between 2006 and 2007, support increase with a further 12 percentage points, but this cannot be explained by an increased belief in effectiveness – it remained constant between 2006 and 2007. Finally, in 2010 and 2011 beliefs about benefits fell back to approximately 2004 levels – but support for the charges remained at the same high level as in 2007.

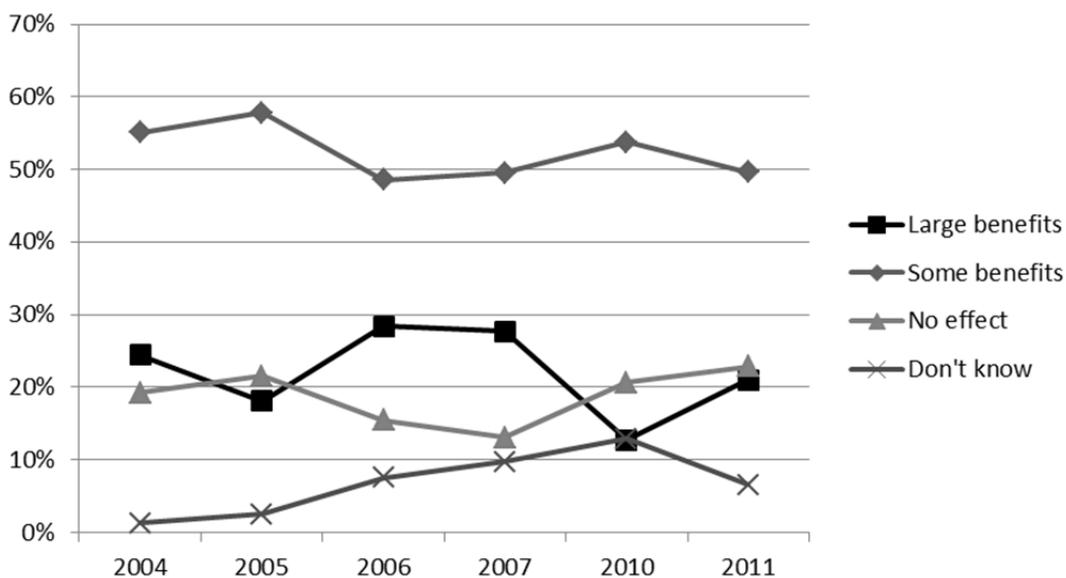


Figure 3. What effect do you think the charges will have/have had on road congestion in Stockholm? (In 2011, the question was rephrased as "If the charges were abolished, how do you think road congestion would be affected?" Answers have been recoded to make them comparable to previous years – see appendix.)

It is possible that respondents' interpretation of the response alternatives – "some benefits" and "large benefits" – may change over time. The threshold before benefits are labelled "large" may increase when expectations increase. Still, the share of respondents stating that the charges have "no effect" is higher than ever in 2011.

It is also interesting to note that the share of respondents answering that they "don't know" the effect of the charges is increasing over time. It is not surprising that a considerable share of the population honestly do not know. What is interesting is that comparatively few people answered that they did not know what would happen before the charges (2004 and 2005) and when the charges were new (in 2006). A hypothesis could be that when the issue becomes less controversial, less people have any opinion at all. This would be consistent with how the share of undecided voters has developed

over time. In 2004-2006, around 10% of voters were undecided, while after the referendum, around 20% respond that they do not know how they would vote if a new referendum would be held.

Hence, the hypothesis that changed beliefs about effects is the main driver of the change in attitudes seems unfounded. A simple illustration is given in Figure 4, which shows how support would have developed if it only had been affected by beliefs in benefits and self-interest variables (in other words, support is assumed to be constant for each self-interest/belief segment from 2004 onwards, and then hypothetical support is calculated by taking only the relative sizes of these 12 segments into account; the self-interest and belief variables are described in detail in the Appendix).

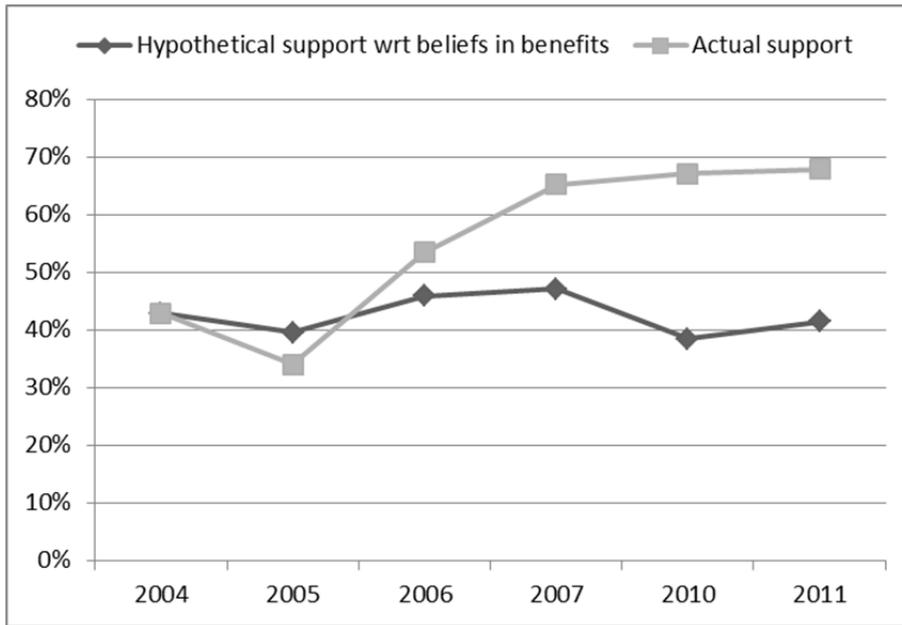


Figure 4. Support for the charges, grouped by beliefs in the charges' effects.

