Decisive factors for the acceptability of congestion pricing

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1 INTRODUCTION
Among transportation economists and traffic planners, there is broad support for congestion pricing. Most professionals in the field recognise that the benefits in terms of traffic flow and welfare improvements can be substantial, and that given low costs of operation the policy instrument can be socially beneficial. Still however, when specific schemes are being suggested, public acceptance turns out to be a critical issue, often preventing the systems from being implemented.

Over the last decades a vast literature has sought to understand the causes of the low level of acceptance. Several factors have been identified as being influential, including the expected costs to the driver (e.g. Schade and Schlag, 2003), the stated use of the revenue (e.g. Schlag and Teubel, 1997), as well as practical experience of a congestion pricing system (e.g. Brundell-Freij and Jonsson, 2009). Most previous studies have however focused on only one or a small set of explanatory variables, and on a single population.

In this study, a wide range of explanatory factors is tested by a common survey design used in three different cities, with varying degrees of experience from congestion pricing. Respondents are asked for their preference to congestion pricing, and the influence of other factors on this ordinal dependent variable is then tested (mainly) by ordered logit regression. Thereby the different factors can both be compared as to their relative influence on attitude, as well as tested for generality (by comparing across the three populations).

The three cities used for comparison are Stockholm (Sweden), Helsinki (Finland) and Lyon (France). They are similar-sized European cities, but with distinctly different experiences of congestion pricing. In each of the three cities, a unified comprehensive survey has been issued, covering a wide array of questions. In the light of previous research, the contents of the survey can roughly be categorised in four groups of factors:

a) Factors related mainly to self-interest, including how much people pay or expect to pay in congestion charges, how much one values not being delayed
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when travelling, and how the revenues from the system are recycled and made useful for the population

b) Factors related to perceived fairness of the charging system, including the effect on income equity (rich-versus-poor), as well as the fairness of principles of allocation and pricing (e.g. polluter pays or user pays principle).

c) Factors related to other attitudes of principle or political inclination, including the natural environment and the role of the state.

d) Factors related to own experience from congestion pricing and belief in its effects.

This categorisation is not without ambiguity. What is here labelled self-interest – amount paid, time saved, and where the money is spent – may for some people be determined more by a concern for other people’s money, time, and usefulness of government spending, thereby representing not self-interest but a more general preference for justice. Likewise, what is labelled as fairness here is overlapping with political inclination. Bearing these limitations in mind however, the categorisation made is convenient for analysis and allows for comparison with results previously published in the field.

References to the existing literature are given in section 3, in conjunction with the results from the survey. Before that, in section 2, the method is presented in detail, followed by a brief background of the three cities together with some descriptive statistics to summarise the opinion and attitudes in each of the cities. In section 4 finally, the results are discussed.

2 BACKGROUND AND METHOD

2.1 Survey and data

To collect data on people’s attitude to congestion pricing a generic survey has been designed, from which some deviations were made to adapt to local circumstance for the three cities. In addition to questions directly related to congestion pricing, respondents are asked for their opinion on a wide range of topics, mostly pertaining to transport, but also a few of more general nature, such as preferences related to taxation and environmental issues.

In each survey a detailed congestion pricing scheme was presented, describing the charging area, and prices for driving in the system. In the case of Stockholm, the scheme presented was identical to the one in use; in Helsinki it was in line with a charging scheme put forward and widely debated in media; while in Lyon, a scheme similar to the one used in Stockholm was presented, which was purely hypothetical and had not been up for debate in the general population. Then opinions about the scheme presented were solicited, and a question about how the respondent would vote if there were a referendum on implementing (or in the case of Stockholm, abolishing) such a scheme today.
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In the survey, the questions are sorted in groups to make sense to the respondent, to cause less cognitive load when answering, as well as to reduce inclinations to answer strategically or to abandon the survey altogether. Sprinkled across the survey are questions pertaining to the key topics for this study, such as self-interest, fairness, political inclination, expected effects of a scheme etc.

The survey was developed collectively by the three participating research teams, situated in Stockholm, Helsinki, and Lyon. In Stockholm and Helsinki, the survey was issued by post during Spring 2011 to a random sample of people 18-65 years of age in each city. After three weeks, one postal follow-up was made to non-respondents. The final response rate was 43% (N=1837) in Stockholm and 39% (N=1178) in Helsinki. In both places, a small but clear response bias was visible, with women and the elderly more likely to return the questionnaire.

In Lyon, where a postal survey was ruled out based on previous experiences with very low response rates, a telephone survey was conducted instead. It was designed to meet predetermined quotas for, among other things, age and gender, thereby managing the response bias already at the collection stage. In order to ensure a sufficient share of respondents perceiving the survey as relevant, a deliberate additional bias was also introduced, by oversampling frequent car users and people living inside the hypothetical charging zone, to higher shares than would have been the case in a randomized sample of the population of Lyon.

A total of 10,241 calls were initiated, out of which 53% picked up to answer. Out of those answering, 37% agreed to start answering questions after having been introduced to the purpose of the call. Then, as the interview went along, some calls were prematurely terminated, either on request by the respondent, or when the caller system detected that some answer placed the respondent outside one of the predetermine quotas. When 1,500 calls had led to a complete survey being answered and all quotas met, the calling was complete.

When discussing attitudes and other attributes as shares of respondents answering in specific ways, each of the three local data sets has been reweighted to counterbalance the known biases. This has been done by giving a higher weight to respondents of the under-represented groups (gender and age in Stockholm and Helsinki; car usage and inner city inhabitants in Lyon), so that their proportional weight in the response data is equal to their weight in the general population. Hence, the results are projections aiming to represent the true nature of each population, their attitudes, and habits. Data of this kind dominates section 2.2 and table 1, and appear to a lesser extent in section 3.

2.2 Quantitative analysis

The majority of the analysis in section 3 is made using ordered logit (proportional odds logistic regression) as implemented in the statistics program R (R Development Core Team, 2010) and its package MASS (Venables and Ripley, 2002). The dependent variable used is the answer to the question *How would you vote if there was a referendum on the introduction* (in Stockholm, abolishing) of congestion pricing today?
and the options are Certainly yes, Leaning towards yes, Undecided, Leaning towards no, and Certainly no.

In this part of the analysis, the data is used as it is, each city population on its own and in combination, making no corrections for response biases.

Throughout the analysis, a dummy category has been created to capture both those who tick the No opinion box of a question and those who skip the question altogether. The coefficients for this dummy are left out of the results table, as it lacks explanatory power in most cases. The benefit of treating skipped questions with a dummy category is that the remaining answers from that respondent can still be used.

In one question of the survey, respondents were asked first how they would vote today if there were a referendum on congestion pricing. This question was immediately followed by a list of potential changes to the charging scheme proposed, asking how these changes would affect the respondent’s vote. Answers to this question are used in the sections on hypothecation (3.1.3) and concern for the underprivileged (3.2.1). There, the same reweighting has been used as with the baseline descriptions. To determine the total potential swing in opinion, all those who have stated that they will increase (decrease) their likelihood of voting Yes (Na) following some change, and at the same time have either stated that will vote No (Yes) or are undecided, are counted as potential change in opinion. This calculation is described in more detailed at its first use in section 3.1.3.

2.3 The three cities

2.3.1. City and traffic situation

In a global perspective, Stockholm, Helsinki, and Lyon are similar to each other. They are all medium sized cities based around a historical city core, which is encircled by more recently populated areas. Traffic has a distinctly radial pattern, with the main flow of commuters moving inward in the morning and outward in the evening. About three out of four inhabitants have access to a car (see table 1). These similarities could be taken to indicate that the three cities would not be too different in terms of potential benefits and downsides from implementing congestion pricing.

