ROAD PRICING: HOW PEOPLE PERCEIVE A HYPOTHETICAL INTRODUCTION. THE CASE OF LYON

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ROAD PRICING: HOW PEOPLE PERCEIVE A HYPOTHETICAL INTRODUCTION. THE CASE OF LYON

Cristina Pronello*
Université Lumière Lyon2, Laboratoire d'Économie des Transports
14, Avenue Berthelot, 69007 Lyon – FRANCE
Phone: +33.4.72726440 - Fax: +33.4.72726448
cristina.pronello@univ-lyon2.fr
Politecnico di Torino - Interuniversity Department of Regional and Urban Studies and Planning
Viale Mattioli 39, 10125 Torino – ITALY
Phone: +39.011.0905613 - Fax: +39.011.0906450
cristina.pronello@polito.it

Valentina Rappazzo
Laboratoire d'Économie des Transports
14, Avenue Berthelot, 69007 Lyon – FRANCE
Phone: +33.4.72726440 - Fax: +33.4.72726448
Politecnico di Torino - Interuniversity Department of Regional and Urban Studies and Planning
Viale Mattioli 39, 10125 Torino – ITALY
Phone: +39.011.0905605 - Fax: +39.011.0906450
valentina.rappazzo@polito.it

ABSTRACT

Following Singapore (1975), some metropolitan areas introduced pricing schemes to make car users aware of the real costs of their trip. This research looks at citizens' reactions to the hypothetical introduction of a road pricing scheme in Lyon (France).

People's perceptions were investigated through a sample of 61 persons selected according to a stratified sampling plan. A web-questionnaire was administered to the participants, and eight focus groups were then organized, each including about 7-8 persons. The focus groups allowed us to investigate the participants' opinions, emotions, and reactions to the hypothetical introduction of different road pricing schemes in the urban area.

This research has largely confirmed what found in previous studies and its key additional contribution is the clustering of citizens according to their reactions. Different groups of people showed dissimilar attitudes and opinions about the effect of road pricing, but the whole sample agreed upon the need for a coherent policy both for transport planning and management in the Lyon metropolitan area, while respecting freedom of mobility. In fact, citizens expect that a reduction of their freedom to move by car should be compensated with a strong and clear policy to improve the alternative modes and want to know clearly how revenues will be spent. A clear communication policy should be defined and this should be tailored according to the different groups defined in this paper.

Keywords: road pricing; traffic congestion; air pollution; pricing policies; transport; city; urban transport policy; parking policy; mobility; focus group; citizens' opinions; citizens' emotions; travel behaviour

1. Introduction

Road pricing schemes have long been used as policy instruments to tackle traffic congestion and environmental pollution in urban areas or to finance infrastructures (Lindberg, 1995). Vickrey (1963) and Button (1995) have recognised the effectiveness of pricing schemes in managing congestion, if set up with real prices, not just "notional charges", to induce behavioural changes.

The earliest and best known example is Singapore, where road pricing was implemented in 1975, and nowadays there are some interesting experiments underway all over the world. In Europe, the most important cases are those of London, Stockholm, Oslo, Bergen, Trondheim, Milano, and, since January 2013, Gothenburg. Furthermore, Austria and Germany introduced (respectively in 2004 and 2005) a distance-based road pricing scheme applied just to trucks.

These applications can give some insights about the perception and the effectiveness of such schemes. Concerning the cases of Hong Kong and Seoul, Harrington et al. (2001) report a traffic decrease by nearly 14% in the tunnels where charging is applied while carpools, buses and taxis more than doubled. Similar positive effects are reported by Viegas (2001) for Oslo, Bergen, and Trondheim.

Despite the expected positive effects on traffic, lack of public and political acceptance is a serious issue as discussed in Jones (1992) and Schlag and Teubel (1997). In fact, public opposition has prevented the spread of pricing to other facilities in Hong Kong and Seoul. Public opinion, associations and local stakeholders always stress the intrinsic social iniquity of pricing schemes (Langmyhr, 1997; Eliasson and Mattsson, 2006), which inevitably emphasizes people disparities, since benefits would be greater for the wealthiest. Sheldon et al. (1993) point out that the lack of acceptance stems from the misperception of the negative effects as being caused by others rather than by oneself. Viegas (2001) states that the management of road pricing schemes should be based on efficiency and equity as basic economic objectives.

Thus, road pricing policies still encounters strong oppositions and remain very unpopular; the low public acceptability is one of the strongest barriers hindering their applicability (Langmyhr, 1997). As highlighted by Jakobsson et al. (2000), people feel a lack of freedom by having to pay for something that has been always free of charge.

As a result decision makers - although willing to introduce a road pricing policy - often abandon the idea, also considering the huge investment required to establish a management system. Moreover, some administrators are not very confident of the expected traffic results and fear political consequences (Viegas, 2001).

Nevertheless, decision makers who had the courage to keep to their views are satisfied with the results, and citizens as well recognize the benefits and generally approve the pricing schemes. That is the case of Stockholm, where a first trial pricing scheme was introduced in January 2006. The results were satisfactory, even beyond the most optimistic expectations, and when in September 2006 the citizens had to express their willingness to keep the scheme or not (referendum), a narrow majority decided for a permanent charge, although the pre-test opinion polls highlighted a majority against the congestion charging (Jansson, 2008). The Stockholm experience shows that such a measure, usually unpopular, can be appreciated and supported as long as valid alternatives to car use are provided. Similarly, UK adults increased their support for road pricing from 30% to 57% if the revenues were spent on a mix of improved transit, local traffic management and better pedestrian facilities (Harrington et al., 2001).

Since 1990, in Norway money is raised to finance improvements in road and public transport thanks to the toll rings (Odecka and Brathenb, 2002; Larsen, 1995; Lauridsen, 2011). Positive outcomes are also evident on congestion levels, since traffic growth is slower than the national average, while the public transport share increases and two thirds of the citizens are favourable to a new toll ring if the revenues subsidize public transport. In Stockholm, road pricing produced an increase of 6% in public transport use. In 2007 London enlarged the charging zone previously established in 2003 and incoming traffic decreased by 16% while congestion fell by 30% (May et al., 2010).

Beside low public and political acceptance, claims of social injustice and iniquity, another feared consequence of road pricing schemes is the loss of attractiveness of the city centre, entailing negative

effects on its commercial and social role within the conurbation. Even though businesses always fear huge decreases of their sales and productivity, empirical evidences show that such worries are not justified. A decline in Trondheim annual turnover registered before the introduction of the toll was reversed after the implementation of the cordon charge, demonstrating that the toll was not influent on business trends. Similarly, in London business surveys show a broadly neutral impact of the congestion charge on central London economy (May et al., 2010).

However, the real effect of pricing schemes and their acceptance can be certainly known only after their implementation, since they strongly depend on the characteristics of the town and on the citizens' modal choice (Santos and Rojey, 2004). Furthermore, the gap between perception and behaviour is an important point in forecasting the effects of pricing schemes and remains an element of uncertainty for decision makers. De Groot and Steg (2006) tried to analyse through an internet survey how a transport pricing policy may reduce car use. The results showed that people ignore how they would behave if a pricing scheme were actually implemented, and they find it difficult to imagine its behavioural consequences. This highlights how the mere quantitative approach is inadequate to explore in depth such a tricky issue, involving principles of social equity and individuals' freedom.