This becomes even clearer in Figure 5, where the population is split into three groups according to their belief in the charges' effects. Obviously, the support in the group claiming that the charges have "large benefits" is much higher than in the group claiming that the charges have "no effect". This is true at any point in time. What is surprising is that the support has increased dramatically in *all* groups – even in the group claiming that the charges have no effects. The increase is particularly pronounced in the group believing that the charges have had "some benefits", where support has grown from a low point of 35% to a peak of 77%. This may lend some support to the interpretation that the definition of "some benefits" has changed over time. But even in the "no effects" group, the share of supporters has more than tripled from its lowest point.

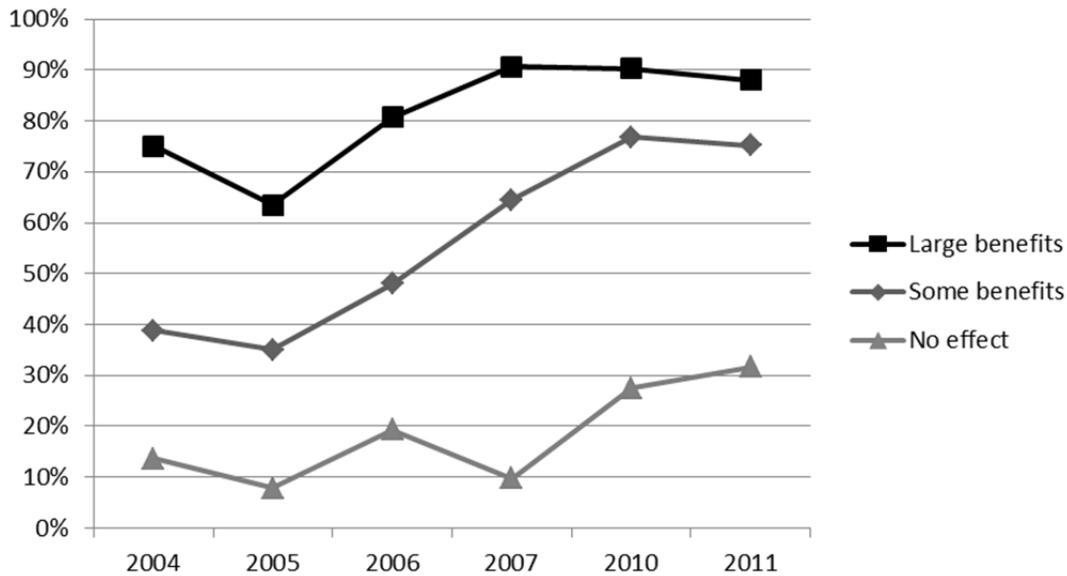


Figure 5. Support for the charges, grouped by beliefs in the charges' effects.

In 2004, not even the group who anticipated "large benefits" were convinced supporters. Starting at a relatively moderate 75% level, support dropped to 63% - the biggest drop among all groups - before soaring to the current 90% support level.

We may hence conclude that beliefs about benefits cannot be the sole, or even the main, driver of the change in attitudes. While there is a strong correlation between attitudes to the charges and beliefs about their benefits at any given point in time, the *change* in attitudes seems to be driven by something else. This is also argued by Winslott-Hiselius et al. (2009) and Brundell-Freij et al. (2009). Schade and Baum (2007) show that respondents are more positive to a road pricing reform if they believe that it is inevitable, which is a related conclusion. Finally, the phenomenon can be interpreted as status quo bias, i.e. a resistance to a change in any direction, or loss aversion: before the charges, the time gain is valued less than the increased travel cost, while after the charges, the (equally sized) time loss that would result if charges were abolished is valued higher than the charge.

Self-interest and belief in effectiveness

Previous studies have shown a link between self-interest and stated beliefs about charges' effectiveness. For example, Schade and Baum (2007) show that respondents who expect to pay substantial charges express lower belief in the charges' effectiveness in reducing congestion. This phenomenon can be seen in each cross-section of Figure 6. Here, the share of respondents who believe that the charges' have had "large benefits" is tracked for four groups: respondents without a car, respondents with a car but who never cross the toll cordon during charged periods, those who sometimes pay (or expect to pay) the charge, and who pay (or expected to pay) the charge often (more details in Appendix, Table 5).

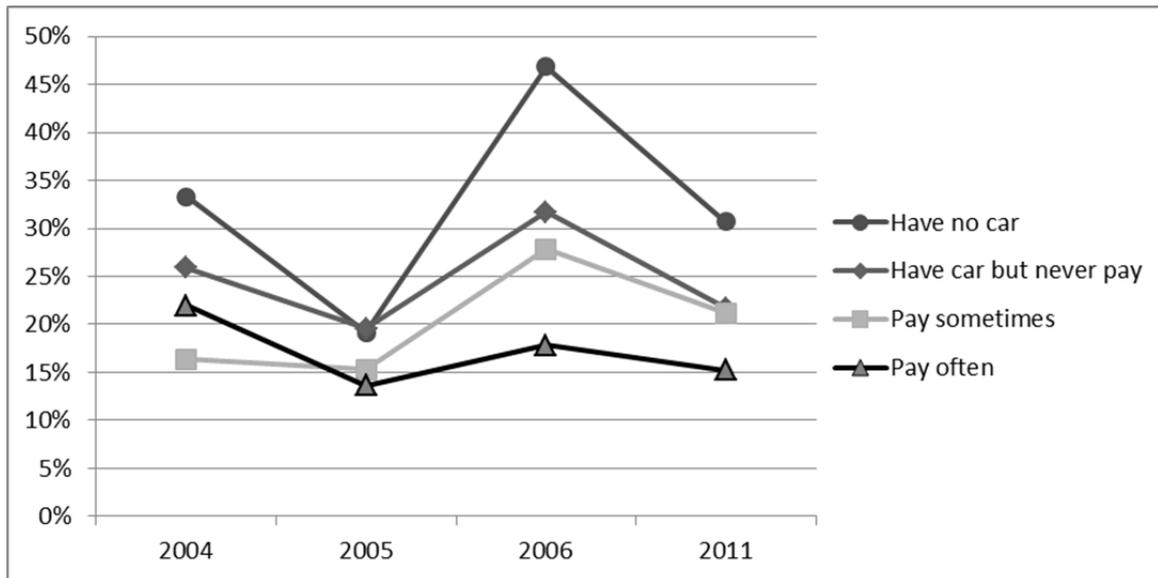


Figure 6. Share that thinks the charges will have/have had large effects on congestion. (2007 and 2010 answers are not shown, because these surveys did not ask how often respondents drove across the cordon.)

