

Public Acceptability of Road User Charging: The Case of Edinburgh and the 2005 Referendum

MARTIN GAUNT*, TOM RYE** and SIMON ALLEN*

*Centre for the Study of Environmental Change and Sustainability, University of Edinburgh, Edinburgh, UK; **School of the Built Environment/Transport Research Institute, Napier University, Edinburgh, UK

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ABSTRACT *In February 2005 residents of Edinburgh in Scotland, UK, were given the opportunity to vote in a referendum on the introduction of a road user charging scheme, which had been in development for almost a decade. The public voted against the scheme by a ratio of 3:1 and it was consequently abandoned. The objective of this research was to determine the principal factors responsible for the public's overwhelming opposition to the scheme. A postal self-completion questionnaire was distributed to 1300 randomly selected households along a transect from central to south Edinburgh. The 368 completed questionnaires returned were analysed to assess the influence of several factors on the way respondents voted in the referendum. Car use was shown to be the principal determinant of voting behaviour, with car owners strongly opposing the scheme and non-car owners only weakly supporting it. The public's limited understanding of the scheme increased the strength of the opposing vote. Further, the public were largely unconvinced that the scheme would have achieved its dual objectives of reducing congestion and improving public transport. The findings suggest that more attention should have been paid to designing a simpler, more easily communicated scheme and convincing residents, particularly public transport users, of its benefits.*

Introduction

Road user charging (RUC) has recently emerged as a practical solution to the growing problem of congestion. Yet, RUC is not a new concept. The theoretical advantage of RUC, namely improved economic efficiency via reduced traffic congestion, has been advocated by economists for decades (e.g. Pigou, 1920; Vickrey, 1955). Subsequently, transport planners have recognized the suitability of RUC, not only to improve efficiency, but also as a means to generate revenue and restrain the environmental degradation synonymous with congestion (e.g. Ministry of Transport, 1964; May, 1975). Yet with the notable exceptions of Singapore, Oslo, Bergen, Trondheim (defunct since the end of 2005), Stavanger (all in

Correspondence Address: Tom Rye, School of the Built Environment/Transport Research Institute, Napier University, 10 Colinton Road, Edinburgh EH10 5DT, UK. Email: t.rye@napier.ac.uk

Norway), London and, most recently, Singapore, comprehensive RUC systems implemented at the urban level (otherwise known as congestion charging schemes) have failed to proceed beyond the planning stage. Examples of schemes that never materialized proliferate: London (some one-quarter of a century before the successful introduction of an alternative scheme; May, 1975); Kuala Lumpur, Malaysia (Jones, 1998); Hong Kong, China (Hau, 1990); the Netherlands (Stoelhorst and Zandbergen, 1990; Emmerink *et al.*, 1995); and several proposals in the USA (Jones, 1998). In short, RUC is frequently discussed and debated, but seldom implemented. While public opposition has repeatedly inhibited the introduction of major RUC schemes, only in the case of the City of Edinburgh in Scotland, UK, were the public given the opportunity to vote exclusively on the issue. The fate of Edinburgh's congestion charging scheme, the best part of a decade in the making, was decided by public referendum in February 2005.

The objective of the research reported in the present paper was to assess the importance of a range of factors that might have influenced the residents of Edinburgh to reject congestion charging by a large majority in the referendum. The factors examined were: residents' habitual choice and frequency of use of transport mode; their understanding of the details of the scheme; and their attitudes towards congestion and the City of Edinburgh Council.

It is recognized that significant institutional barriers to RUC remain in many countries (Glazer *et al.*, 2001; Schade and Schlag, 2003). Nevertheless, most commentators now acknowledge that the greatest impediment to implementation is public (and linked to this, political) acceptability (e.g. Jones, 1998, 2003; Schade and Schlag, 2003; Jaensirisak *et al.*, 2005). As Gray and Begg (2001, p. 5) state:

the likelihood of large-scale, city wide charging being delivered successfully depends as much on local authorities winning "hearts and minds" (of key stakeholders, the media and, ultimately, the public), as it does on producing an integrated transport strategy or overcoming any technical difficulties.

In a democratic society, "societal, political and technological innovations must be introduced via the democratic process and must prevail against competing innovations" (Schade and Schlag, 2003, p. 2). As Edinburgh can now testify, RUC, like other innovations, can rarely be imposed against the public will.