This paper investigates citizens' reactions to the hypothetical introduction of a road pricing scheme in Lyon (France), tackling both traffic congestion and air pollution. A sample of 61 residents in the Lyon metropolitan area participated to a discussion (managed through focus groups) on different transport policies, particularly focussed on road pricing policy. They also filled in a quantitative web questionnaire, thus allowing us to investigate the same issues through a mixed approach, using both qualitative and quantitative investigation methods. This paper focuses on the qualitative analysis, presenting only the results of the focus group discussions.

The next sections explain the methodology for the survey and the data analysis design. The results are then described and conclusions are finally presented.

2. Methodology: the survey and the data analysis

Figure 1 shows the Lyon Metropolitan Area, under the Grand Lyon authority, which covers 512 km² (58 municipalities) and houses about 1.3 million people. Lyon is an important centre of economic development and it is the 2nd French metropolitan area after Paris. The orography of the territory (partially hilly and crossed by two rivers, Rhone and Saone) makes road traffic often congested, notably during peak hours, in the city, in the tunnels and on the ring-road TEO ("Trans Est-Ouest", the Boulevard Périphérique Nord de Lyon).

Participants to the survey were selected according to a stratified convenience sampling plan based on gender; age; education; occupation; income; presence of children in the household; travel pattern (travel time, scope, used mode, origin and destination). A sample size of 61 people allowed us to manage a feasible number of focus groups (about 7-8 people in each one of eight Focus Groups). The sample was not designed to represent the Lyon or French population, but to include different users' profiles so as to better test all possible reactions.

The web-questionnaire, created with the software LimeSurvey, was addressed to the participants in two stages: a first part a few days before the Focus Group (focusing on travel behaviour, attitudes, life style, urban transport policies, and socio-economic data), and a second part on the day after the discussion (only focusing on road pricing). This set up prevented participants from knowing that the key topic of the discussion would be road pricing, thus allowing us to get people's spontaneous reactions. The focus group investigated the same issues contained in the questionnaire to allow a cross-reference with the topics discussed.

The survey was held in October 2011 in Lyon, in the premises of the University.

The focus groups started with a short presentation of the participants (name, occupation, household composition, residence and work location) and investigated three main issues:

1. daily mobility: travel habits (modes most used, trip purposes and durations) and attitudes;

2. transport policies: at first there was a theoretical discussion about the three levers (technology, economics, and individual behaviour) suggested by the European Commission to deal with traffic problems. Then, specific transport policies were presented (bike sharing, car pooling, car sharing, High Occupancy Lanes, Limited Speed Zones, Limited Traffic Zones, Pedestrian Zones, Charging Zones, tackling alternatively car congestion or car pollution), and participants expressed their opinions about them;
3. hypothetical road pricing in Lyon. The proposed scheme would be in force during weekdays from 7.00 a.m. to 7.00 p.m. and apply to all cars entering or circulating in Lyon (excluding the 5ème and the 9ème arrondissements) and in the outer city of Villeurbanne. This third topic was the core of the research and several issues were discussed (see Results).

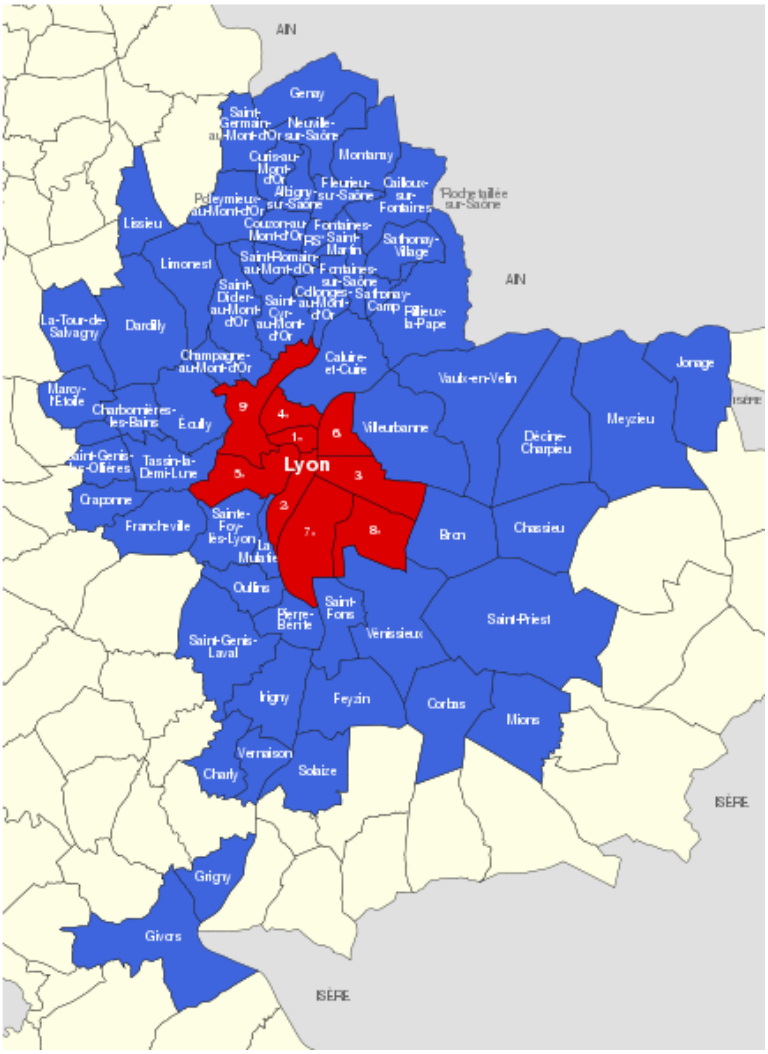

Figure 1 – Grand Lyon area

The discussions during the focus groups were recorded (audio and video) and verbatim transcribed. The transcriptions were then carefully read in order to draw a synoptic grid including main subjects and sub-subjects, thus creating the structure for the content analysis. Then the participants' wordings on the different topics were reported in the grid. This work was carried out iteratively, to organize raw data in a definite structure (Krueger and Casey, 2000; Zammuner, 2003).

3. Results

The participants were well gender balanced (30 women and 31 men) and rather highly educated: 37.7% hold a university degree, and 24,6% have a school-leaving certificate; only 3 persons (4,9%) do not have any diploma. 32.8% of interviewees are high level professionals, 23% office-workers, 9.84% students and 11.48% retired.

The average gross household income is 3,000-5,000 €/month for 27.9% of participants, while 26.2% earn 1,500-3,000 €/month; only 10% did not reveal their income. As regards household composition, 37.7% of people in the sample live in a couple; 29.5% live alone, and nearly 23% have a large family (4 people minimum). People living with kids represent nearly 30% of the sample.

Considering car ownership and travel habits, almost all respondents have a driving license (95%) and the overall car availability is rather high: 42,6% own one car while 37.7% own two cars. However, almost 10% do not have any car available within the household.

Analysing daily travels, the mode most used is the car as driver (57.4%), while nearly 20% use public transport. Slow modes are currently used by 13% (5% use the bike while 8.2% walk). Since most of the participants are part of the working population, for 72% of them the most frequent trip is the one to work, while for the six students in the group the home-university trip is the most frequent one. Car is the most frequent transport mode also during the weekend (for 75.4%), while 13.11% use public transport.