It seems very likely that self-interest is influencing beliefs in the charges' effectiveness, and that consciously or subconsciously, opposition to the charges induced by self-interest are rationalized by distrust in the effects. (Other explanations, such as systematically different travel patterns between groups, cannot be ruled out, though.)

In 2005, before the start of the trial, beliefs in the effects are low in all groups, affected or not. But once effects appear, perceived effects increase in all groups. Objective measurements show that effects have remained roughly constant over the years. We also know that the effects when the charges were introduced in 2006 were much larger than anyone had expected. Hence, the change in beliefs about effects must be driven by something else than just the objective effects. Interestingly, beliefs are more volatile the less affected people are. The largest effect can be seen in the group without a car. Drivers who pay often, on the other hand, only show a marginal change in their belief about effects. In 2011, though, beliefs have fallen back almost to 2005 levels for the three car-owning groups.

So why do beliefs in the benefits attenuate? We can only suggest some hypotheses. First, reference points are less stable than one might believe, so over time, fewer and fewer people will have a relevant "before" situation to compare with. For example, during any given year, 20-25% of the workforce change jobs (or start working), and 15-20% of the population move, and these are just two of many changes that affect travel patterns. Second, it is well known from the psychological literature that people are in general much more sensitive to changes than to absolute levels. After a few years, it is not surprising that few will actually be able to remember the situation before the charges – especially since congestion varies substantially both across days and with the time of year. Third, partly for these reasons, most people will rely on the media to form an opinion, and media are usually more interested in the short-term view, rather than whether congestion in 2010 were higher or lower than 2005.

Self-interest and support for the charges

Figure 7 shows support for the charges in four groups: people without car in the household, car owners who never or very seldom cross the charge cordon, car owners who sometimes pay the charge, and car owners who often pay the charge. (2007 and

2010 data are missing, since these surveys did not ask about driving across the cordon; more details in Appendix, Table 6) The support shows the same U-shape in each group. In fact, the dip from 2004 to 2005 is most pronounced for the *unaffected* groups, i.e. people not expecting to pay the charge.

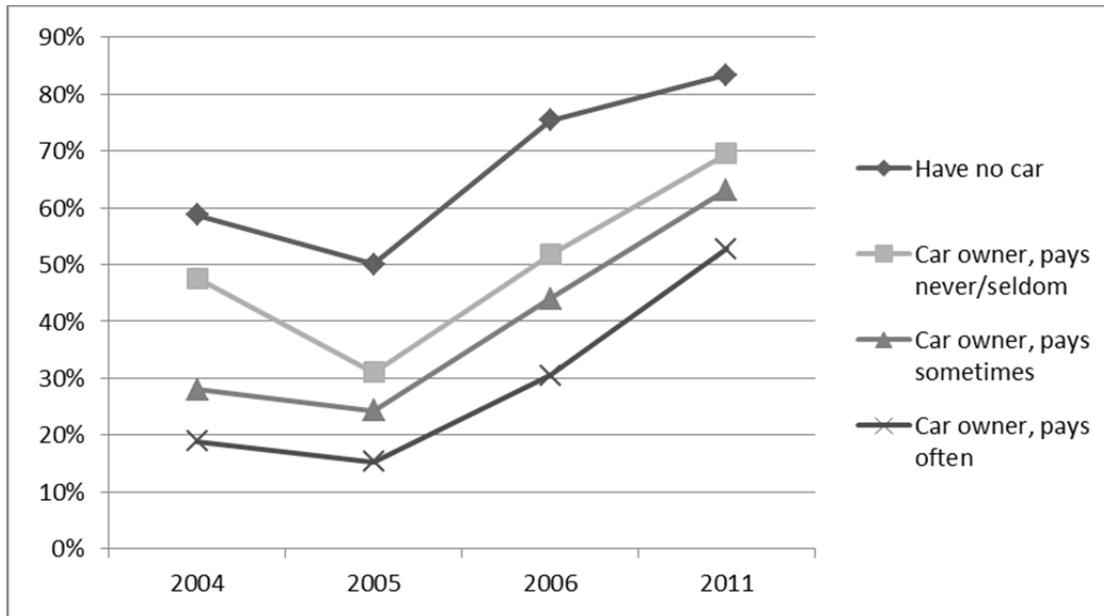


Figure 7. Support for congestion charges depending on car ownership and paid charges.

Evidently, self-interest variables such as tolls paid make a large difference for the support, looking at each cross-section. But it is just as evident that it cannot be self-interest variables that are the main drivers of the attitude change. All the groups show the same pattern of attitudinal change, regardless of how much they are affected by the changes in travel costs and travel times. Even in the most affected group, support for the charges has more than tripled from a low point of 15% to 53%. In other words, there is a majority in favour of the charges in all groups by 2011.

An alternative or complement to the “unexpected benefits” explanation is that the change is caused not so much by benefits being larger than expected, but negative effects turning out to be less than feared. Before the start of the charges, many problems were anticipated, such as increased transit crowding, congestion on the ring-roads and technical failures. Maybe most important, it seems to have been difficult to anticipate how one would have to adapt one’s life to the charges (cf. above about self-predicted changes in travel behaviour; see also Henriksson (2009) for interviews illustrating this). But once the charges were in place, the anticipated problems did not materialize, and people discovered that life went on more or less as usual. When the end-of-the-world did not arrive, this may have turned attitudes a little more positive. There is some evidence for this mechanism, e.g. in Henriksson (2009). But it can hardly explain the dramatic increase in support among all the groups in Figure 7. It could explain some decrease in the negative attitude of the most affected groups when they adapt to the charges, and some increased support in the unaffected groups when second-order problems did not materialize – but it can hardly be enough to explain the large, consistent and long-term increase in support among all the groups.