The acceptability of RUC is typically quite low. This is not a phenomenon unique to the UK. Numerous studies (e.g. Bartley, 1995; Luk and Chung, 1997; Schade and Schlag, 2000; Link and Polak, 2001) have demonstrated considerable public resistance to RUC elsewhere in Europe and beyond. A report by PRIMA (2000) into the acceptability of urban road pricing in eight European cities found an average of less than 30% support.

Nevertheless, as a review by Jaensirisak *et al.* (2005) indicates, public opposition to charging is not inevitable. The acceptability of RUC is typically dependent upon a whole host of factors, which may be classified as demographic, attitudinal, political, and the details of the scheme. As regards demographic factors, the most important determinant appears to be the car use of the population in question. Numerous studies (e.g. PRIMA, 2000; Department for Transport (DfT), 2004; Jaensirisak *et al.*, 2005) have consistently highlighted significantly more support for RUC among non-drivers. Attitudinal factors include the existence of opposition to the notion of charging on the grounds that mobility is a basic right (PATS

Consortium, 2001), and varying perceptions of the problem and the proposed solutions (Jones, 1998; Viegas *et al.*, 2000; Schade, 2003). The support of key politicians as figureheads around which public support may coalesce is critical to any successful RUC scheme (Schade and Schlag, 2003; PROGRESS, 2004). An RUC proposal may be congestion-based, area-based, cordon-based or distance-based. However, Schlag and Schade (2000) found public support for RUC was low, irrespective of the type of scheme. Instead, the controlling factor appeared to be whether the charging revenues were hypothecated or not. Several other studies (e.g. Harrington *et al.*, 2001; Commission for Integrated Transport (CfIT), 2002; PROGRESS, 2004; Jaensirisak *et al.*, 2005) have highlighted an increase in the acceptability of charging when the revenues are hypothecated towards specific objectives in specific regions. As such, revenue hypothecation, typically towards local transport improvements, has become a central tenet of urban road pricing proposals. As could perhaps be expected, public opposition to charging is reduced in accordance with a lower level of charge (Harrington *et al.*, 2001; Cain *et al.*, 2002; Jaensirisak *et al.*, 2005). Jones (1998) highlights the importance of the issue of equity, which he defines as being both social and geographic in its dimensions. As the PATS Consortium (2001) outlined, any scheme likely to worsen the situation for disadvantaged groups or which does not target an improvement in the status quo is very likely to be rejected. Finally, undesirable impacts, or perceptions thereof, such as the adverse effect on city centre businesses (EUROPrice, 2002; Bell *et al.*, 2004) or diversion of traffic to previously uncongested regions (Jones, 1998) can weaken support for a charging proposal. It should be noted that many of the surveys referred to above are based on relatively small sample sizes and/or investigate attitudes to congestion charging within the context of wider surveys, meaning that their results should be treated with caution. The Edinburgh referendum that is the topic of this paper was an interesting exception in that the entire population of a city was eligible to take part, and a significant number did so.

Evolution of Edinburgh's Proposed Congestion Charging Scheme

Although the Transport (Scotland) Act 2001 introduced legislation that permitted local authorities to impose congestion charging on public roads, the City of Edinburgh Council (and its predecessor Lothian Regional Council) had already been contemplating such a scheme for several years (Begg *et al.*, 2004). A New Transport Initiative (NTI), and later an Integrated Transport Initiative (ITI), sought to refine the abstract concept of congestion charging into a more definite proposal. Between 1999 and 2003, five phases of public consultation were undertaken (by the Council and, latterly, Tie Ltd, an 'arm's-length' company formed by the Council to implement the ITI) to determine the acceptability of the proposals.

Phase IV (2002) was the most comprehensive of the consultation phases. A total of 240 000 leaflets were distributed through a variety of media to residents of south-east Scotland. Residents were asked whether they supported or opposed three different scenarios: a single cordon congestion charging scheme; a double-cordon scheme; or no charging. Just 34% of Edinburgh residents supported the proposed double-cordon scheme. Nevertheless, with slight modifications, the Council opted to proceed with this option, "due to this design's ability to influence city-wide congestion levels and to fund region-wide traffic improvements" (PROGRESS, 2004, p. 67). By Phase V (2003), support amongst Edinburgh



Figure 1. Map of Edinburgh showing the network of major roads (grey) and the location of the proposed inner and outer charging cordons. The numbered circles show the location of the charging entry points in the outer cordon. The diameter of the mapped area is approximately 16 km (adapted from City of Edinburgh Council, 2004)

residents for the proposed double-cordon scheme had increased very slightly to 36%. Following a public inquiry, the scheme was finalized and proceeded to a public referendum. The final proposal consisted of an inner and outer cordon, as shown in Figure 1.