When it comes to mode choice and attitude to being in the traffic however, the three cities have some noteworthy differences. Helsinki stands out as the place of frequent driving, with over 53% choosing to drive a car every day, 20 percentage points above both Stockholm and Lyon.

Another clear difference between the cities is their experience with congestion pricing. Stockholm has had such a scheme in place since January 2006. Although initially subject to a fierce debate, the pricing scheme was confirmed in a referendum after seven months of trial operation, and is nowadays rarely a cause of political disputes or media attention. The system charges a fee for a passage in to or out from the inner city between 6.30 and 18.30. The charge ranges from €1 to €2 per passage, depending on...
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time of day, and is capped at €6 per day and car (with 10 SEK to the Euro). (For a comprehensive description of the congestion pricing scheme in Stockholm, see Eliasson, 2008 and Börjesson et al. (2012).)

At the time of the survey, Helsinki went through an extensive debate about the implementation of a distance based road user charge, with a strong focus on congestion mitigation. A task force had come up with a pre-study, including a detailed scheme design. This design proposition, widely discussed by politicians and in the media, was supposed to employ GPS units in all vehicles, and charge by the kilometre. Different tariffs were to be used depending on how close to the city one travels, with the outermost area that was still priced lying far outside of Helsinki. Political support for congestion pricing was never widespread, and during the time of this survey being conducted, it became clear that there was a decisive majority against its implementation. Presently there are no plans for implementing congestion pricing in Helsinki.

Lyon, on the other hand, had a short encounter with congestion pricing, in the form of peak hour pricing of a specific road segment in 1997. The road in question was a newly built section of the Boulevard Périphérique, financed partly by national funds and partly by a private concessionaire, who in turn was entitled to regain its investment by charging a toll for those using the new road. The tolls were set to follow the traffic flow, with a discount during off-peak hours. As a measure to ensure that the concessionaire gained sufficient toll revenues, traffic signs and access to parallel roads were rearranged, directing traffic to the new tolled facility. This deliberate reduction of alternative routes did not land well with the public, however. Raux and Souche (2004) summarise: "As a consequence, there was a movement to boycott the new road accompanied by weekly demonstrations at the toll barriers. These prevented users from paying and occasionally even led to the destruction of the barriers."

2.3.2. Baseline attitudes

Much of the survey presented in this paper builds on the central question how the respondent would vote if there were a referendum on congestion pricing in their city today. The level of support for such a policy is at similar level in Helsinki and Lyon; about one third of those expressing an opinion are in favour of such a scheme. Stockholm on the other hand, shows twice as strong support. (It is worth noting that before congestion pricing was on the political agenda in Stockholm, the support was in the same neighbourhood as found here for Helsinki and Lyon.)

These figures, given in line 5 of table 1, consist of both shades of yes as a proportion of all respondents who have expressed an opinion (i.e. ignoring those who selected the middle option). The same method of only counting those stating an opinion is used for lines 6-12 of table 1.

In each of the cities, there is a larger share, even a majority, who finds construction of new roads as a more reasonable way of addressing congestion than pricing. In
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Stockholm, this share is larger than in the other cities (line 6). There is also a clear majority who thinks congestion is a major problem in all the cities (line 7).

In France, it is common to finance motorways by tolls paid by the users, while this practice is hardly used at all in Sweden or Finland. The acceptance of using tolls to finance road construction is however much lower in Lyon than in the two Nordic cities (line 8). Note the difference in pattern here; for congestion pricing, it is the city with experience of the scheme that is most positive, while for user financed motorways, it is the other way around.

Most people are generally happy with the quality and supply of public transportation in their city, with Lyon being the most satisfied population (line 9). The Lyonnaise are also the most keen to spend more public funds to protect the environment, with close to unanimous support for such a policy (line 10). However, Lyon also displays the largest share of respondents supporting the statement that taxes are too high (line 11), with Helsinki as second and Stockholm as third. The opposite order of preference is revealed when querying whether the use of Automatic speed enforcement cameras is a good way to save lives (line 12).

3 RESULTS

3.1 Self-interest

Self-interest is arguably the easiest place to start looking for decisive factors determining attitudes to any policy change. In a textbook static model of a congestion pricing with homogenous value of time, the charge paid is worth more than the value gained from time savings. Therefore, a rational and self-interested driver would only support congestion pricing if the revenue from the system is spent on something valued by her. This simple analysis however has some significant shortcomings, including its assumption of a single value of time and a single road link. Several authors have shown that allowing for heterogeneous user preferences, bottleneck congestion or network effects, drivers can indeed be better off after the introduction of congestion pricing, even before revenues are recycled in the economy (Arnott et al, 1994; Verhoef and Small, 2004; Börjesson and Kristoffersson, 2012).

Previous studies have shown empirically that the support for congestion pricing is linked to self-interest. For example, Schade and Schlag (2003) identify expectation of personal outcomes as one of three main explanatory factors for attitude to congestion pricing in a study of car drivers in four European cities. In the 2005 referendum on congestion pricing in Edinburgh, car drivers were significantly more prone to voting no than non-car drivers (Gaunt et. al. 2007), much in line with the textbook analysis of car drivers being worse off unless duly compensated. The same pattern is found by Jaensirisak et. al. (2005).

Revealed-preference studies are rare in this field, but Hårsman and Quigley (2010) use the results from the 2006 referendum on the Stockholm congestion pricing to show
that voting results per voting district were affected by both average time savings and average toll payments per district (taken from a transport model).

In addition to the money spent and the time saved, self-interest may also be influenced by how the revenue from the congestion pricing system is spent. A Pigouvian tax tends to be more palatable to the public if the revenues are committed to a specific purpose and if this is clearly communicated (Schlag and Teubel, 1997; Schlag and Schade, 2000; Banister, 2003; Anesi, 2006; Saelen and Kallbecken, 2011). In a real-world example Kottenhoff and Freij (2009) studied the Stockholm congestion pricing trial and found that the public transport improvements, which were part of the trial, contributed significantly to the acceptance of it.

Meanwhile, Dresner et al. (2006) observes a tendency that the public does not always trust the government to spend according to the claimed earmarks. Additionally, although there may be sound economic arguments to propose a scheme where revenue is earmarked not to transport at all, but instead to reduce some other tax that has more distorting effects in the economy, people typically find such a use of revenue being nonsensical, and instead prefer revenue to be spent within the same sector as where it was collected (Deroubaix and Lévèque, 2006; Kallbekken and Aasen, 2010).

In summary, self-interest can be analysed as consisting of three components; out-of-pocket expenses, time savings, and benefits derived from the use of revenue. Each is discussed separately below.

### 3.1.1. Out-of-pocket expenses

In the survey, respondents were asked to estimate how much they expect to be driving in the charging zone each month. Given the differences in tariff structure presented for each city, this is not immediately comparable between the three cities. Therefore, the expected monthly payment is coded as four levels (low, medium, high and very high). In table 2, factor 7 shows the extent to which this payment estimate explains attitude to congestion pricing (stated voting preference). The coefficient is strictly decreasing with the payment, and is significant at the 1% level for the combined population.