In the Annex, a table offers a synthetic overview of the participants' socio-economic characteristics and travel habits. Furthermore, the table is also a useful reference to understand the profile of the participants which are mentioned in the following sections.

The focus group participants can be roughly divided in two groups based on their first reactions to the hypothetic road pricing in Lyon.

A first group, the largest, showed a strong opposition, rejecting the idea of a congestion charge, which would be a very unfair policy, socially unacceptable, emphasizing the differences between rich and poor people, also increasing social segregation. Many participants are against the principle and perceive the congestion charge like the TEO (ring-road), whose high toll raised strong protests in 1997-98 since it highlighted socio-economical differences between "those who have the means and can pay and those who cannot and must therefore queue up in the Fourvière tunnel for half an hour" (Virginie). Many participants felt that a toll would become just a supplementary tax, a simple way to raise money from the citizens during the recession, not an effective measure for reducing congestion and pollution. Another common feeling was the sense of fear towards road pricing: several participants admit that the car represents their freedom to be proud of, while a pricing scheme would infringe their personal freedom.

The second group showed a more moderate reaction to the toll hypothesis, not opposing its introduction a priori and recognizing the need for effective measures to limit traffic and pollution. Although someone was even a supporter of road pricing, the dominant reaction was not "Welcome the toll", but a general awareness that road pricing could become a reality, as it happened elsewhere. This group demanded that the toll should be defined within a coherent urban transport policy, in order to offer a real alternative to the car for all metropolitan trips. The supply of modes other than the car seemed mandatory to the greatest part of the interviewees, who argued that "otherwise people will not understand and the toll policy would turn out to be not useful" (Sophie R).

A deeper analysis of the different reactions allowed refining the first rough division of respondents in two groups, defining six homogeneous groups as regards their position towards the introduction of a pricing scheme: 4 out of the 61 participants are not included on the groups below because they did not give any element useful to label them:

- a very small group (n=3, 5.3%) representing a "niche" of people showing a positive attitude, supporting the introduction of a pricing policy, is labelled "Supporters";
- a small group (n=6, 10.5%) expressing a general positive attitude but showing a degree of caution, is labelled "Cannily well-disposed" ;
- the biggest group (n=18, 31.6%) that deeply debated about such a policy, showing a good knowledge and an open mind attitude in understanding the pros and cons, but without taking a defined position, is labelled "Non-partisans". Some of them might be considered as the ones that would probably shift towards a more positive position towards the charge, if part of a larger and coherent transport policy;
- a group (n=9, 15.8%) showing a certain unwillingness towards the pricing, is named "Reluctants";

- a large group (n=16, 28.1%) that expressed a great, but polite conviction about the senselessness of such a policy, is named “Strong opponents”;
- a small group (n=5, 8.8%) that showed a very negative and rude attitude expressed with a certain degree of postural and verbal violence, is labelled as “Fierce opponents”.

Table 2 shows the socio-economic characteristics of each group, as well as their travel habits. It is interesting to compare the groups as regards their age, household income, presence of children in the household and of, course, their travel habits (mainly the modal choice and the time spent for the most frequent trip). Other variables are less significant in characterizing them.

Table 2 - Socio-economical characteristics and travel habits of the identified groups

		Supporters (n=3)	Cannily Well-disposed (n=6)	Non partisans (n=18)	Reluctants (n=9)	Strong opponents (n=16)	Fierce opponents (n=5)
Gender	Female	66.6%	33.3%	66.6%	22.2%	43.7%	40%
	Male	33.3%	66.6%	33.3%	77.8%	56.3%	60%
Age [years old]	Average	35.33	49.33	38.83	48.55	45.8	41.2
	Median	32	53	31	52	43	39
Education	Low	-	-	11.2%	22.2%	18.7%	-
	Medium	66.6%	66.6%	44.4%	11.2%	43.7%	60%
	High	33.3%	33.3%	44.4%	66.6%	37.6%	40%
Occupation	Student	33.3% (PhD)	-	27.5%	-	-	-
	Worker	-	-	5.5%	-	-	-
	Office-worker	33.3%	-	39.5%	22.2%	43.7%	80%
	High level	33.3%	83.3%	16.5%	66.6%	37.6%	20%
	Retired	-	16.7%	11%	11.2%	18.7%	-
HH income [€/month]	Average	1833	3708.3	2703.1	3937.5	3583.3	2950
	Median	2250	4000	2250	4000	4000	2250
HH composition	Single	33.3%	33.3%	39.3%	11.2%	18.7%	40%
	Couple	66.6%	16.7%	16.5%	33.3%	56.3%	20%
	3 people hh	-	-	16.5%	-	-	40%
	>= 4 people hh	-	50%	22.2%	44.3%	18.7%	-
	Single with a child	-	-	-	11.2%	6.3%	-
	ND	-	-	5.5%	-	-	-
HH with children		-	50%	22.2%	55.5%	25%	40%
Used mode	Car	-	33.3%	55.8%	66.7%	75%	100%
	Motorbike	-	16.7%	-	-	-	-
	Regional Train	-	-	-	11.1%	-	-
	PT	-	50%	22.2%	-	12.4%	-
	Bike	33.3%	-	-	-	-	-
	Foot	33.3%	-	5.5%	-	-	-
	Other (specified)	33.3% Only on foot (SS) / PT (AW)	-	5.5% Bike (SS) / PT (AW) 5.5% Bike (SS) / Only on foot (AW) 5.5% Only on foot (SS) / PT (AW)	11.1% Car + PT + On foot 11.1% Two-wheelers (SS) / Car (AW)	6.3% PT + foot 6.3% Car + PT + foot	-
Scope	Work	33.3%	83.3%	61.2%	88.9%	75%	100%
	Voluntary work	-	-	-	11.1%	12.4%	-
	Study	33.3%	-	22.2%	-	-	-
	Shopping	33.3%	-	-	-	-	-
	Leisure	-	16.7%	11.1%	-	6.3%	-
	Pick up / Drop someone	-	-	5.5%	-	6.3%	-
Most frequent OD	IN	66.6%	33.3%	50%	-	31.3%	40%
	MIX	33.3%	33.3%	27.8%	77.8%	56.3%	60%
	EXT	-	33.3%	22.2%	22.2%	12.4%	-
Time spent [min]	Average	17.33	22	23.3	44.44	31.38	43
	Median	15	22.5	20	45	30	30

The "Supporters" get the lowest salary (1833 €/month as an average), are one of the youngest group (average age 35, median 32), they have no kids and they all use environmentally friendly modes (bike, foot and PT), spending the lowest time to travel. This, probably, explains their more favourable attitude towards the pricing, because they would not be really touched by such a policy. The “Cannily well-disposed” are well balanced between motorised modes (50%) and PT (50%), they are the oldest group (average age 49, median 53) earning the second highest salary (3708 €/month) and 50% of them live with their kids. Their socio-economic characteristics are similar those of the "Reluctants' ", who are the richest (3937 €/month) and the second oldest group (average age 48.5, median 52). Moreover, 56% of them live with their kids. Although their socio-economic characteristics are very similar, they have different travel habits, since the “Reluctants” are more car dependent (only 11.1% use PT) and their travel time is definitely the highest among all groups (both the average and the median are of about 45 minutes). This aspect leads them to be more reluctant towards the introduction of a road pricing policy. Nevertheless, both "Cannily well-disposed" and "Reluctants" take a moderate stance, although on opposite sides. In between them, the "Non-partisans" are a very interesting group, one of the youngest (average age 39, median 31), living in households with a medium-low salary (2703 €/month). Their modal choice is rather well balanced between car (56%) and sustainable modes (44%). The two groups of opponents are mainly or totally composed by car users: 75% of the "Strong opponents" and 100% of the "Fierce opponents" are motorists. The Strong opponents are the third oldest (average age 46, median 43) and richest group (3583 €/month), while the Fierce opponents are a bit younger (average age 41, median 39) and have a medium salary (2950 €/month).