Self-reported attitude changes

Just as respondents seem to be unaware of their behavioural changes, they seem to be remarkably unable to remember their past attitudes. In the voting literature, it is well

known that self-reported votes do not coincide with actual votes, with respondents tending to forget that they have ever had another opinion than their current one.

This phenomenon is apparent in the surveys from 2006 and 2007, which asked whether respondents had changed their attitude to the charges. From 2005 and 2006, voters intending to vote "yes" in the referendum increased by 19 percentage points from 30% to 49% (including undecided voters in the base). 29 percentage points of the 49% yes-voters stated that they have "become more positive" during 2006 – that is, some of the positive voters must have become even more positive. But when the same question is repeated in 2007, only 13% of voters state that they "became more positive" during 2006. Not only is this less than half the 29% from 2006, it is lower than the 19 percentage points that became so much more positive that they changed from "no" to "yes".

5 A POSSIBLE UNDERSTANDING OF THE ATTITUDINAL CHANGE

The previous section demonstrated a number of paradoxes that beg explanation. Why did support fall before the charges were introduced, even in unaffected groups? Why did it increase after the introduction by very nearly the same amount in all groups, regardless of whether people were affected or not? Why did the support for the charges increase even in the group that state that the charges have no effect? This section is devoted to discussing how the change in public attitudes may be understood and interpreted. There are in fact several possible explanations, or rather interpretations. To some extent it will be necessary to be somewhat speculative; there is simply no single conclusive explanation.

It is clear that even if self-interest and belief in effects strongly affect attitudes, these are not the sole determining factor, especially when looking at how attitudes change over time. To understand why attitudes changed over time the way they did, we need some results from the social psychology literature on how attitudes are formed.

For our discussion⁶, the most important result is that attitudes may be more or less stable and more or less developed. Attitudes tend to be more stable the more vertical and horizontal structure they have. The vertical structure of an individual's attitude refers to how it is anchored in fundamental values (the things the individual considers important, such as freedom, family, democracy, environment etc.) and beliefs (experience and knowledge, or at least what the individual believes is objectively true). The more an attitude is anchored in strongly held values, and the more it is supported by beliefs, the more stable it will be. The horizontal structure refers to how the attitude relates to attitudes in other, similar issues. An attitude which connects to, and is consistent with, several other attitudes tends to be more stable. The attitudes form a network where many interrelated attitudes strengthen each other. Attitudes also tend to be more stable the greater so-called *affect* they have, i.e. the more emotions they are charged with.

Attitudes are also more or less well developed. They tend to be more developed in issues where an individual for example has a lot of direct experience, has encountered the issue many times, know a lot about the issue and towards which they have strong emotions. When people are faced with a new issue where attitudes are not well developed, new attitudes are often formed by associating the new issue to some

⁶ The presentation here draws heavily on the excellent book on environmental attitudes by Heberlein (2012).

familiar one, where the individual already has a well-developed attitude. The new issue then inherits the attitude from the familiar one. Generally speaking, the new question will be linked to an existing issue which is perceived to be similar, in some sense, to the new one. The stronger the existing attitude is, the larger is likelihood that the new question will be connected to it. Such new attitudes, which are based on limited experience, knowledge and emotions, tend to be less stable, and may change comparatively easy if they are associated to another issue. In the following, we will see how the development of congestion pricing attitudes can be understood as an association of the issue to other, existing issues with existing, strong attitudes, such as environmental concerns and resistance towards restricted mobility.

Phase 1: Congestion pricing for efficient allocation

Several studies, in Stockholm and elsewhere, have shown that although the public agrees that road congestion is an important problem, this does not make them more positive towards congestion pricing. This is in fact logical: road congestion is a problem because it reduces accessibility, and congestion pricing will not increase accessibility for most people (the value of the time gain will usually be less than the cost increase). The real argument for congestion pricing is not that it increases accessibility; the real argument is that it allocates existing road capacity in a more socially efficient way. But very few people have an attitude towards allocation efficiency. So when the question of congestion pricing is raised, people will look for a similar issue where they do have an attitude, and base their attitude to congestion pricing on that other, pre-existing attitude.

When this happens, congestion pricing is not likely to be perceived as similar to measures that increase accessibility. Such measures generally mean that more of something is provided – more roads or more/better public transport, for example. Consequently, seeing road congestion as an important problem tend to be strongly correlated with supporting new roads and increased public transport, but less with supporting congestion pricing (Hamilton & Eliasson, 2012). Congestion pricing is more likely to be perceived to be similar to taxation, or perhaps to restrictions of mobility and individual freedom. Consequently, negative attitudes to taxation are correlated with negative attitudes to congestion pricing (Hamilton & Eliasson, 2012).

Hence, it is not surprising that planners and economists in Stockholm and elsewhere had limited success in advocating congestion pricing with the argument that it increases allocation efficiency. There are simply too few people who have an attitude to this concept, and even fewer who has an emotional engagement in it. Instead, when faced with the question, people associated to an issue where they have an existing attitude, which most likely was a negative one.

For an issue to be politically interesting, it must generate enthusiasm among a sufficiently large group of voters. But since transport efficiency is simply not an issue that many people get enthusiastic about, the issue had virtually no political upside. From a political perspective, even large gains in transport efficiency would not be valued enough by voters to be worth the political cost in terms of some voters associating to strong negative attitudes such as mobility restrictions and increased taxation. Hence, the suggestion failed to gain political traction.