Factor 6 in table 2 encodes *Number of cars available* to the respondent’s household. The size of coefficients, their relative size, and significance is similar to that of *Amount charged*. It can reasonably be argued that these two factors should measure the same phenomenon. Comparing the two, the number of cars available to a household is however easier to for the respondent to answer correctly, and less likely to be influenced by one’s attitude to congestion pricing.

Since both of come out as highly significant, the overlap in what the two factors represent is not complete. Possibly, owning more than one car adds to a self-image as a car driver, which could influence opinion separately from the amount expected to pay. Alternatively, the ownership of cars makes a person more sympathetic to other drivers, even when oneself is not expecting to be paying very much.
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### 3.1.2. Value of Time

The attitude to congestion pricing can be expected to be positively associated with the value of time, since the value of the resulting time gains increase with value of time. Measuring value of time is a delicate matter, normally requiring a range of questions with carefully designed pairwise options to select from. In the survey, a single question was posed about willingness to pay in a hypothetical case. Respondents were asked to imagine the following situation, and answer a question:

*You commute daily by car. On the way, you have to cross a bridge across a river. One day you learn that the bridge is closed for repairs for a long time. Another bridge is available further downstream, but it takes an additional 20 minutes to go that way. During the time it takes to repair the bridge, the road authority has arranged with a ferry that can take cars over the river.*

*What is the highest amount you would be prepared to pay for a one-way ticket for the ferry, to save 20 minutes on your journey to work?*

(In Lyon, the hypothetical situation instead involved a closed tunnel, as this was judged to be closer to reality and easier to imagine.)

With this simple approach one can only expect a crude estimate of people’s value of time. Still, the mean and distribution of values of time closely resembles what is found in other studies (see e.g. Börjesson and Eliasson, 2012 for the Stockholm population). Figure 1 shows the cumulative distribution of answers by city.

This value of time, captured as the stated willingness to pay for a ferry ticket, turns out to be a strong predictor of attitude, both in the combined population and in each city population on its own, as seen in table 2, factor 8. Although it can be sensibly argued that the design of the question makes the respondent subject to anchoring effects, and that the true value of time is higher or lower, this should not reduce the validity of the finding, which is only dependent on the relative distribution being properly captured.

Where previous literature has showed that the amount of time saved increases acceptance, this survey can strengthen that finding by adding that there is also an effect from a higher willingness to pay for such time savings, and that this holds even in a population that has not experienced congestion pricing effects first hand. Note that this is not merely an income effect – income is already controlled for (various alternative model specifications also confirmed this). Thereby, this observation indicates the influence of the marginal utility of time, with some control for the marginal utility of money.

If the analysis is done only using respondents who have chosen to answer this question, i.e. not treating a lack of answer as a stated *No opinion*, then the significance is even higher, and the coefficients increase monotonically for the combined as well as for the Stockholm population.
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3.1.3. Hypothecation

The survey underlying this paper includes a section devoted to exploring the impact of hypothecation of revenues on acceptance. As described above, respondents were asked to state their voting preference, had there been a referendum on a scheme such as the one presented in the survey. Following that, a range of additional specifications to the scheme was presented, and respondents were asked to what extent the introduction of those would make them change opinion.

Two of those additional specifications were related to the use of revenue from the system, and specifically offered it to be spent either on improvements to public transport or on new roads, located in or near the city. Figure 2 breaks down the voting preference in each city by the stated propensity to change opinion given a change to the scheme, and then separately for frequent car drivers and non-frequent car drivers.

The city labels indicate the baseline voting preference, with the leftmost group representing the whole population (same values as shown on line 5 in table 1). The next two groups of city labels indicate the voting preference for the subsamples of those using a car only a few times per month or less (mid section), and those using it a few times per week or more (rightmost section).

From each city label run two bars, indicating the propensity for this share of the population to switch opinion. The left bar represents hypothecation to roads and the right hypothecation to public transport. The length of the bar is the share of the sample that states that they would move towards switching voting preference given the stated hypothecation scheme. The upward pointing bar shows how many No-voters and undecided would be more likely to vote Yes, and the downward bar shows how many Yes-voters and undecided would be more likely to vote No.

Increasing the propensity to vote in some direction does obviously not mean the same thing as actually changing one’s mind and switch vote. But if the stated direction of voting is correct, then the total span of the two bars show the span inside which the resulting referendum result will be, given each hypothecation scenario.

It is immediately evident that the earmarking in general drives up acceptance (the upward bars are almost always taller than those pointing downward). It can also be seen that hypothecating to roads leads to both negative and positive reactions in all subsamples, while spending revenue on public transport rarely reduces the support more than a few percentage points. Car drivers in general are keener to support spending on public transport than non car drivers are on spending on roads (The left bar stretches farther down in the mid section than in the rightmost section for each of the cities).

It can also be seen that in Lyon, the difference in opinion between the car-driving and the non-car-driving populations is only about ten percentage points, while it is twice that in Stockholm and more than four times as big in Helsinki. This may suggest that
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self-interest is a stronger determining force for opinion about congestion pricing in Helsinki than in Lyon.

There is another interesting detail in the difference between how the effect of hypothecation to roads differs from hypothecation to public transport (not visible from the chart). When revenue is dedicated to roads, people who are certain to vote No are just as, or almost just as, likely to be influenced by the hypothecation argument as those only Leaning towards No. While many of the certain No-voters may not be sufficiently influenced to actually switch over to voting Yes, the intensity of their disapproval is at least influenced. And if the purpose of hypothecation is not to maximise the number of people just barely choosing to vote Yes, but rather to reduce the strength of the opposition, then the data suggests that a hypothecation to roads may be the better bet.

3.2 Fairness

Perceived fairness – or unfairness is perhaps a better description – of congestion pricing is a thorny subject, as the phrase “it is unfair” can be interpreted in several ways. At least three interpretations can be identified:

a) Concern for the underprivileged, leading to a conclusion that policies that decrease the difference between rich and poor in society are desired, or that new policies should be designed not to be disadvantageous to those with low income. When the term equity is used without further qualification, this is what is often meant.

b) Concern for the principles of allocation of resources and responsibility, leading to a preference for policies where the use of a resource is closely associated with carrying the cost of its consumption (user pays principle), and where the costs associated with the causing of harm, e.g. pollution, is carried by the one who caused the harm (polluter pays principle).

c) Concern for negative changes from the status quo, including identification of categories of individuals as winner and losers. Note that this does not require any consideration whether the initial state represented a fair allocation or not. There are many ways to categorize people – by ethnicity, as car owners, parents of small children, farmers, long distance commuters, the elderly and so on – and at least one of them may be found to gather a critical mass of people perceived to be worse off by some policy change. In policies related to transportation, a natural such group would be those living in the same area, as they are likely to be affected in a similar way by the construction of a new road or a scheme altering the cost of travel, such as a congestion charge.

These groups of fairness concepts are sometimes labelled as three types of equity; vertical, horizontal, and spatial, with the latter being a subset of the general concerns for changes from the status quo. There are other definitions of those terms in use. This terminology is borrowed from Raux and Souche (2000 and 2004, where a more elaborate discussion on these definitions, their relation to efficiency and to Rawls theory of justice is offered).
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3.2.1. Concern for the underprivileged

Congestion pricing appear by several analysts to be inherently regressive (see e.g. Small, 1983 and 1992; Guiliano, 1992; Arnott et al, 1994), and thereby subject to legitimate criticism for benefitting the already well off. This finding can however be reversed, if it is mostly high income people who drive to begin with (Eliasson and Mattsson, 2006). Additionally, if the use of revenue is taken into account, the effect of congestion pricing can be made progressive as well as regressive, depending on how the funds are spent (Small, 1983; de Palma and Lindsey, 2004; Santos and Rojey, 2004). The effect of revenue allocation on public acceptance has been addressed above (section 3.1.3). This is, as mentioned in the introduction, one example of how perceived fairness has a potential overlap with self-interest, rather than only being an altruistic concern for the general welfare distribution.