Besides the 57 classified participants, 4 could not be included in the groups because they did not give any element useful to label them.

In the next paragraphs the results will be presented analysing both the single groups and cutting across them to find out the divergences as well as the potential commonalities. The main focus will be on the acceptable and deterrent charge levels to understand the potential effect of the introduction of a pricing scheme in Lyon, critically comparing them with the effects already recorded in other cities.

3.1 The charge level and the size of the congestion zone

The charge level that participants would consider rather acceptable varies a lot, according to personal revenues, attitudes and needs.

When asked to define the charge level that would be a real deterrent for them, many participants spontaneously made a comparison with the parking rate in the city centre and the cost of a public transport ticket. Someone defined the threshold for the rate equal to the single ticket price (1.60 €), while others at least to the return ticket (3.2 €), otherwise the car would still appear to be less expensive. Those opinions cut across the “Non-partisans”, the “Reluctants” and the opponents who were sometimes more critical or analysed more deeply the value of the charge.

The levels declared by each participant are shown in table 3, where people are grouped according to their overall position towards the hypothesized policy. Some specific comments on charge level for each of the participants (although not exhaustive) are reported, putting a coloured flag next to the comments recurring in different groups; finally, the commonalities within a group are given in the last column to facilitate the characterization of each group.

Observing the values in Table 3, the Fierce opponents towards the charge assigned a very low deterrent value, equal to 0.5 €, which goes up a bit for the strong opponents to 3 € with a case of 5 €. Few exceptional cases stated a quite high “symbolic” threshold declaring to be willing to pay “an unlimited toll” or “anything”. The reason is that they really need to travel by car and they could not get to work without it, so they would bear such a constraint and pay, unless it is worthier to change job.

The “non-partisans” present a wider range of values, going from 1 to 8 € with an exception for Cyril who pointed out as deterrent threshold the fine for parking in a no-parking zone, corresponding to 17 €. The groups more favourable to a charge present higher and more homogeneous values, from 3 to 7.5 €, stressing more the importance to define high values to deter the use of car but offering, in the meantime, real alternatives to the users (public transport ¬ PT and park and ride ¬ P+R).

Table 3 - Groups, acceptable and deterrent charge levels, comments and commonalities

	Name	Acceptable charge	Deterrent charge	Comments	Commonalities
Supporters	Alexandra	2	3	Charge for polluting vehicles	They agree on introducing a charge. Awareness of the effects of pollution on health.
	Camille	1,5	7,5		
	Frédéric H	1,5	7,5		
Cannily well-disposed	Ariane	2,5	5	Need of an alternative to car (PT and P+R) **before** introducing the charge	The charge would be effective. They agree on a charge IF concrete alternatives (PT and P+R) to car are introduced as well as high charges are provided.
	Gabriel	1,5	7,5	High charge to deter car use There should be a special rate for car-pooling	
	Marie-Chantal	1,5	7,5	High charge to deter car use	
	Michael G	2	6		
	Thierry	3,5	7		
	François			Need of an alternative to car (PT and P+R) **before** introducing the charge	
Non-partisans	Colette	1,5	2,5	A threshold similar to the ring road charge is acceptable	They argue a lot, elaborating on pros and cons, without taking a defined position. Their positions are indeed both close to some "Cannily well-disposed" and "Strong opponents".
	Cyril	2	17	The psychological threshold would be the rate of a fine in a no-parking zone (e.g. 17 €) The charge should vary according to the car pollutant emissions	
	Déborah	2	4	The deterrent rate would vary according to the income level The employer might pay part of the charge	
	Franck	1,5	7,5	High charge to deter car use (BUT be careful to avoid social injustice) It would be shocking to have both the charge and the parking pricing If the charge is introduced, PT should cost less than 0,5 €	
	Françoise	2	4,5	A threshold similar to the ring road charge is acceptable for an exceptional use	
	Gaelle	1,5	8	She would pay "anything" in case of extreme need	
	Guillaume	0	1	He rarely uses his car so he would not pay a high rate	
	Julien	2	3		
	Marylène	2	3	The charge should be higher than the price for a return ticket by bus	
	Mélissa	1,5	5	High charge to deter car use	
	Pierre	0	1	The charge should vary according to the car pollutant emissions	
	Sophie P	2	8	High charge to deter car use (BUT pay attention to avoid social injustice)	
	Sophie R	4	6	There should be a special rate for car-pooling The residents could have 2-3 free accesses per day, as in Montpellier	
	Virginie	2	8	High charge to deter car use	
	Julia			Indexing the rates on income and on the model of the car	
	Lahssen			The charge should vary according to the engine size	
	Marie-Françoise			The charge should vary according to the car pollutant emissions	
	Nicole			Need of an alternative to car (PT and P+R) **before** introducing the charge	
Reluctants	Bernard	0	5	Agree on varying the charge according to the engine size	Claim for a coherent policy: providing an improvement of PT before introducing a charge. The revenues should be invested in further improving the PT service.
	Cécile	3	4,5	Need of an alternative to car (PT and P+R) **before** introducing the charge	
	Christian	0	4,5		
	Francine	3	4,5	Need of an alternative to car (PT and P+R) **before** introducing the charge	
	Jacques	1,5	8	He would pay "anything" in case of extreme need	
	Richard	0,5	1		
	Yves	0	5	High charge to deter car use	
	Pierre-Yves				
	Svein			The charge should vary according to the engine size	
Strong Opponents	Ana	2	3	The charge should vary according to the car pollutant emissions (even though she has an old car) The charge should vary according to the income, if feasible	Strongly opposed. Socially unfair. Just useful to get money. Not effective to reduce congestion. Need of an alternative to car (PT and P+R).
	Aurélien	2	3	Need of an alternative to car (PT and P+R) Indexing the rates on income and on the model of the car	
	Aysel	0	15	High charge to deter car use	
	Aysun	0	5	No rate would be acceptable, but she places the deterrent level at 5 euros	
	Christelle	1	1,5	The revenues should be invested to improve cycle paths. The charge should vary according to the engine size	
	Erna	1	1,5	Need of an alternative to car (PT and P+R)	
	Gilles	0	0,5	Need of an alternative to car (PT and P+R)	
	Michel R	0	0,5	Need of an alternative to car (PT and P+R) Parking fee is already a charge (people would not change their travel habits)	
	Michel W	0	0,5	Parking fee is already a charge (people would not change their travel habits) It would be shocking to have both the charge and the parking pricing	
	Mickael H	5	15	He would pay "anything" because the toll would not make him change his mode of transport	
	Mickael G	2	3	Indexing the rates on the age of the car and [the level of] pollution	
	Nadira	1	1,5	Strong opposition	
	Rémy	5	15	He would pay "anything" unless it would be more convenient to change his job. His threshold would be 100 to 200 euros/month	
	Anthony			increase of congestion in the surrounding area	
	Frédéric P			The charge should vary according to the engine size	
	Myrose				
Fierce Opponents	Eric	0	0,5	Tax big oil companies instead of motorists	Violent reaction, strongly opposed to the principle, just one more tax. Complaints about the high installation costs: invest in PT and PR would be more effective. Always the same people who pay.
	Estelle	0	0,5		
	Loic	0	0,5		
	Malika	0	0,5		
	Régis	0	0,5	Parking fee is already a charge (people would not change their travel habits)	

The acceptable level of the charge is, instead, more homogeneous throughout the groups, going from 1.5 to 2 € with an exception till to 3.5 € for the "Cannily well-disposed" and several "0" € for the "Reluctants" and the Opponents.