Phase 2: Congestion pricing as an environmental measure

This changed when congestion pricing was reinterpreted as an environmental policy, which happened in Stockholm during the mid 1990's. Gradually, the issue was clustered to an area where many had strong, well-developed attitudes, namely

environmental issues. While allocation efficiency in the transport sector could not arouse enthusiasm or engagement among the general public, environmental concerns definitely could. Once at least some people associated congestion pricing to environmental policy rather than taxation or mobility restrictions, it could gain political traction. The objective environmental benefits of congestion pricing were twofold: emissions would decrease when car traffic did, and the demand for road investments would decrease when congestion was reduced. But just as important as such objective effects, congestion pricing gradually came to be perceived as "similar" to other measures that reduced car traffic, causing a positive attitude to emerge among environmentally concerned. This was what was needed to get congestion pricing on the political agenda – a link to an area with where strong and emotional attitudes existed.

The adoption of congestion pricing by the environmental movement is interesting for several reasons. In order to force through significant political changes, one needs moral and emotional engagement and arguments. An issue that is not charged with moral and emotions, attracts very little political interest, simply because there are very small political gains to be made. Again, very few people feel an emotional engagement in the issue of increasing transportation efficiency. Likewise, few people have a strong emotional engagement for infrastructure financing. Hence, to be politically interesting, congestion pricing *had* to be associated with an area where there were strong moral and emotional attitudes – and the environment fitted the bill.

Phase 3: The battle for the moral high ground

When the decision to carry out the congestion charging trial was made after the election in 2002, a fierce debate broke out. Consistent with what was said above about the necessity of emotions in politics, the arguments soon turned into matters of principle, morality and emotions, leaving little room for compromise. The question of the merits of congestion pricing quickly became a *moral* question, not a *technical-rational*, and both proponents and opponents tried to win the moral high ground. It was not enough to invoke objective or technical arguments such as anticipated effects, efficiency or revenues: both sides tried to establish that their respective position was *good* or *just* in a deeper sense. As argued above, this might have been an inevitable development: if congestion pricing had not been elevated to a moral-emotional question, it hadn't entered the political stage in the first place. But just as inevitable, the morally supercharged arguments for congestion pricing implied (or could be perceived to imply) that *all* car traffic was evil and unnecessary, and should be banished. This might be one reason for the decreasing support also among car drivers that were actually unaffected: they might simply have been alienated by the anti-car rhetoric. The affected groups of car owners had already decided that they were against the charges, so the debate could not change their opinion much. It was the unaffected car owners who decreased their support for the charges the most of all groups. A reasonable interpretation is that they at first did not have firmly developed attitudes based on self-interest, since they were not directly affected, but the development of the debate with its tendencies to anti-car rhetoric may have alienated them.

But there are also other reasons that may have caused non-affected groups to develop more negative attitudes. Opponents to the charges also used moral and emotional arguments, appealing to the "citizen" logic of voters rather than the "consumer" (self-interest) logic (Nyborg, 2000). For example, the charges were claimed to have adverse equity effects ("the poor can't afford to travel"), be unfair ("motorists are already paying their fair share of costs") and a waste of taxpayers' money ("the system is horribly expensive"). The most recurring argument was the lack of democratic legitimacy. The social democrats had made a very clear promise not to introduce road

pricing during the election period – and here they were doing it anyway. The social democrats of course countered that multi-party compromises were always necessary, but this defence was made more difficult since the promise had been so definitive, and because the political agreement had not even been made in Stockholm: it was an agreement between the *national* Green and Social-democratic parties. Any or all of these arguments may have caused voters in the unaffected groups, even those not even owning a car, to develop more negative attitudes.

The battle for the moral high ground can be seen as a battle about which pre-existing moral attitude the congestion pricing issue would cluster to. Proponents tried to associate it to existing positive attitudes to environment (climate, air quality), liveability and to some extent rationality/efficiency (a word with positive connotations in a rationalistic society like Sweden). Opponents tried to cluster it to existing negative attitudes to taxes, inequity, restricting freedom and mobility, public interventions and national interference in regional matters. Most visible were these clustering efforts in the fight over terminology: "environmental charge", "car tolls" or "congestion tax".

Phase 4: Reinterpretation and emotional discharging

The Stockholm referendum ended in a narrow majority in favour of keeping the charges. But at the same time, the social-democrats lost power both in Stockholm and nationally. Since all parties had promised to obey the outcome of the referendum, the new liberal/conservative mayor of Stockholm had to ask the new liberal/conservative government to reintroduce the charges. The crux was how this fit into the on-going negotiations about infrastructure investments in Stockholm. Eventually, the region and the government negotiated a huge infrastructure investment package, funded partially by the charge revenues and partially by government funds. The revenues from the charges were specifically earmarked for the Western Bypass, a motorway tunnel west of Stockholm.

From an attitude point of view, this was probably important for several reasons. First, the charges now had democratic legitimacy. In addition to the referendum result, there was now a political agreement about the charges and the revenues – made by the liberal/conservative alliance no less, which meant that all political parties had now sanctioned the charges in some way. The problem of the broken election promise could finally be laid to rest.

Second, the revenues were earmarked for *roads*. As it was really part of a multimodal package, the revenues could just as well have been earmarked for the railway investments that were also part of the package. But earmarking the revenues for roads not only spoke to motorists' self-interest. It sent a moral signal: it's OK to be a car driver. It indicated a reinterpretation or re-clustering of the congestion pricing issue from a morally charged anti-car measure to a technical-rational measure that was effective – it "worked" in the sense that it generated revenues and reduced congestion. And technical measures arouse much less emotions: people usually do not love them, but they do not hate them either. The most important function of the earmarking may hence have been to discharge some of the sentiments around the charges, moving the debate from the moral domain to the technical-rational domain.