If congestion pricing had been inherently regressive, and this was clear to people, self-interest would have suggested that higher income people would be more positive. Income does however not seem to explain higher level of acceptance very well, and neither so in previous studies (e.g. Jaensirisak, 2002). It is only for the highest earning group that any significant explanatory power is found at all, and they are less positive, not more, to congestion pricing (see factor 5 in table 2). Hence, the policy is either seen as not being regressive, or this does not matter very much in the opinion forming process.

One reason that the stated opinions does not seem to indicate a perception of congestion pricing as being alarmingly regressive could be that the survey is conducted in European cities where there frequent automobile use is closely associated with higher income, and public transit ridership with middle and lower income. (This association can be confirmed from the data, where income bracket is a clear and significant predictor of car usage.) Had a larger share of the population had low income and at the same time been dependent on daily car usage to get to work, the result may have been different.

The survey offers two different questions that could offer some insight into attitudes related to vertical equity. First, respondents are asked to rate to what extent they agree with the statement “The government ought to do more to reduce the differences between the rich and the poor in society”. In Stockholm and Helsinki, those agreeing to this statement outnumber those opposing it by a factor of 3. In Lyon the majority is even stronger, with more than 5 people agreeing for each who disagrees (see table 1, item 13).

However, agreeing with this statement is not associated with a more negative attitude to congestion pricing. In fact, there is a small tendency that agreeing with the statement is associated with a more positive attitude (see factor 9 in table 2). Hence, if anything, this seems to indicate that the popular perception is that congestion pricing is progressive rather than regressive, which, given the car usage pattern is probably the right conclusion to make.
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Second, in the same way as the questions on how voting preference would change in the presence of hypothecation of revenue, respondents are asked to what extent they would change their vote if “people with low income are offered a discount” on the congestion charge. Factor 10 in table 2 shows how the answer to this question predicts stated voting behaviour – in Stockholm and Helsinki not at all, while in Lyon significantly and negatively, i.e. the opposite direction from what was found for factor 9.

Figure 3 illustrates the total span of potential swing of opinion such a policy adjustment would trigger, in the same format as with hypothecation in figure 2. In Stockholm, both drivers and non-drivers are on average negative to such a discount, while the opposite is true in Lyon. In Helsinki, drivers are similar in opinion to those in Lyon, while the non-drivers are about as likely to increase as to decrease their support for congestion pricing with such a discount.

It is difficult to draw any definite conclusions from these findings. What is clear is that concern for the underprivileged is relatively weakly associated with attitude to congestion pricing, and that a policy design directly addressing this can have ambiguous effects, with substantial local variations. This is in stark contrast to the impression one may get from listening to the debate when a congestion pricing scheme is suggested, where concern for the less fortunate in society is a frequently used ethos laden argument.

3.2.2. Concern for the principles of allocation of resources and responsibility

The second category of fairness is related to the principles of allocation, rather than end states. If this principle is applied to something desirable, it is called User Pays Principle, and if it is used to allocate responsibility in terms of discomfort of costs, it is called Polluter Pays Principle. By extension, these principles lead to pricing of externalities and markets as the primary allocation mechanism. It is however not certain that an intuitive agreement of the user pays or polluter pays principle always coincides with an agreement of the market principle.

A body of literature exists where respondents are queried for perceived fairness of various allocation methods in hypothetical situations when there is insufficient supply of some desirable good (e.g. Kahneman et. al., 1986; Frey and Pommerehne, 1993; and Raux et. al., 2008). They have shown that pricing is often among the least preferred methods when it comes to fairness. Instead, it is commonly seen as more fair if people with special needs are given priority when demand exceeds supply. Queuing is seen as somewhat fair, while pricing and lottery are seen as unfair in many of the tested cases.

In the survey underlying this paper, five questions are relevant when identifying respondents’ attitude to the user or polluter pays principle. The first four of those asks the respondent to rate to what extent they agree with the following statements:
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• I think it is reasonable that airplane tickets cost more for departure at peak hours than in low traffic.

• I think it would be reasonable if a new bridge or road were financed by a road toll, to be paid by those who use the road.

• I think it would be reasonable if those cars and motorcycles that make the most noise were subject to a special noise tax.

• I think it would be reasonable if air traffic were subject to a special environmental tax.

All four questions pertaining to principles of allocation are listed in table 2 as factors 11-14. With two exceptions (factor 11 in Lyon and 14 in Helsinki lacking statistical significance) they clearly point in the same direction; people who agree to the principles of allocation related to Polluter Pays or User Pays Principles are more likely to support congestion pricing.

In addition to these, a fifth question related to user pays principle was asked in conjunction with the hypothetical scenario with the broken bridge, described above under 3.1.2. After having asked respondents about their willingness to pay for the ferry ticket, the following question was posed:

Some people complain to the authority that they charge a price for the tickets, claiming that it is unfair. When offering the ferry for free, it turns out that all who then want to use it cannot fit on board.

The authorities now consider four different methods as to choose who may travel with the ferry.

To what extent do you consider each of these alternatives fair?

• Price: Revert to the original policy of charging those who want to travel for the tickets.

• Queue: Those who arrive first to the jetty, and stand first in line get to go with the ferry.

• Conditioned on need: Those who want to travel by the ferry have to show some evidence to support their need. Then the authority provides ferry passes based on their judgement.

• Lottery: Tickets are allocated randomly, so that everybody has an equal change of winning.

The degree to which respondents find Price as fair is similarly positively associated with support of congestion pricing. (In this context it is interpreted as acceptance of a User Pays Principle.) This factor too is found in section 15 of table 2, where it is shown to be strongly associated with support for congestion pricing in Stockholm and Lyon, but insignificant in Helsinki.
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Comparing all four answering options in this question of fairness offers a curious observation; viewing any of the allocation methods Price, Queue or Conditioned on need as fair is positively associated with support for congestion pricing. (Lottery, which is preferred by a very small group, has close to no predictive power.) This hints at a more general finding: judging any allocation mechanism as fair increases the likelihood of accepting congestion pricing. Thus reversely, the opinion, perhaps naïve, to find allocation of scarce resources as generally unfair, regardless of method, is positively associated with disapproving of congestion pricing. A belief that there simply should be enough space for everybody, even in rush hour, is obviously incompatible with any allocation principle, fair or not.

Disregarding their relationship to acceptance of congestion pricing, and only looking at the answer to this question on its own, previous studies are confirmed in that Lottery is seen as highly unfair. Ten per cent or less of each population supports it. Second weakest support gets Conditioned on Need, with 37% of the Stockholm population finding it fair, and about half of that in the two other populations. Price is, in contrast to previous studies, the most preferred allocation method in Stockholm and Lyon, and the only method that is accepted by more than 50% of all three populations. Queuing takes the number one spot in Helsinki, with more than 90% support. The Lyon population rates all four methods of allocation lower than the other two cities.

**3.2.3. Concern for negative changes from the status quo**

Perceived fairness in policy changes related to transport typically has a spatial dimension. Without regard to the fairness of the status quo, changing the rules mid game is likely to be perceived as unfair, if that leads to a loss. Having for example bought a house and settled in an area, and only then learn about a major change in the use of nearby land or accessibility to the surroundings can certainly provoke reactions of unfair treatment.