A reason supporting the acceptance of a hypothetical toll is that the car represents a symbol of freedom, as Cyril highlighted, and that people would probably accept to pay in order to preserve their freedom to move.

In synthesis, it is interesting to observe that 15 out of 48 people have not considered acceptable any charge. Excluding the above 15 people, the distribution of the charges ranges from 0.5 to 5 €. The median of the value is 1.5 €, where the most cited charges are 1.5 (9 persons) and 2 € (12 persons). The deterrent tariff ranges from 0.5 to 17 € with the median at 5 € and a flat distribution (Figure 2).

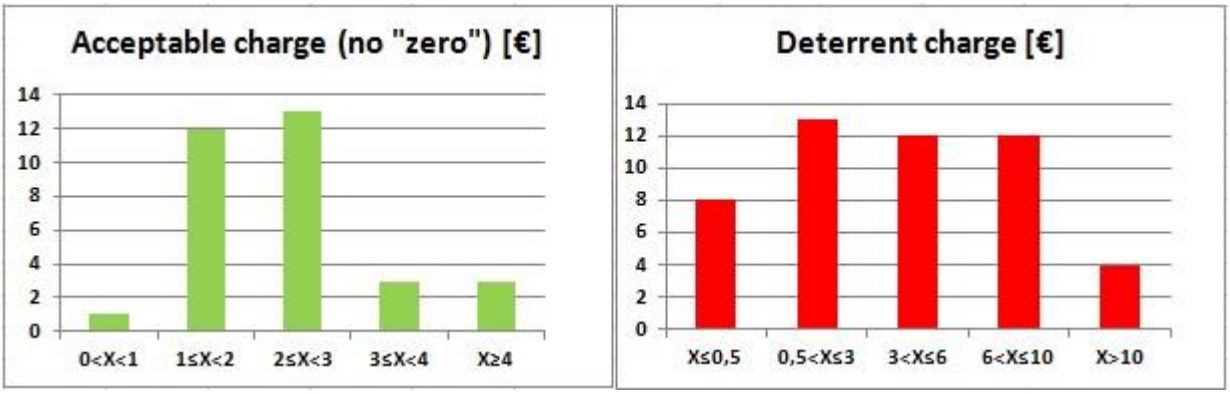

Figure 2 – Level of acceptable and deterrent charges

The people not accepting any charge belong to all groups except the two most positive ones. Table 4 reports the average and median value of the acceptable and deterrent charges according to the six groups of opinions towards the road pricing. It can be noticed that the participants who expressed a violently negative attitude towards road pricing show the lowest values and that they do not consider any rate acceptable. People favourable or rather positive towards such a measure show the highest values of the charges and identify quite high daily values for ensuring a deterrent effect for car users. An interesting and numerous group is that of people who have extensively debated during the discussion, highlighting the pros and cons of the measure and showing in some cases a good attitude to accept the road pricing if introduced. This is clearly emerged from their discussion, showing well informed people who are able to consider the multifaceted aspects of this transport policy, being also able to appreciate the positive effects while being aware that it should be properly used to be accepted.

Table 4 – Average and median values expressed by the groups for acceptable and deterrent charges

Acceptable		Deterrent	
Average	Median	Average	Median
0,00	0,00	0,50	0,50
1,14	0,50	4,64	3,00
1,46	1,00	5,00	4,50
1,67	1,50	5,61	4,75
1,71	2,00	6,00	7,00
2,20	2,00	6,60	7,50

Legend
Supporters
Cannily well-disposed
Non-partisans
Reluctants
Strong opponents
Fierce Opponents

Some ideas spontaneously emerged during the discussions:

- the employers would probably pay half of the charge, as for the parking;
- the rate could be varied according to the number of car passengers, although this would entail the management of different charge levels;
- the pros and cons of a very low rate, accessible for the great majority of people, and of a rate high enough to effectively discourage car use;

- the application of a tax during the days with pollution peaks, to be paid several instalments spread throughout the year. This would allow the tax to be better supported, but also perceived as a lower burden and then less discouraging of car use.

The “Cannily well-disposed”, the Non-partisans” and the “Reluctants” called for a coherent urban transport policy based on two pillars: increasing park and ride facilities and improving public transport services.

Considering the first pillar, many participants stressed that the cost of parking already plays a significant role in limiting their access to the city centre by car: they prefer using public transport or walking. Thus, a well-planned parking policy, supported by adequate park and ride facilities, would allow an easier management of congestion and make car access less attractive, avoiding the introduction of road pricing. Nevertheless, some people remarked that the public administration could not support building free parking lots at the entrance of the city since this would not bring any financial advantage.

The improvement in public transport supply, constituting the second pillar, was strongly recommended by all participants, since it would offer a real alternative to car use. Some participants highlighted that current (year 2011)public transport fares are too high (single ticket: 1.60 €; pass: 52€/month), especially for occasional riders; in addition, many of them wanted free public transport, even more strongly if a pricing scheme were introduced. Virginie suggested having free public transport at least in periods of pollution peaks, so as to effectively induce people to leave the car at home. By the way, someone stressed that "free public transport" would not be actually free, since its cost would be supported somehow (e.g. by income taxes). They highlighted the main role of the “versement transport”, a tax paid by the enterprises, both public and private, to fund the construction and maintenance of transport systems.

Modulating the toll according to the cars' pollutant emissions (the less polluting cars pay a reduced rate) was proposed by several groups (except the “Fierce opponents”) (Table 2) even though the way of doing it divided the participants. Many people opposed, sometimes very strongly, considering it doubly unfair, since it would favour rich people and penalize those who have an old car and cannot afford a new one, who should then give up travelling by car or bear an excessive rate. Usually having newer and less pollutant cars (Mélissa), wealthier people would pay less and also "take advantage from greater traffic fluidity" (Franck), or "could also buy a hybrid car to pay a reduced rate" (Régis), or simply bear the cost of a higher rate without any problem. Furthermore, some participants thought that such a proposal would not be the best method to make people aware and responsible against pollution. On the other hand, someone agreed with paying according to car emissions even if owning an old car. Cyril was particularly enthusiastic about Ecopass, the congestion charge in force in the centre of Milano, where the rate varies according to the car pollutant emissions. Pierre as well would appreciate an Ecopass Lyon, since such a policy "would allow fleet renewal, economic upturn, pension investments and increase of jobs".