Thirdly, it calmed the fears of Stockholm politicians (from all parties) that revenues would end up in the national coffers, either directly or indirectly, by subtracting the revenues from Stockholm's "fair share" of national infrastructure grants. In the end, it seemed that the opposite happened: the revenues made it possible to reach an agreement that unlocked the largest national funding scheme Stockholm had got in a

long time. This leveraging of revenues suddenly made congestion charges very attractive for regional politicians. It is likely that the more positive attitudes from politicians from all parties also affected public opinion. As shown in Hårsman and Quigley (2010), there is a strong correlation between parties' official attitude to charges and the attitudes of their respective voters, and causality most likely runs in both directions.

In 2012, discussions started about revising the system design – changing charge levels, time periods and charging points. By then, no political party, and not even the NGOs that had been among the most vocal opponents, were against the charges anymore – not even against raising the charge levels or extending the number of charging points. The discussion had turned almost completely technical-rational, in the sense that it focused on objective effects such as traffic effects, revenues and scheme design. In November 2013, an agreement was reached between the liberal/conservative majorities at all levels that the charge levels would be substantially increased and a new toll on the Western Bypass introduced. The purpose was twofold: congestion would decrease, and revenues would finance an extension of the Metro. The only objection from the left/green opposition was that this should have been done earlier.

5.2 Fields of rationality: Rationality or morality?

Issues may belong to different “fields of rationality” or “domains”. Roughly speaking, issues in the *moral domain* are settled by arguments about what is “right”, “fair” or “just”, while issues in the *technical-rational domain* are settled by arguments relating to objective consequences, such as costs and benefits of a certain action or policy. A related distinction is whether individuals act as *consumers* or *citizens* when they state their attitudes in a political issue, i.e. whether they view the question from their own self-interest or from what they perceive as socially beneficial. (See Nyborg (2000) and Sagoff (1988); Sen (1991) uses the terms “well-being” and “agency” for a similar distinction.)

One way to view the congestion charging debate is that the issue seems to have moved from the technical-rational domain to the moral domain and back again. When presented as a purely technical-rational suggestion, it failed to gain political interest because the type of benefits it could potentially bring (increased transport efficiency) could not generate sufficient enthusiasm. It seems that too few people had strong attitudes regarding this type of benefits, meaning that it could not generate the necessary emotion to gain political traction.

By reinterpreting it as an environmental measure, the issue moved gradually to the moral domain. This connected to strong attitudes regarding local and global environment, and maybe also general anti-car sentiments in some groups, and hence the necessary political engagement emerged. But the other side of the coin is that it made the issue divisive – even unaffected groups became more negative. These negative sentiments were probably bolstered by other moral arguments, e.g. about lack of democratic legitimacy, waste of public funds and over-taxation. These attitudes were also strong and well-developed, making the debate very heated.

But after the referendum, the infrastructure agreement and the establishment of democratic legitimacy moved the issue back into the technical-rational domain. This discharged some of the negative moral-based attitudes. Moreover, this connected the issue to concepts such as “rationality” and “efficiency”, which in Sweden have very positive associations.

The congestion pricing debate is one of rather few examples where a relatively prosaic transport policy measure is judged on moral rather than technical-rational grounds. The transport system is full of rules, regulations and prices which are judged purely on technical-rational grounds – speed limits, traffic signs, public transport fares etc. It is very rare to hear anyone argue that, say, speed limits should be abolished for *moral* reasons⁷. Congestion pricing, on the other hand, was both proposed and opposed with moral arguments. As we argued above, this move from the technical-rational domain to the moral/emotional domain may have been necessary for the issue to enter the political arena at all – but it came at the cost of making it an even more divisive issue. Not only were different groups' self-interests pitched against each other: the issue was linked to deep and strongly developed attitudes to environmental concerns, free individual mobility and resistance towards public intervention.

5.3 The political rationality of congestion pricing

Different political parties had different incentives and rationales to act the way they did. There were certainly a handful of politicians who were honestly attracted by the efficiency argument, even if this was never going to win many voters. But the two dimensions that attracted political interest were primarily the environmental dimension and the revenues, especially the possibility to use them to leverage national funds. The Green party viewed congestion charges as an environmental measure with obvious appeal to their voters. Other parties also used environmental arguments – but it was the revenues as a bargaining chip with the national government that really attracted political interest.

The most apparent example was the subsequent development in Gothenburg. The opposition against congestion pricing was even stronger than in Stockholm, and there were considerably less congestion problems. But when the politicians in Gothenburg saw the Stockholm agreement, they decided to strike a similar deal. Congestion charges were introduced in Gothenburg in January 2013, financing almost half of a 3 M€ deal with the national government funding the other half.

6 CONCLUSIONS

While variables relating to self-interest and belief in the charges' effectiveness strongly affect attitudes at any given point in time, they do not seem to be sufficient to explain the observed change in attitudes across time. All groups, regardless of travel patterns, car ownership and belief in the charges' effectiveness (*ex ante* and *ex post*) show the same U-shaped change in attitudes – more negative attitudes before the introduction of the charges, and increasingly more positive attitudes after the introduction. In fact, this pattern is more pronounced for unaffected groups.

This paper has discussed several possible explanations for the change in attitudes over time. For example, car owners who were not objectively affected by the charges may have been alienated by a perceived anti-car rhetoric; the broken election promise may have upset voters, and the democratic legitimacy after the referendum and subsequently negotiated agreement may have increased support. The phenomenon can be seen as a form of loss aversion, a resistance against any change – first against introducing the charges, then against removing them.

⁷ A reviewer pointed out that photo radars have been strongly opposed by drivers in some jurisdictions of North America, apparently on moral grounds.