From an outside observer, such an argument could look like little more than an attempt to elevate self-interest to a matter of principle. If the argument has some principle value, people’s opinions ought to be influenced by where they live in a way that is not explained entirely by their driving habits or expected out-of-pocket expenses.

In all three versions of the survey, respondents indicated whether they live inside or outside the charging zone. Additionally, in the Stockholm and Helsinki surveys, data was also collected on what area of the city they live in. None of these spatial variables come out as significant explanatory factors, when controlling for other factors as in table 2.

This does not prove that people are not influenced by this kind of fairness experiences. But it does suggest that where one lives is not among the most important factors determining whether one ends up a supporter of this particular policy, once general self-interest variables such as expected payment have been controlled for.

**3.3 Attitudes to other political issues**
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Previous studies have revealed a strong link between attitude to congestion pricing and other political attitudes, especially those related to the environment and the trust in government.

### 3.3.1. Environment

Although the main welfare benefits from congestion relief typically come from time savings, the environmental improvements associated with it can be even more influential when it comes to acceptance. Eliasson and Jonsson (2011) showed that a green self-image was one of the most influential determinants of attitude towards congestion pricing in Stockholm, and Jaensirisak et al. (2005) found that an ability to achieve substantial environmental improvements was more important for acceptability than the scheme's perceived ability to deliver concerning congestion relief.

Three of the questions in the survey mention the natural environment or environmental policies, asking for the extent to which the respondent agrees with the following:

- *I think it would be reasonable if air-traffic were subject to a special environmental tax.*
- *Motor vehicle traffic is among the largest threats to the natural environment.*
- *Considerably more resources should be used to protect the natural environment.*

(Note that the first of these is also referenced when discussing fairness above.) In table 2, these are found as factors 14, 16, and 17. All three are significant and positive, indicating that people who give priority to environmental issues are more prone to support congestion pricing.

### 3.3.2. Trust in government

Another reason to oppose congestion pricing is distrust in the stated reasons for its introduction or the use of the proceedings from it (see e.g. Kallbekken and Saelen, 2011). Even if one understands the economic rationale behind the policy, it is still possible to also disbelieve that the particular politicians in place to introduce and manage such a system will do it properly, and stick to the promises of revenue hypothecation made. And perhaps more importantly, even if one believes that politicians will do as promised, one may still be of the opinion that it is principally wrong for the government to get involved in a particular policy. One may call the former a pragmatic kind of libertarianism and the latter an ideological kind. Regardless of which, they are both associated with a low level of trust in government.

Dresner et. al. (2006) cite attitudes from people in five European countries, and finds a fundamental distrust of government when it comes to the spending of revenue from environmental taxes. That study used focus groups, and does not make any quantification of the degree to which general trust in government explains acceptance of the environmental taxes studied.
Decisive factors for congestion pricing acceptability

In the survey underlying this paper, there are two factors touching upon aspects related to willingness to accept government intervention. Respondents are asked to state to what extent they agree to the following:

- *Taxes are too high in [this country]*
- *Automatic speed enforcement is good way to prevent traffic accidents*

Both of these have strong explanatory power for voting behaviour in the combined population (in opposite and expected directions), as seen from factors 18 and 19 in table 2. In Stockholm, Lyon and in the combined population they are both highly significant and with coefficients with the expected sign, while weaker in magnitude and significance in Helsinki.

By design, the questions do not make a clear distinction between pragmatic and ideological libertarianism, i.e. attitude to the government’s ability to do what it has set out to do, and attitude to government involvement in general. The question on taxes could be described as more generic, relating to any kind of government involvement, while the question on speed cameras is specific to the transport sector, and also includes a mentioning of the benefit side (saving lives). Still, in two of the cities, the explanatory power of attitude to taxes is much stronger. This may indicate that to the public, congestion pricing is more similar to a general tax increase than to a policy aimed at curbing a specific problem.

### 3.4 Experience

One of the most well established observations of attitudes to congestion pricing, and road pricing in general, is that familiarity breeds acceptability. Before congestion pricing was seriously considered in Stockholm, the support for it hovered around 30 per cent, i.e. in the same neighbourhood as in Helsinki and Lyon today. But after a few months of operation, support started to grow, and has since then reached about two thirds (Brundell-Freij and Jonsson, 2009; Börjesson et al. 2012), an increase typically attributed the experience effect.

#### 3.4.1 Perception of ex ante situation

Congestion is often seen as a big problem in cities. Between 64 and 78% agreed with some degree of certainty in each city to the statement *Road congestion is one of [city]'s largest problems* (see table 1). As expected, many authors have found that congestion must be perceived as a big problem for congestion pricing to be acceptable (Jones, 1995; Odeck and Bråthen, 1997; Schlag and Teubel, 1997; Schade and Schlag, 2000; Jaensirsak et al., 2005).

However, there is no evidence for this association in the material underlying this paper. The answer to the question on congestion being a problem is not significantly associated with how someone would vote in a referendum on congestion pricing.

But if those supporting congestion pricing do not do it in response to congestion, then why support it? Perception that motor vehicle traffic is a major threat to the
environment turns out to be a much stronger (and statistically significant) predictor of support for congestion pricing (item 16, table 2). And by replacing the dependent variable (voting behaviour for congestion pricing) with attitude to construction of new roads, it is found that there is a much stronger link between people’s perception of congestion being a problem and whether they believe that it would be a good idea if new roads were built. Hence, there is a link between perception of the problem and desire for the remedy – only that the remedy preferred by those perceiving congestion as the problem is more roads, not pricing those already there.

### 3.4.2. Expected effects

It is plausible that a person who believes a policy measure to be effective will also be more prone to support it. Indeed, a range of studies finds a strong connection between belief in effects and support for congestion pricing. Summarising five studies of acceptability of road charging from the period 1979 to 1991, Giuliano (1992) notes that the most frequently cited reason for opposing congestion pricing is scepticism about its effect. This notion is confirmed by Bartley (1995), Schlag and Teubel (1997), Schlag and Schade (2000), Thorpe et al. (2000), Schade and Schlag (2003), and Jones (2003).

When analysing the voting behaviour in Edinburgh, Gaunt et. al. (2007) again found that the low level of expected benefits from congestion pricing was a main reason for the overwhelming No in that referendum. Similarly, when Eliasson and Jonsson (2011) analysed explanatory factors behind attitudes in Stockholm, belief in positive effects came in as one of the two most important factors.

The survey underlying this paper too included four questions on the expected effects, which, as expected, come out as highly significant predictors of attitude to congestion pricing. But the causality here may be in the reverse direction. If one believes that congestion charges are desirable for some reason other than its ability to reduce congestion, it cannot be ruled out that a mechanism is at play here, adjusting the perception of effectiveness to align to an already formed attitude, in support of, or against congestion pricing. This affect heuristic was first described by Slovic et. al. (2000) and later explored by others (eloquently summarised by Kahneman, 2011, p. 103). For this reason, the factors related to expected effects are not used in table 2.