Rémy proposed to "tax the purchase of polluting cars", while Michael G. put forward defining the toll by "making the ratio between the year of the car and also [the level of] pollution". Yves suggested considering both the power and the pollutant emissions level.

The definition of “polluting car” was extensively debated since both old small cars and big, new gas-guzzlers are polluting; thus also car size and vehicle capacity should be considered in the definition of the proper rate. In fact, those who buy big and high-powered cars are usually richer and could then afford to pay a higher charge. Interestingly, Gaëlle highlighted that the solution to modulate the toll based on the car power does not necessarily penalize all "rich people" since "there are people who will buy a small car to use it just in the city to avoid paying a high charge".

The reactions to a change of rate level according to the income level or the car characteristics varied a lot. Those opposing the idea argued that the rate should be the same for everyone: "because everyone should have the same right to move" (Malika), otherwise "also the baguette should have different prices according to the income level", as well as all other products. Michael W. highlighted that "since the tax does not have the role of redistributing money, it would not make sense to impose different charge levels". Moreover, a few people felt scared about data confidentiality and traceability. On the other hand, those in favour of a variable charge think it would be "fairer" (Sophie P) and "more logical" (Régis), as it gives the opportunity to everyone "to contribute according to his/her possibility, as for other taxes" (Marie-Chantal).

Despite the interesting proposals of modulating the rate for a fairer toll, several participants highlighted that the toll management system should then be more elaborated, requiring more resources and would thus jeopardize its economical convenience.

Another important issue concerns the residents, who cannot escape the charging zone. Some participants argued it would be normal, even “mandatory” (Julien), for residents to have a reduction. Deborah envisaged a 90% reduction, as in London, or even a free pass "since people living in the city centre already pay the yearly parking subscription" (Françoise). Conversely, someone pointed out that a 90% reduction would be excessive, and the objective of deterring car use would be missed. Furthermore, in such a scenario, "the residents would be the only ones taking advantage of the charge effects, since their environment would be calmer and quieter, at other people's expense" (Régis). Sophie R. proposed that residents could have 2-3 free accesses per day, as in Montpellier.

When discussing the size of the charging zone, several people highlighted that the hypothetical area (the municipality of Lyon, excluding the 5th and the 9th arrondissement, and the outer city of Villeurbanne, see Figure 2) would definitely be too large, huge, and unreasonable. An argument supporting this opinion is that such a size "will increase the traffic jams in surrounding areas which are already rather congested".

Moreover, the inclusion in the charging zone of some quiet areas (the 8th arrondissement, part of the 3rd, and, particularly, Villeurbanne) really seemed just a way to raise money. Others pointed out that the Croix Rousse (4th) should not be included, since its hilly topography makes it not convenient for soft modes.

On the other hand, someone remarked that it would be fairer to include even the 5th and 9th, or, at least, the 9th where there are many professional activities.

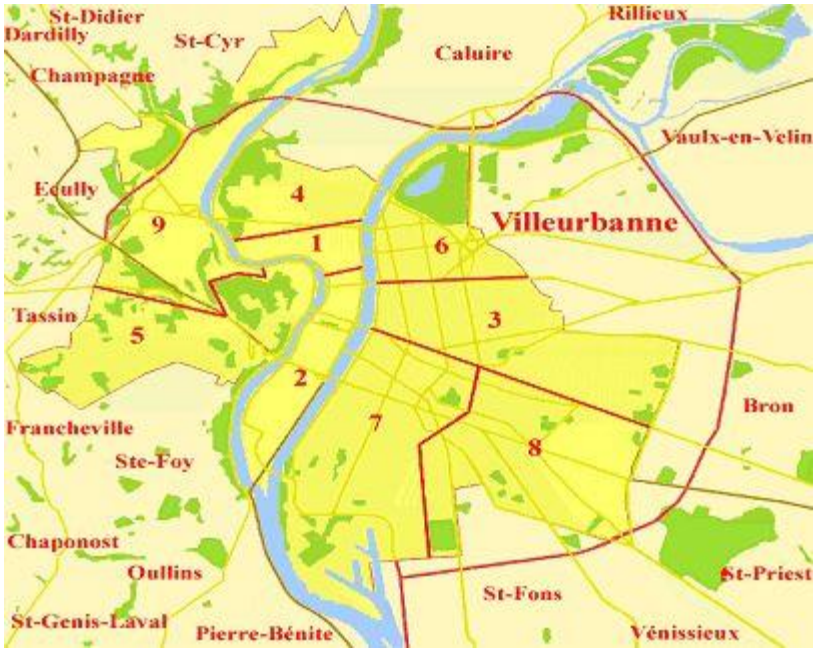

Figure 3 – Lyon neighbourhoods (from 1st to 9th) and Villeurbanne, in the North-East

Table 5 presents a synthesis of the opinions, classified by groups. It can be observed how there is a quite common view about limiting the wideness of the pricing area, excluding the calm districts. The “Non-partisans” are again those debating more the issue, stating that it is not given for granted that the charge will be really useful to deter the use of the car, but it would be interesting to test the charge in the Presqu'Ile in order to figure out how it could work for the whole city.

Table 5 – Opinions on the size of the charged area

Topic	Statements / Positions	Supporters	Connily well-disposed	Non partisans	Reluctants	Strong opponents	Fierce Opponents
Size of the charged area	Whole area too big, exclude the calmer districts						
	Fairer all over Lyon						
	Problem if charge applies to the 4th arrondissement because it is hilly						
If the charge was just on the Presqu'Ile ...	Agree						
	Presqu'Ile should be pedestrian						
	Charge in Presqu'Ile: death of the city centre						
	Interesting and feasible						
	Pay attention to the river banks						
	Do not focus just on the city centre						
	Would change shopping habits						
	Problem for families with babies and for elderly people						
	People shopping in expensive boutiques would not care						
	Useful to test the effects of a charge in Lyon						
	Charge in PI: smaller area thus lower charge						

Legend

The colour intensity shows the approximate number of groups' members who expressed that opinion

low	medium-low	medium-high	high

The idea of limiting the charging zone to the Presqu'Ile (2nd) seemed to be much more reasonable, also supported by the particular geography (narrow area between the two rivers).

This solution can be "rather acceptable from a social point of view, as the ones who do not want to pay can do everything on foot or by public transport, which is highly concentrated here".

Nevertheless, attention must be paid to the management of traffic along the banks of the rivers (Rhône and Saône), to prevent them from becoming parking areas; this was their status before the recent requalification. Moreover, the administration should be careful towards the whole city and not just to the centre, to avoid an increase of traffic in the outer area just to preserve the most touristic sites. Finally, Michael G. highlighted that the toll in the Presqu'Ile could trigger a vicious circle, "leading the city centre car parks to bankruptcy".

Those more favourable to the charge think that closing the Presqu'Ile would be valuable for the city because this scheme would leave more space to pedestrians, reducing car congestion and noise, and make it more attractive for tourists. The opponents argue that it would be fairer to extend the charge over all Lyon and the Fierce opponents think that closing the centre would change the shopping habits and it would be unfair for families with babies and elderly people.