The system was to be operational on weekdays only, with a once-a-day charge of £2 (maximum) for crossing one or both cordons in an inbound direction. The outer cordon would charge trips from 07.00 to 10.00 hours, whilst the inner cordon would charge trips between 07.00 and 18.30 hours. No residents' discount was proposed, other than for those City of Edinburgh residents living outwith the outer cordon. They would have been exempt from the outer cordon charge only. Exemptions would have been in place for people with mobility impairments, emergency vehicles, taxis, buses and motorbikes.

Modelling commissioned by the Council forecast a number of the benefits of the scheme. Compared with retaining the status quo, the congestion charging proposal would, by 2011, significantly reduce city centre and city-wide traffic

delays (Tie Ltd, 2002). Moreover, the scheme was predicted to raise £706 million (at 2005 prices, net, over 20 years), which would be hypothecated for transport improvements in Edinburgh and elsewhere in the South East Scotland Transport Partnership region (Tie Ltd, 2002).

The final stage in the pre-charging consultation process was a postal referendum, held in February 2005. Edinburgh residents (only those on the edited electoral register or those that had otherwise registered to vote) were asked to vote on the Council's 'preferred' strategy: congestion charging and increased transport investment funded by it. A total of 179 905 residents participated in the vote, which was a turnout rate of 61.8% of those registered. There were 133 678 votes against and 45 965 in favour. This represented a 74.4% public rejection of the proposal. Consequently, the proposed scheme, and indeed the entire concept of congestion charging, was abandoned and instead a 'base' investment package was adopted. A new Local Transport Strategy, without charging, is likely to be produced by the end of 2006.

Research Methodology

For practical reasons, and to ensure a sufficient spatial density in the data collected, an analysis of the entire city was rejected in favour of a specific study area from within the city boundaries. The study area consisted of a transect from Central to South Edinburgh (six adjacent city electoral districts each with a population of around 7000) specifically selected as being representative of the demography and transport provision of the city as a whole. In May 2005 a self-completion, mail-back questionnaire was sent to 1300 randomly selected residents in the study area, taken from the unedited electoral register (thus including potential voters, registered to vote in the referendum or otherwise). The questionnaire consisted of 21 questions designed to elicit information on the residents' use of transport modes, most frequent journey, voting behaviour in the referendum, understanding of and attitude towards the congestion charging scheme, and demographic details. All questions were of the multiple-choice type, with the exception of one question inviting further comments from respondents. A total of 336 useable responses were returned in the reply-paid envelopes provided (a response rate of 25.8%). Proportionally fewer responses were received from two lower-income areas, a problem countered by making house-to-house calls to elicit further responses. The final data set comprised 368 completed questionnaires.

Results and Discussion

Representativeness of the Sample

Table 1 shows that the voting behaviour of the questionnaire respondents in the sample was similar to the actual referendum result, but with slightly fewer non-voters (as might be expected in a survey of this type) and slightly more voting in favour of the proposal. The sample included an approximately equal number of males and females, consistent with census data for Edinburgh as a whole (City of Edinburgh Council, 2001). Similarly, the age breakdown of the sample was comparable with city-wide figures. However, as regards housing tenure, outright owners were over-represented, with a subsequent under-representation of those residing in social rented housing. This misrepresentation was primarily due to

Table 1. Comparison between the reported voting behaviour of respondents and the actual voting behaviour of Edinburgh residents in the referendum on congestion charging

Voting behaviour	Proportion of registered electors who voted (%)	Proportion of voters in favour of congestion charging (%)	Proportion of voters against congestion charging (%)
Reported by respondents	78.8	31.6	68.4
Edinburgh residents in referendum	61.8	25.6	74.4

differential response rates. In addition, 79.3% of respondents owned or shared a car or a van, an over-representation in comparison with Edinburgh as a whole, as shown by a survey average of 1.27 cars per household, which is somewhat higher than the 0.81 cars per household for the entire city (City of Edinburgh Council, 2001).