### 3.4.3. Experienced effects

An intuitively plausible explanation, widely supported in the literature, is that people do not expect the positive effects of congestion pricing to be as big as they turn out to be in reality, and that the surprising realisation of benefits causes the opinion to change. This is at least partly supported by Schuijtema et. al. (2010), who found that people in Stockholm, after having experienced congestion pricing, perceived that congestion, parking problems, and pollution had decreased more than they had expected beforehand. The same authors also found that people’s actual out-of-pocket travel expenditures did not increase as much as they had feared. In summary – the benefits turned out to be better than expected, and the worst fears did not materialise.
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After analysing the development of public attitudes to the Stockholm congestion taxes, Winslott-Hiselius et. al. (2009) suggests an additional and parallel process, in which “the change was rather a re-evaluation of personal values (preference function), so that the same objective effects were evaluated differently.” The authors furthermore argue that the experience undergone by the population is not an increased level of individual knowledge gained by those who have personally interacted with the system, but rather a collective learning process, which affects the whole population, regardless of whether they have been driving in the city or not. This tracing of learning to the collective rather than the individual is also described by Brundell-Freij and Jonsson (2009).

In line with this, Schade and Schlag (2003) identify the expected opinion of friends and family as a significant factor of influence. Similarly, Jakobsson et. al. (2000) identifies the expected behavioural reaction to a congestion pricing scheme to be a strong factor influencing people’s attitude. All of which suggest a network effect in beliefs, which once set in motion will have some effect on everybody who interacts with each other, regardless of their travelling behaviour.

This description of a shift in collectively held beliefs is related but not identical to the findings of Schade and Baum (2007), who show by an experiment that a scheme does not have to be implemented for acceptance to increase – it is sufficient that a respondent believes that the introduction of the scheme is already decided and unavoidable. The authors suggest a psychological mechanism called cognitive dissonance as the most likely explanation. It refers to the phenomenon that humans have an innate dislike for situations when the interpreted factual situation is not consistent with one’s opinions, when different opinions are not in agreement with each other, or with one’s actions. When the mind finds itself incoherent in any of these ways, it attempts to realign itself, either by changing opinion, behaviour, or belief about the surrounding world. In this case, the choice of least effort would be to change one’s attitude to congestion pricing, thereby accepting the unavoidable. Brundell-Freij and Jonsson (2009) identifies this mechanism as a subset of the establishing of a collective experience.

Yet another psychological explanation to the experience effect comes from how people systematically overvalue what they have and may lose, and undervalue what they do not have but might gain. This leads to well documented anomalies, such as not being willing to pay nearly as much to buy something as the amount one later cites as the lowest acceptable price at which one is prepared to sell the exact same item, even when it is a replaceable item available in a liquid market. Thaler (1980) refers to as the endowment effect, closely related to what Kahneman and Tversky (1984) calls Loss aversion and Samuelson and Zeckhauser (1988) refers to as Status Quo bias. Since congestion pricing effectively offers people to lose some of their money and gain some time in return, the concept of loss aversion would imply that if the difference in value is not too great, people would tend to first refuse the trade money for time, and then, once forced to that trade, refuse to trade back.
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Without an elaborate experimental design, it is not possible to separate the relative influence that each of these psychological factors has on the combined experience effects. But by controlling for a vast array of demographical, behavioural, and attitudinal factors, it can be argued that the remaining difference between the cities could be mainly explained by the experience effect. That is, factor 1 (city) in table 2 is interpreted as an experience factor. This is the most influential factor, comparable only with a very high value of time in terms of predicting attitude to congestion pricing.

3.5 Socioeconomic variables

Without controlling for other factors, socioeconomic variables appear to be quite influential on attitude. The groups most positive to congestion pricing are found among the oldest, those with a higher education and people living outside the charging zone. In Stockholm, women are more positive to congestion pricing with a margin of about 3 percentage points, while in Helsinki the difference is more than 10 percentage points. In Lyon the difference is the same as in Helsinki, but men are more positive than women. Those with an income close to average are most positive, with support lower among those with the highest income, and lowest among those with the lowest income. There is no clearly visible difference between households with and without children.

When controlling for other factors however, many of these differences disappear. Gender is insignificant in Lyon and Helsinki, while it is strongly significant in Stockholm, but with the opposite sign compared to what the absolute numbers would suggest (table 2, factor 2). Ceteris paribus, women are less positive to congestion pricing than men in Stockholm. Age is largely insignificant, with the only discernible pattern that people younger than 18 and around 40 are slightly less supportive than other groups (not included in table).

Education is unlike what the absolute numbers suggest barely significant at all, and only when considering the break point at more than 3 years of university, and even then only in Lyon (table 2, factor 3). Income is similarly to education only a significant factor in the break off point between the group of highest earners and the rest (table 2, factor 5). Living inside or outside of the charging zone, is not significantly associated with any particular voting pattern in any of the cities, when controlling for other factors (not shown in table).

There is one thing however that becomes more influential when controlling for other factors than what is visible in the absolute numbers. Families with children (table 2, factor 4) are significantly less positive to congestion pricing in all three cities than those without. There is a possible explanation to this, which can only be partly verified from the data available. It is feasible to assume that having children implies more scheduling constraints, from requirements to drop off and pick up children at times that cannot be negotiated. This in turn should lead to higher value of time. The data confirms that having children is significantly and positively associated with high value of time. But as seen from table 2, a higher value of time means increased support for congestion pricing (factor 8). Hence, other aspects of parenthood jointly make up a stronger influence than the increase in value of time can compensate for. Partly, this
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can be the lack of flexibility inherent in the scheduling constraint. Additionally, it may be associated with other reductions in the adaptation strategies available – with a few children in tow, it may not be feasible to travel by bicycle or public transit, first to day care or school, then to work and back. And as the model already controls for the value of time, the remaining effect of being a parent, i.e. fewer adaptation options both in scheduling and mode choice, is showing up as a negative coefficient.

If value of time is removed from the model, the coefficient for having children (factor 4) is reduced from -0.25 to -0.18. This supports but does not prove the validity of the hypothesis – it may very well be something other than a reduction in alternatives that is the missing factor. Whatever the reason is, it has to do with having children, and its effect is large enough to counter the effect of the increased value of time.

4 DISCUSSION

4.1 Comparison of cities and factors

Much of what has been shown from this survey confirms, reinforces, and adds detail to previous knowledge about the popular attitudes to congestion pricing; experience is the single most influential factor; people do care how the revenue is spent; and self interest competes with political attitude for much of the rest of the influence.

Among the political attitude factors, the data confirms previous research in identifying two general directions of opinion as influential: attitude to environmental issues and attitude to government intervention, albeit with some local differences between the cities. The Helsinki population for example seems to be relatively little affected by trust in government, and the Stockholm appear to be more influenced by environmental aspects than the other two cities.

Making these comparisons requires some care – the size of coefficients is not comparable on the same scale across the three cities, nor to the combined population. (The scale for each population is found at the bottom of table two, in the form of intercept specification.) A simple way to compare the relative weight of the respective factors is to rank them by the absolute value of the coefficients, and then compare the rankings. The result of such a ranking is shown in table 4. To remind the reader of which factors was used as proxies for which general attitudes, table 3 summarises this mapping.

From the ranking in table 3 it can be seen that factors pertaining to environmental issues all end up in the upper half of the list, when considering the combined population (first column). The same is true for the Stockholm and Lyon populations (second and fourth columns), while in Helsinki (third column) one of those factors are found in the bottom half. Doing the same comparison for the two factors associated with government involvement in society (tax and speed cameras), both of those are found in the upper half of the list for Stockholm, and in the lower half for Helsinki, while one is found on each side for Lyon.
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Factors pertaining to vertical equity all rank in the bottom half for all populations, except factor 10 (discount to low income travellers) in Lyon, where it comes out as number one. This reflects the much stronger stance that vertical equity has in Lyon, compared to the other cities, which is also clear from the section on fairness above (section 3.2). Whether this is something specifically French, or perhaps represents a North-South divide in European political opinion is left for future research to conclude.