3.2 Opinions about the pricing and hypothetical behaviours

Table 6 reports a summary of the opinions, classified per group. It can be noticed how the different groups are focused on different aspects even though there are some topics showing some agreement amongst the participants. The traffic pollution is effectively perceived both by those favourable to the pricing and by the Reluctants, while health effects of the traffic pollution are more felt by the most favourable and by the "non-partisans".

The urban sprawl potentially caused by the charge worries the "Cannily well-disposed", the "Non-partisans" and the "Reluctants". Such sprawl is often evoked as undesirable, since it would both entail environmental concerns and determine a strong economical and cultural recession of the city and of its role within the agglomeration. Big malls in the outskirts already become more and more attractive, particularly for motorists, since "using the car in the city centre sucks" (Régis). If a congestion charge were to become reality, the commerce in the Presqu'Ile would be further impaired. Colette imagined strong protests from traders, while Jacques and François would see the death of the city and of the Presqu'Ile. Several participants recognized they would change their shopping habits, "strongly penalizing the businesses in the city centre" (Eric).

The "Non-partisans" are those who think more about the potential effects of the charge, hypothesising

users' behaviour and comparing with the London pricing. Instead, who is favourable depicts potential scenarios affecting the city centre and the parking along the rivers and propose how to formulate the charge. The participants against the pricing policy do not believe in its effectiveness and emphasise only negative aspects and effects, saying that in any case, due to the urban sprawl, they can accede to any service by car, outside the pricing area.

Table 6 - Opinions about the charge

Topic	Statements / Positions	Supporters	Cannily well-disposed	Non partisans	Reluctants	Strong opponents	Fierce Opponents
General beliefs	Car is freedom						
	Even if PT were free, we would pay it anyway through the taxes						
	PT service is expensive						
	The employer could not pay						
	Appreciate urban sprawl, everything accessible by car						
	Charge is socially unfair						
Opinion on congestion	Congestion particularly when GETTING INTO the city, not IN the city						
	Awareness of the impacts of congestion						
	Risk of overcongestion in the surrounding areas						
	Necessary to fight congestion						
	Congestion also in the outer districts						
Opinion on environmental pollution	Effectively perceived						
	Awareness of the impacts: health problems						
	Necessary to fight pollution						
	Doesn't feel guilty for polluting						
If the charge was just on the Presqu'Ile ...	Since it would be on a smaller area the rate should be higher						
	Banckruptcy of car parks						
	Charge would be counterproductive for the city centre						
	If PI pedestrian or charged it would be incoherent because of many parking buildings						
London pricing	London congestion charge is NOT effective						
	London congestion charge is effective						
Effect of the charge	As London would enphasize ghettos						
	Encourage car pooling						
Worries	Urban sprawl						
	Worries for traders in the city centre						
Proposal to make the charge more acceptable	More Park&Ride						
	A feasible alternative to car is mandatory						
	PT service should be improved (cheaper and fairer than introducing a charge)						
	PT should be free						
	Improve PT, THEN introduce a charge						
Propasal for using the revenues of the charge	Should be invested to improve PT						
	The use of the revenues should be declared.						
	Should have a redistributive role						
	Should make PT free						
	Should be invested for cycle paths						
Alternative proposals to charge	Other measures than the charge would be more effective						
	High installation costs for the charge, better invest in PT and P+R						
	Better to invest public money by providing incentives to buy new (green) cars						
General proposal	Charge during highly polluted days (it would be educative)						
	The employer might pay half the charge / reimbourse it						
	Modulate the rate according to the number of car passengers						

Legend

The colour intensity shows the approximate number of groups' members who expressed that opinion

low	medium-low	medium-high	high

Other people would not care about the toll, since they rarely come to the city centre which they do not like, preferring the countryside and the outskirts, where every place can be reached by car. The importance of the car is evoked both by “Non-partisans” and “Reluctants” who emphasize the freedom it allows.

The effectiveness of the toll in reducing congestion and pollution divided the participants. The participants favourable to the pricing are well aware about the urban congestion and its impact and believe it is important to take some remedies, while the “Non-partisans” observe that the congestion is everywhere, also in the outer district. Instead the opponents state that the problem is to get into the city and not inside the city and that the pricing could generate an over-congestion in the areas outside the charging zone, because “crazy traffic jams” would mainly move to the border of the tolled zone. Many others recalled that people continue to travel by car despite the fuel price increases; also people continue to smoke even though the price of cigarettes increases, since the role of habit is very strong. Some others thought that the toll would be effective in reducing car trips in the city because "it will induce people to think twice before taking their car" (Gabriel). Ariane believes that the toll could act as deterrent by making explicit the cost of the car, which, although being high, is not really perceived by motorists.

The daily period of the scheme, 07.00-19.00, could penalize all workers during typical «office hours», while paying a charge could be more reasonable for leisure activities. In order to avoid a discrimination for workers, Aurélien proposed a 24 hours toll, in force also on Saturday, when people usually have more time and can take public transport. Conversely someone tried to suggest « ad hoc mitigations » as a toll only during short time periods (e.g. 10.00-16.00) in order to move freely during commuting hours.

All the participants, except the “supporters”, proposed interventions to make the pricing more acceptable, stressing the need to increase the park and ride facilities as well as the provision of feasible alternatives to the car. Notably an improvement of PT, to be made before introducing the pricing, is considered of the utmost importance and, for the opponents, it should be free to soften the dramatic effect of the charge.

A transparent knowledge about how the revenues are used could heavily change the citizens’ opinion. A redistributive role for an effective return to the community would be highly appreciated, such as investments to improve the Vélo’v service and cycle paths, or the public transport supply. Mentioning the example of some other municipalities, several participants even expect that the public transport service should become free if a toll were actually introduced, since the revenues should finance it.

The opponents proposed alternative measures to the pricing, considering that it implies high installation costs and it is better invest in PT and park and ride, while a certain number of “Non-partisans” think that it is better to invest public money by providing incentives to buy new (green) cars.

Hypothetical behaviours after the scheme implementation emerged. In table 7 a synthesis of the people behaviours is depicted according to the different groups, showing again how the attitude towards such a policy strongly characterises the responses. Who is against think that people would do anything to avoid paying, relocating or avoiding to go the charging zone; however, they will never renounce to using the car and, if obliged to go to the pricing zone, they will pay. Quite transversal to several groups is the awareness that people will become used to the new tax and that, however, would try to get around to avoid to pay, when possible.

Table 7 – Hypothetical behaviours in case of a charge

Topic	Statements / Positions	Supporters	Cannily well-disposed	Non partisans	Reluctants	Strong opponents	Fierce Opponents
Hypothetical behaviour in case of a charge	Get around						
	People would get used to the new tax						
	Cannot give up travelling by car						
	Would stop voluntary activities in the city centre						
	Would move						
	Would stand a higher transport cost						
	Would change mode of transport						
	Would leave the car out of the tolled area						
	Would close his shop in the city centre						

These prefigured behaviours turn out to be in line with the behavioural adjustments analysed by Karlström and Franklin (2009) during the trial test of the Stockholm congestion charge. Karlström and Franklin particularly focused on mode choice and on departure time choice of morning commutes.