The explanatory model that seems to best explain our observations is the attitude formation model from social psychology. At first, few people have any particularly strong attitude towards congestion pricing; if they have, groups with strong environmental attitudes tend to cluster it to this group of attitudes, while groups with strong attitudes regarding taxation, public interventions and individual freedom and mobility tend to cluster to this group of attitudes. When the debate becomes more intensive, attitudes become stronger and more pronounced, and voters more polarized. This development is enhanced by the use of moral and emotional arguments. But once the debate calms down, attitudes become less strong, and congestion pricing may be judged more on its objective purposes and effects. As a technical-rational solution to congestion and a need to generate revenues, it may have a better chance to gain support. While the allocation efficiency and revenues do not seem to generate sufficient enthusiasm to make introducing congestion pricing worth the political risk, these arguments may be sufficient to make the charges survive once they have been introduced.

The “economic man” paradigm seems to work well enough to predict behaviour. The behavioural response to the charges could be predicted by simple, objective variables such as travel times and travel costs, using models based on utility-maximizing behaviour and observations of cross-sectional differences. In fact, the model could predict behaviour better than people could themselves, *ex ante* as well as *ex post*. But extending the “economic man” paradigm from behaviour to attitudes, assuming that attitudes can be explained by self-interest variables, seems to be insufficient to explain attitudes in this case, and especially attitudinal changes.

An interesting question is to what extent the results and interpretations presented here apply to other cities as well. Most cities that have introduced congestion pricing have seen support increase after the introduction, and it seems plausible that several of the mechanisms discussed here are relevant for these cities as well. On the other hand, the framing, marketing and public debate of a congestion charging proposal may play out differently in every city, so it seems likely that the story in each city will be unique – even in cases where objective effects may be similar.

It is slightly paradoxical that while relatively simplistic “economic man”-type models seem to be able to predict aggregate behaviour, they do not seem to be sufficient to predict attitudes with any precision. It raises the question to what extent valid normative rules can be derived from these models. If economic welfare evaluation, derived from observed behaviour, predicts that individuals should oppose a certain reform, but it turns out that they support it – how do we interpret this? We have seen that about 3/4 of the disappearing car trips seem to have gone unnoticed by respondents, and that more than half of those who became more positive to the charges during the trial state that they have not changed their mind. What are the implications for welfare analysis of this, if any? If preferences do not seem to be stable, as we have seen in this paper, such that the same population first opposes, then supports the same policy, without any new information or effects having been added – how do we evaluate such a reform? The discussion of this question is still in its infancy in the economics literature (see Bernheim and Rangel (2007) for an excellent discussion). The issue is of course even wider than the welfare economics field. Is it ethical to advise politicians to introduce policies against popular support, with the argument that the voters will be positive afterwards? This raises very troubling questions about the foundations of democracy and welfare evaluation. Abandoning the notion that individuals on average, most of the time and in most situations act in their own best interest would open the door for all sorts of paternalism. To quote Karin Brundell-Freij, “How can we avoid interpreting the fact that preferences are malleable or shapeable as

a mandate for planners/decision-makers to form preferences in way that conform to planners' preferences?" The findings in this paper cannot answer these questions.

7 REFERENCES

- Bernheim, B. D., & Rangel, A. (2007). Behavioral public economics: welfare and policy analysis with nonstandard decision-makers. In P. Diamond & H. Vartiainen (Eds.), *Behavioral Economics and its Applications* (pp. 7–84). Princeton University Press.
- Börjesson, M., Eliasson, J., Hugosson, M. B., & Brundell-Freij, K. (2012). The Stockholm congestion charges—5 years on. Effects, acceptability and lessons learnt. *Transport Policy*, *20*, 1–12.
- Brundell-Freij, K., Jonsson, L., & Källström, J. (2009). Accepting charging – a matter of trusting the effects? *Proceedings of the European Transport Conference*.
- Eliasson, J. (2008). Lessons from the Stockholm congestion charging trial. *Transport Policy*, *15*(6), 395–404.
- Eliasson, J., Börjesson, M., Brundell Freij, K., Engelson, L., & Van Amelsfort, D. (2013). Accuracy of congestion pricing forecasts. *Transportation Research A*, *52*, 34–46.
- Eliasson, J., Hultkrantz, L., Nerhagen, L., & Rosqvist, L. S. (2009). The Stockholm congestion - charging trial 2006: Overview of effects. *Transportation Research Part A: Policy and Practice*, *43*(3), 240–250.
- Eliasson, J., & Jonsson, L. (2011). The unexpected “yes”: Explanatory factors behind the positive attitudes to congestion charges in Stockholm. *Transport Policy*, *18*(4), 636–647.
- Eliasson, J., & Levander,, A. (2006). *Equity Effects of the Stockholm Trial*. Transek report.
- Eliasson, J., & Mattsson, L.-G. (2006). Equity effects of congestion pricing: Quantitative methodology and a case study for Stockholm. *Transportation Research Part A: Policy and Practice*, *40*(7), 602–620.

- Franklin, J., Eliasson, J., & Karlström, A. (2010). Traveller Responses to the Stockholm Congestion Pricing Trial: Who Changed, Where Did They Go, and What Did It Cost Them? In Saleh & Sammer (Eds.), *Demand Management and Road User Pricing: Success, Failure and Feasibility*. Ashgate Publications.
- Goodwin, P. (2006). The gestation process for road pricing schemes. *Local Transport Today*, 444.
- Hamilton, C., & Eliasson, J. (2012). Decisive factors for the acceptability of congestion pricing. In C. Hamilton (Ed.), *Implementing Road Pricing: Standards, Institutions, Costs, and Public Acceptance*, Doctoral dissertation. Centre for Transport Studies, KTH Royal Institute of Technology.
- Hårsman, B., Pädam, S., & Wijkmark, B. (2000). *Ways and means to increase the acceptance of urban road pricing* (Final report from the PRIMA project). European Commission.
- Hårsman, B., & Quigley, J. M. (2010). Political and public acceptability of congestion pricing: Ideology and self-interest. *Journal of Policy Analysis and Management*, 29(4), 854–874.
- Heberlein, T. (2012). *Navigating environmental attitudes*. New York: Oxford University Press.
- Henriksson, G. (2009). What did the Stockholm Trial mean for Stockholmers? *Gullberg and Isaksson (eds.): Congestion taxes in city traffic. Lessons learnt from the Stockholm Trial*. Nordic Academic Press.
- Jones, P. (2003). Acceptability of Road User Charging: Meeting the Challenge. In J. Schade & B. Schlag (Eds.), *Acceptability of Transport Pricing Strategies*. Elsevier, Oxford.
- Karlström, A., & Franklin, J. P. (2009). Behavioral adjustments and equity effects of congestion pricing: Analysis of morning commutes during the Stockholm Trial. *Transportation Research Part A: Policy and Practice*, 43(3), 283–296.