Continuing to use this method of comparison, it can be seen that Helsinki has 10 of 12 self-interest factors in the upper half (counting every step in ordered factors separately), while Stockholm has 7 and Lyon 6. Remember that at the time of the survey, there was an extensive debate in Helsinki about congestion pricing, with a fairly detailed scheme design available, in contrast to Lyon, where congestion pricing is far from the political agenda of the day, and Stockholm, where it is already a certainty. This may be taken as an indication that when a detailed scheme is presented, the public mind is focused on the expected personal effects, and especially the downsides (as also noted above in section 3.1.3 on Hypothecation).

The five factors associated with polluter pays or user pays principle (horizontal equity) are evenly distributed across the ranking, with three factors above and two below the mid level for all populations but Helsinki, where only two such factors make it to the top half of the list. Here it must be noted that as this general attitude is captured through five proxies, the size and significance of each is diluted. If dropping any one of them, the size of significance of the remaining four increases. Hence, the fact that all five remain significant in each other’s company indicates that user pay (or polluter pay) principle is a strong explanatory factor across all three populations.

With the exception of top earners (factor 5) in Lyon, socioeconomic variables are all in the bottom half of factors when ranked by absolute value of the coefficient. This can be interpreted as the attitudes and other factors used as explanatory variables are fairly well selected, and that attitude to congestion pricing is shaped more by what we do (car ownership and out-of-pocket expenses) and what we believe (attitudes and value of time) than by what we are (age, gender etc.).

In summary, the attitude of the Stockholm population is dominated by concern for government intervention, horizontal equity, concern for the environment, and self-interest. In Helsinki the attitude is strongly dominated by self-interest and to some extent by concern for the environment and horizontal equity. The Lyon population stands out as the one where vertical equity matters the most, joined by self-interest, horizontal equity, and concern for government intervention.

4.2 Political left and right

In London, Stockholm, and Copenhagen, congestion pricing has been suggested by the political left, and opposed by the right, which given the data presented here may seem paradoxical. On the political left, vertical equity is a cornerstone of the ideology. Left
Decisive factors for congestion pricing acceptability

leaning politicians who suggest introducing congestion pricing can then perhaps be assumed to subscribe to the notion that, at least in Europe, the net effect of the policy is a tool for progressive reallocation of resources. But if so, this view may not be shared by the population, since attitude to vertical equity is a poor predictor of attitude to congestion pricing.

On the other end of the political spectrum there is a traditional orientation toward horizontal equity, stressing that costs should be born to a larger extent by the users. This would indicate that the political right should be supporting congestion pricing, as user fees ensure that each person pull a larger share of her own weight.

It cannot be denied that the findings related to fairness in this study fit the political landscape poorly. But there is another section of the survey that may explain what is going on here. The questions pertaining to trust in government, which also aligns with the left-right scale, work well to explain attitude to congestion pricing. Likewise, the questions related to the environment have strong explanatory power, and with green parties often ending up left-of-centre, this too offers a fitting explanation.

Thus it appears that in the case of this particular policy, and the political debate in many European cities, it is the attitude to the role of government and to the environment, rather than the fairness of allocation principles, which has guided the political parties in their opinion forming.

4.3 Timing of attitudes

Another frequently observed phenomenon is that just before a scheme is implemented, support drops to an all time low. This is a consistent pattern described for Stockholm by Winslott-Hiselius et. al. (2009), for Norwegian cities by Odeck and Bråthen (2002) and Odeck and Kjerkreit (2010), and for London by TfL (2004).

Although this survey is only a snapshot in time, it is worth noting that Stockholm experienced approximately the same level of support prior to its introduction as Helsinki and Lyon did at the time of the survey. Given the debate going on in Helsinki at that time, it can be argued that this population ought to be subject to at least some of the pre-implementation drop in support. Repeating the survey today, when the issue is off the agenda, would possibly offer some insight into that.

4.4 Generalising of results

This study examines attitudes in three European cities, which by global standards all were industrialised early, have populations that are rich, and where the pace of development and change is now slow. Findings that are similar across these three cities can be expected to at least also be common with other Western European city populations, and some possibly even be universal in nature. Among those findings are the influence of experience from using a system, the expected out-of-pocket expenses and the value of time.
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Previous studies have offered several worthy suggestions of psychological mechanisms responsible for the experience effect. Although this study cannot separate between them, it does offer a total weight for their combined effect, and as such, this is singled out as the strongest among the explanatory factors in the study.

Self-interest has been broken down in three components: out-of-pocket expenses, time savings, and benefits from revenue recycling. Finding that the amount of money to be paid has a negative influence on the attitude toward the system is hardly surprising. Perhaps somewhat surprising is however that the number of cars available to a household is just as good a predictor of attitude as an estimated amount of money to be paid out.

Although theory, as well as common sense, would predict value of time to have a positive influence on acceptance of congestion pricing, this link has not been shown by previous studies. The survey presented in this paper can verify that the association is not only present but also that it is among the top factors determining attitude. Additionally, and perhaps surprisingly, self reported value of time has an almost equally strong predicting power in populations without experience from congestion pricing as it has where the policy is already in place. This indicates that the difference in support before and after introducing congestion pricing is not only due to a failure of foreseeing and valuing the benefits of the time savings.

The strong influence by out-of-pocket expenses and value of time indicates that people understand the general function of congestion pricing from the individual’s perspective – you pay some money and gain some time. These results are consistent and statistically significant across populations. There is no reason to believe that they do not hold some universal explanatory power.

But there are also other factors, which have been shown to have great influence, but with differing degrees between the three cities surveyed here, and for which it is more difficult to draw any general conclusions. These factors are of a different kind, more philosophical, moral, or political in nature. They include fairness, the role of the state, and the relationship to the environment, and for such factors it is more difficult to generalise the conclusions and predict the potential explanatory power in other populations.

In addition to a potential for strong explanatory power and a large variation across populations, another thing these factors have in common is that they are not immediate characteristics of congestion pricing, but rather general attitudes, only indirectly associated with the policy. While time and money are obvious and fundamental aspects of any congestion pricing scheme, the links between it and fairness, the role of the state, and the environment are more indirect. With a little stretch of the imagination, almost any area of politics can be connected to congestion pricing, either by an indirect causal relationship or by a superficial resemblance.

There is a possible interpretation of what happens in the mind of the person about to determine what opinion to hold about this policy, which is closely related to what
Decisive factors for congestion pricing acceptability

Kahneman (2011) calls the *substitution heuristic*. This refers to the psychological process of the mind replacing a difficult question with a simpler one, and answering that instead, without reflecting on the change. In the case of congestion pricing, the complete set of questions to ask oneself may be something like “Which consequences may come from the introduction of congestion pricing”; “What is the magnitude of each of those consequences”; “What is the net effect of them all”; and “How does that compare to the things I judge as important?” Answering this set of questions requires a thorough cost benefit analysis, which is an unlikely effort to go through. Instead choosing to make a Kahnemanesque substitution of these difficult questions will result in a much simpler set of questions; “What does this policy resemble”, and “How do I feel about that?”