4. Discussion and conclusions

During the discussion participants to the focus groups "changed their mind" about congestion problems in Lyon. At the very beginning, many of them complained about traffic jams and consequent delays, while as soon as the hypothetical introduction of a congestion charge in Lyon was mentioned, several participants did an about-face, stating that the city congestion level would not justify the introduction of a toll. As regards environmental pollution, some people recognized Lyon to be a highly polluted city, but not as polluted as China or other Countries which do not apply strict regulations on pollution. Furthermore, many participants envisaged that the purposes of tackling congestion and air pollution are "just an excuse to squeeze extra money from the citizens", since there would be other effective measures to deal with such problems, especially air pollution. Some participants actually took a "defensive attitude", to deny any rationale for the introduction of the charge. Nevertheless, a few of them enjoyed the idea of an "Ecopass Lyon" encouraging the renewal of the vehicle fleet, although at the expenses of private citizens, as stressed by many others. To this extent, public subsidies are required as a concrete help to those who want to buy a "greener" car, especially the hybrids.

Also concerning the charge level, participants' views evolved during the discussion, demonstrating that the interaction between the participants is a concrete opportunity to compare their own opinions and to possibly change mind.

Several participants, who firstly placed their threshold at a very low level (e.g. 0.5€ or 1€), soon realized along the discussions that a 2 € charge would not be a real deterrent. So they recognized that "although at the beginning people would strongly complain, after a while we would all get used to it" and "as long as we can pay the toll we would not change our habits" (Rémy), in order to continue taking advantage of car comfort. Virginie as well points out that, after a first opposition, all new fees become habits for all those who can afford to pay them. The key role of habit is very clear to some of them, particularly to the most careful observers. As a concrete example, Yves mentioned the "TEO" (ring-road) that is now so much used that is always congested.

Trip purpose is a very discriminating aspect: the willingness to pay is higher for trips to work and could be null for leisure trips to the city. Nevertheless, in order to facilitate those who need to use the car daily and those who use it just exceptionally, Mélissa proposes a daily fee of 7-9 € (a significant disincentive for those who come occasionally) and a monthly fee of 30 € for those who must use the car daily for work-related reasons.

As expected, most car users were strong opponents, and few of them were also rather impolite while aggressively replying that they would not pay anything. Furthermore, car users identified direct and precise figures, while people who rarely use the car had more difficulties in figuring out a possible rate. Some identified a very high rate, which would be a real deterrent to car use. Others identified a very low rate, since not being interested in travelling by car in the city, they would not pay for it.

Road pricing acceptance usually increases consistently after its implementation since habit plays a significant role. Larsen (1995), in his overview of toll cordons in Norway, testifies that the share of opponents to the toll before its introduction in Bergen was far greater (54%) than the share recorded one year later (36.5%), while the share of people supporting the toll increased from 13% to 50%. This recalls the Graduality Strategy, elaborated by Noam Chomsky (Herman and Chomsky, 2002), stating that to make a measure acceptable, it has to be applied gradually, little by little, for years. This is the way in which new socio-economical conditions (neoliberism) were imposed in the eighties and nineties: little welfare,

privatizations, precariousness, flexibility, unemployment, low wages. So many changes that would have caused a revolution if applied all at once.

Despite overall public acceptability of road pricing is usually very low, it increases when information and explanations on its role and importance to tackle traffic congestion and environmental problems are given (Musselwhite and Lyons, 2009). It is crucial to clarify the reason why a road pricing should be introduced (Bielefeldt, 2004; Bird and Vigor, 2006; Vägverket, 2002), in order to prevent that the toll is perceived like an unmotivated imposition, or just as a mean to raise money from the citizens.

A key factor contributing to road pricing acceptability is of course its inclusion in a comprehensive, well structured and coherent transport policy (Green and Stone, 2004), offering concrete alternatives to car use and including adequate measures for all urban transport modes, as highly requested by all participants involved in this study. They also drove the attention on the high installation cost of a toll system - confirmed by literature too (Jansson, 2008) - claiming that "the game is not worth the candle", while important investments to improve the whole urban transport supply would be much more appreciated. Those would include an increase of park and ride areas (which should be accessible 24/24) and the improvement of the public transport service (frequency, comfort, safety, etc.). Restrictions should be mandatorily coupled with new opportunities (e.g. bonus to buy a "greener" car), otherwise the social injustice would be too high and the gap between rich and poor people would further increase. Adequate traffic and parking regulations together with subsidies to public transport are effectively considered one of the "second-best remedies" to tackle urban traffic congestion and environmental pollution (Jansson, 2008).

The principle of "freedom" is widely evoked, related both to the "freedom of movement" - which should not be threatened by "a fashionable tax during recession periods" - and to the risk of confidential data traceability. This last point is especially raised when discussing about the possibility of varying the charge level according to the household income, but also when discussing about the risk of being "tracked" by the cameras controlling car access to the charging zone.

This research has largely confirmed what found in previous studies and, as an additional contribution, it has allowed clustering the citizens according to their reactions. We were able to characterize 6 different groups which we labelled in relation to their reaction to road pricing. The Supporters are rather young, earn a low salary, and only use environmentally friendly modes. This, probably, explains their more favourable attitude towards the pricing, because they would not be really touched by such a policy. The Cannily well-disposed, the oldest group, have a positive attitude towards modes that are alternative to the car and the habit to use them facilitates the acceptance of the policy envisaged. The Non-partisans are very open-minded and able to identify the pros and cons of the hypothetical road pricing. The participants who disagree were divided in three groups, according to the strength of their reaction. The Reluctants showed a moderately negative position, the Strong opponents were firmly convinced of the uselessness of the proposed policy, and the Fierce opponents were even violent and impolite, almost refusing to even discuss the hypothesized policy.

It can be noticed that the groups have different attitudes and opinions about the effect of road charging, but there are some common points on which the policy makers should concentrate because they could facilitate the acceptance of the road pricing. Citizens expect that a reduction of their freedom to move by car should be compensated with a strong and clear policy to improve the alternative modes and want to know clearly how the revenues will be spent. A clear communication policy should be defined and this should be tailored according to the different groups defined in this paper.

Beside the opinions and ideas presented throughout the discussions, the debates suggested some interesting considerations from the methodological point of view. The discussions' dynamics confirmed how the Focus Group investigation method invites people both to think individually and to react to other participants' remarks, while the traditional quantitative investigation method (questionnaire) does not offer any opportunity of discussion among respondents. Moreover, participants were usually rather talkative and proactive: only five out of the 61 (8.2%) did not sufficiently intervene on the different topics. Nevertheless, when questionnaire respondents are "forced" to reply to all questions (very easy to do with an online questionnaire), there is no certainty about their care, honesty and awareness (Rappazzo, 2010).

Due to the Social Desirability Bias (Nederhof, 1985; Kreuter et al., 2008; King and Bruner, 2000; Fisher and Katz, 2000), people may give answers that do not correspond to their real opinions but which are more convenient and socially appreciated. Conversely, it would be difficult for Focus Group participants to "play a role" throughout the whole discussion, so they usually have spontaneous and genuine reactions, as confirmed during the current study by strong opponents to road pricing. Qualitative methods allow us monitoring citizens' emotions, reactions and changes of opinions when issues are analyzed from multiple points of view. Furthermore, such methods allows to get quantitative results, as showed in this paper, highlighting the importance of using alternative methods when pricing issues are investigated.

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