- Nyborg, K. (2000). Homo Economicus and Homo Politicus: interpretation and aggregation of environmental values. *Journal of Economic Behavior & Organization*, 42(3), 305–322.
- Rienstra, S. A., Rietveld, P., & Verhoef, E. T. (1999). The social support for policy measures in passenger transport.: A statistical analysis for the Netherlands. *Transportation Research Part D: Transport and Environment*, 4(3), 181–200.
- Sagoff, M. (1988). *The economy of the earth*. Cambridge: Cambridge University Press.
- Schade, J., & Baum, M. (2007). Reactance or acceptance? Reactions towards the introduction of road pricing. *Transportation Research Part A: Policy and Practice*, 41(1), 41–48.
- Schade, J., & Schlag, B. (2003). Acceptability of road user charging: meeting the challenge. *Acceptability of transport pricing strategies*, 27.
- Schade, J., & Schlag, B. (2003). Acceptability of urban transport pricing strategies. *Transportation Research Part F: Traffic Psychology and Behaviour*, 6(1), 45–61.
- Schade, J., Schlag, B., Giannouli, I., & Beijer, A. (1999). *Acceptability of marginal cost road pricing* (AFFORD Deliverable 2). European Commission.
- Sen, A. (1991). *On Ethics and Economics*. Wiley.
- Tretvik, T. (2003). Urban road pricing in Norway: public acceptability and travel behaviour. In J. Schade & B. Schlag (Eds.), *Acceptability of Transport Pricing Strategies*. Elsevier, Oxford.
- Winslott-Hiselius, L., Brundell-Freij, K., Vagland, Å., & Byström, C. (2009). The development of public attitudes towards the Stockholm congestion trial. *Transportation Research Part A: Policy and Practice*, 43(3), 269–282.

8 APPENDIX

Respondents were asked about their beliefs about the benefits of the charges in slightly different ways in the different surveys. In the five surveys 2004-2010 surveys, respondents were asked two questions about congestion reduction: whether they

thought the charges would reduce (2004, 2005) or had reduced (2006, 2007, 2010) queues on the arterials to/from the inner city, and the same question regarding queues within the inner city. Each question could be answered with “to a large extent”, “to some extent”, or “not at all”. If a respondent has answered at least one of the two questions with “to a large extent”, the answer has been recorded as “large benefits”; if the at least one of the questions with “to some extent”, the answer has been recorded as “some benefits”; otherwise, it has been recorded as “no benefits”.

In 2011, respondents were instead asked whether they thought that abolishing the charges would affect congestion either in or around the inner city (in one question), and the question could be answered on a 7-grade scale from “substantial increase in congestion” (grade 1) over “nothing would change” (grade 4) to “substantial decrease in congestion” (grade 7). Almost no respondents believed that abolishing the charges would decrease congestion (grades 5-7). Grade 1 was recorded as “large benefits”, grades 2-3 as “some benefits” and grades 4-7 as “no benefits”.

Table 4. Beliefs about benefits of the charges.

In terms of reduced congestion, I think the charges have...	2004	2005	2006	2007	2010	2011
Large benefits	25%	19%	31%	31%	15%	22%
Some benefits	56%	59%	53%	55%	62%	53%
No benefits	19%	22%	17%	14%	24%	24%

Three of the surveys asked respondents how much charges they paid last week (2006), or how much they would have paid last week if the charges had been introduced and they had not changed their driving behaviour (2004, 2005). Answers have been grouped in four categories: respondents without access to car in the household (“Have no car”); respondents with access to car in the household but did not pay last week (“Have car but never pay”); those who paid a charge 1-4 times last week (“Pay sometimes”); and those who paid a charge more than 5 times last week (“Pay often”).

The 2011 survey asked how often respondents passed the cordon during charged hours. The possible answers were “Almost or nearly every day”, “a few times every week” (both recoded as “pay often”), “a few times each month” (recoded as “pay sometimes”), “Seldom or never” (recoded as “Have car but never pay” if respondent had a access to a car in the household, otherwise as “Have no car”).

Table 5. Beliefs about benefits of the charges, grouped by how much respondents are affected.

		2004	2005	2006	2011
Large benefits	Have no car	33%	25%	45%	31%
	Have car but never pay	26%	19%	32%	22%
	Pay sometimes	17%	16%	27%	21%
	Pay often	22%	14%	15%	15%
Some benefits	Have no car	55%	65%	46%	52%
	Have car but never pay	56%	59%	55%	56%
	Pay sometimes	61%	59%	54%	49%
	Pay often	53%	51%	52%	55%
No benefits	Have no car	12%	10%	9%	17%
	Have car but never pay	18%	22%	13%	22%
	Pay sometimes	22%	26%	19%	29%
	Pay often	25%	35%	33%	30%

Table 6. Support for charges, grouped by how much respondents are affected.

		2004	2005	2006	2011
Would vote "yes" (excl. don't know)	Have no car	68%	62%	77%	83%
	Have car but never pay	47%	32%	53%	69%
	Pay sometimes	29%	24%	44%	63%
	Pay often	21%	15%	30%	53%
Don't know how to vote	Have no car	17%	11%	11%	20%
	Have car but never pay	11%	12%	7%	15%
	Pay sometimes	8%	8%	7%	12%
	Pay often	5%	4%	5%	15%