For example, for a person giving environmental issues top priority, the property of the congestion pricing policy that may pop out as most striking may be its potential for reduction of vehicle kilometres travelled. For her, the policy resembles a measure to reduce the use of cars, to which the reaction is likely to be a positive emotion. Meanwhile, for a person with strong libertarian values, the key characteristic that stands out may be the precision and inexorableness of the intervention itself, i.e. the surveillance cameras, the detailed database of people’s whereabouts, and the fact that yet another fraction of income will be transferred from individual control to the state. To this person, the answer to the substituted set of questions may be something like “This looks like just another way for the government to expand its scope of control and monitoring, and I don’t like it at all.”

This way, when determining what the policy resembles, the person making the judgement will have no choice but to use her own individual frame of reference and priorities in the selection. This goes some way to explain the individual differences in the mechanism by which people are influenced by different associations when forming their attitudes to congestion pricing. But for this to explain the differences across cities, one must also make likely that there are systematic differences between the populations, in terms of which political and moral dimensions are dominating and which are less articulated in the opinion forming process. And such differences are visible in the data, see for example items 10-13 in table 1. It ought not to be a controversial assumption that there are differences in political discourse across regions that are more substantial than what has here been noted as differences in public opinion.

From this reasoning, a tentative generalisation can be made. Attempting to project the results from this study to another city, one would need to understand the public discourse of that city, and what aspects of it congestion pricing may be associated with. If for example congestion pricing was suggested in a city where the public is placing a high value on economic development, and not so much attention to the natural environment, it is likely that some of the explanatory factors would be very different. In this case, one would need to foresee which characteristics of the congestion pricing policy will resonate with an economic development discourse, and then to anticipate
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whether this characteristic is interpreted as a support or an obstacle given the chosen frame of reference.

This way, the attitude is not only shaped by the design of the congestion pricing scheme, but also by the frame of reference and the dominating values common in the population forming the attitude. This reference dependence is not unique to congestion pricing, but congestion pricing is probably among the more complex policy measures being proposed. To fully understand it, one need to grasp the intricacies of the speed-flow relationship from traffic engineering, the concept of generalised transport costs, price elasticity of demand, the variability of value of time, and the basic ideas of welfare economics. And as most people live their lives without a degree in transport economics, there is reason to expect that they are more than usually inclined to make cognitive shortcuts when it comes to judging this particular policy measure.

In an attempt to generalise the opinion forming process, the person making up her mind can be seen as asking four questions to herself (in non chronological order):

- Have I experienced this before?
- Will I lose money from it?
- Will I save time from it?
- In the political frame of thought engaging me the most, what does the policy resemble, and how do I feel about that?”

From this list, the first question is easy to answer for the majority of the population – if the policy is new, it has an uphill battle to reach acceptance. The answers to the following two questions can be predicted by careful transport modelling, which has potential to be fairly accurate. By influencing the scheme design so that it maximises the net benefits of the scheme, this is also the area where the local government has a good chance of changing the basis for people’s opinions. The fourth question, finally, requires an understanding of the local political opinions and opinion forming process. Given an understanding of this, a policy maker, activist, or lobbyist can attempt to frame the suggested policy in the way judged to be most favourable for her cause. Then again, that should come as no surprise to a policy maker, an activist, or a lobbyist.
Decisive factors for congestion pricing acceptability

## TABLES

<table>
<thead>
<tr>
<th></th>
<th>Stockholm</th>
<th>Helsinki</th>
<th>Lyon</th>
</tr>
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<tbody>
<tr>
<td>01</td>
<td>Population, city</td>
<td>851,000</td>
<td>596,000</td>
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<tr>
<td>02</td>
<td>Population, metro area</td>
<td>2.1 million</td>
<td>1.1 million</td>
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<td>03</td>
<td>Share of population driving daily</td>
<td>31%</td>
<td>53%</td>
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<td>04</td>
<td>Share of population with access to at least one car</td>
<td>75%</td>
<td>78%</td>
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<td>05</td>
<td>Would support congestion pricing in a referendum today</td>
<td>67%</td>
<td>35%</td>
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<td>06</td>
<td>Thinks new roads is a good way to solve congestion</td>
<td>74%</td>
<td>56%</td>
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<td>07</td>
<td>Sees congestion as a main problem for the city</td>
<td>78%</td>
<td>64%</td>
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<td>08</td>
<td>Thinks tolls are a good way to finance new roads</td>
<td>47%</td>
<td>29%</td>
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<td>09</td>
<td>Are mainly happy with public transit</td>
<td>73%</td>
<td>85%</td>
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<td>Agrees that much more resources should be spent by the government to protect the natural environment</td>
<td>88%</td>
<td>85%</td>
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<td>Agrees that taxes are too high in their country</td>
<td>68%</td>
<td>73%</td>
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<td>Agrees that Automatic speed enforcement is a good way to save lives</td>
<td>86%</td>
<td>84%</td>
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<td>Agrees that more should be done to reduce the difference between rich and poor in society</td>
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*Table 1: Selected data describing the traffic situation and some key attitudes in the population of Stockholm, Helsinki, and Lyon*
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<th>Lyon</th>
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<td>Helsinki</td>
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<td></td>
<td>Lyon</td>
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### Decisive factors for congestion pricing acceptability

<table>
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<tr>
<th>General factor (group of factors)</th>
<th>Proxy factors (survey questions)</th>
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<tr>
<td>Experience</td>
<td>1. City</td>
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<td>Socioeconomics</td>
<td>2. Gender</td>
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<td></td>
<td>3. Education</td>
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<td></td>
<td>4. Family constellation</td>
</tr>
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<td></td>
<td>5. Income</td>
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<td>Self interest</td>
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<td>7. Out-of-pocket expenses</td>
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<td>8. Value of Time</td>
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<td>Fairness – Vertical Equity</td>
<td>9. Reduce difference between rich and poor</td>
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<td>10. Give discount to low income travellers</td>
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<td>Fairness – Horizontal Equity</td>
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<td>Trust in government</td>
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<td>19. Automatic speed enforcement is good</td>
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</table>

*Table 3: General factors and their proxies (factor 14 used as proxy in two groups)*
### Table 4: Ranking of factors by absolute value of coefficient

<table>
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<tbody>
<tr>
<td>2</td>
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<td>18. Taxes are too high</td>
<td>6. Three cars</td>
<td>8. VoT 4</td>
</tr>
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<td>8. VoT 3</td>
<td>16. Traffic damages the environment</td>
<td>18. Taxes are too high</td>
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<td>6. Two cars</td>
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<td>17. More resources to environment</td>
<td>7. Out-of-pocket Exp. 4</td>
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<td>17. More resources to environment</td>
<td>17. More resources to environment</td>
<td>7. Out-of-pocket Exp. 2</td>
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</tr>
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<td>13. Tax noisy cars and MCs</td>
<td>7. Out-of-pocket Exp. 2</td>
<td>19. Automatic speed enforcement is good</td>
</tr>
<tr>
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<td>18. Taxes are too high</td>
<td>6. One car</td>
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<tr>
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<td>27</td>
<td>3. Education</td>
<td>10. Give discount to low income</td>
<td>2. Female</td>
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</tr>
</tbody>
</table>

Decisive factors for congestion pricing acceptability
Decisive factors for congestion pricing acceptability

FIGURES

Figure 1: Cumulative distribution of Value of Time as projected from willingness to pay for ferry tickets. On the X-axis, 6 represents the answer "More than 5 Euros" for saving 20 minutes.

Figure 2: Baseline opinion and maximum swing triggered by hypothecation.
Figure 3: Baseline opinion and maximum swing triggered by discount to low-income drivers.
REFERENCES


Decisive factors for congestion pricing acceptability


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