Influence of Transport Mode and Frequency of Use on Voting Behaviour

The simplest means of defining car availability is whether the respondent owns or shares a car or a van (this will henceforth be referred to simply as car ownership). Table 2 shows that more than 80% of car-owning respondents participated in the referendum. This is a substantially higher turnout than was witnessed amongst non-car-owning respondents, nearly one-third of whom failed to use their vote. There are a number of socio-economic factors that are likely to have contributed to this finding. Car ownership is typically, although by no means exclusively, a measure of income, socio-economic class and education, factors which in themselves are recognized determinants of voter turnout. However, quite clearly, motivation to vote in the referendum was greater among car owners. Indeed, more detailed analysis of respondents' voting behaviour found that voter turnout increased in accordance with the number of cars available within the respondent's household—the turnout amongst respondents was around 68% for those with no car in the household, rising to 77% for those with one car and peaking at 77% for those with two or three cars in the household.

The disparity in turnout between car owners and non-car owners would only have been important to the referendum result if there was also a disparity in the voting behaviour of the two groups. Table 3 shows that there was an enormous difference in the voting behaviour of respondents according to car ownership. Car owners were overwhelmingly opposed to the proposal, whereas non-car owners registered net support. Moreover, there was an inequality in the strength of these voting preferences:

Table 2. Influence of car ownership on turnout and non-participation of respondents in the Edinburgh congestion charging referendum

Car ownership	Turnout (%)	Chose not to vote (%)	Not registered to vote (%)
Own or share a car or van	81.6	10.1	8.3
Do not own or share a car or van	67.6	17.6	14.9

Table 3. Influence of car ownership on the proportion of respondents voting for and against congestion charging in the Edinburgh referendum

Car ownership	Voted for (%)	Voted against (%)
Own or share a car or van	24.7	75.3
Do not own or share a car or van	64.0	36.0

- For every car owner supportive of the proposal, 3.05 were opposed.
- For every one non-car owner opposed to the proposal, only 1.78 were supportive.

In short, not only were car owners more likely to vote, but also their opposition to the proposal was far stronger than the support offered by non-car owners. Once again, the strength of opposition towards the scheme increased in accordance with the number of cars available. Support for the scheme (as manifested in voting behaviour) amongst respondents was around 69% for those with no car in the household, falling to 36% for those with one car and hitting a low of 14% for those with two cars in the household.

This served to create a spatial inconsistency in voting tendencies, with opposition greater in the suburbs, where car ownership was typically higher. Indeed, levels of support and opposition towards the proposal were reasonably equitable within a radius of 4 km from the centre of the city. However, in regions beyond 4 km from the centre, those voting against the proposal outnumbered those voting in favour by a ratio of 6:1. The northern boundary of a high-income electoral district is approximately 4 km from the centre of Edinburgh. The exceptionally high reliance on the car in this district (95.7% owned or shared a car, and 71.7% used a car for their most common journey) provides an explanation for the strength of opposition in the suburbs, and the existence of the 4-km threshold.

Voting tendencies, by frequency of use for each of the major transport modes in Edinburgh, are shown in Figure 2. The pattern of voting behaviour of car-driving respondents shows a strong and highly significant ($p < 0.01$) variation with frequency of car use. The frequency of car use may be regarded as a measure of a respondent's reliance upon the car. Figure 2 strongly suggests that the greater the reliance on car driving, the greater the opposition to congestion charging, and the greater the voter turnout. Considering only those most reliant on the car, namely daily car users living in a household with two or more cars (25.7% of the entire sample), then a turnout of 87.1% was found, with seven times as many respondents voting against charging as voting for. Regular car passengers were slightly more opposed ($p < 0.05$) to congestion charging, as drivers were themselves.

Figure 2 shows a highly statistically significant ($p < 0.01$) pattern of voting behaviour of respondents with frequency of bicycle use, the pattern being the opposite of that found for car drivers. Daily cyclists were strongly supportive of congestion charging, although weekly cyclists were equivocal and occasional cyclists showed net opposition. Opinion among regular bus users was equivocal verging on opposed ($p < 0.01$). Indeed, just 31.9% of daily bus users, perhaps *the* group likely to benefit most from congestion charging, supported the proposal. Almost as many, 29.8%, failed to vote at all. Even restricting consideration to those daily bus users who were not car owners, only 34.6% voted in favour, fewer than the number that did not use their vote. Further analysis into the transport mode used for the respondent's most common journey, and the effect this had on

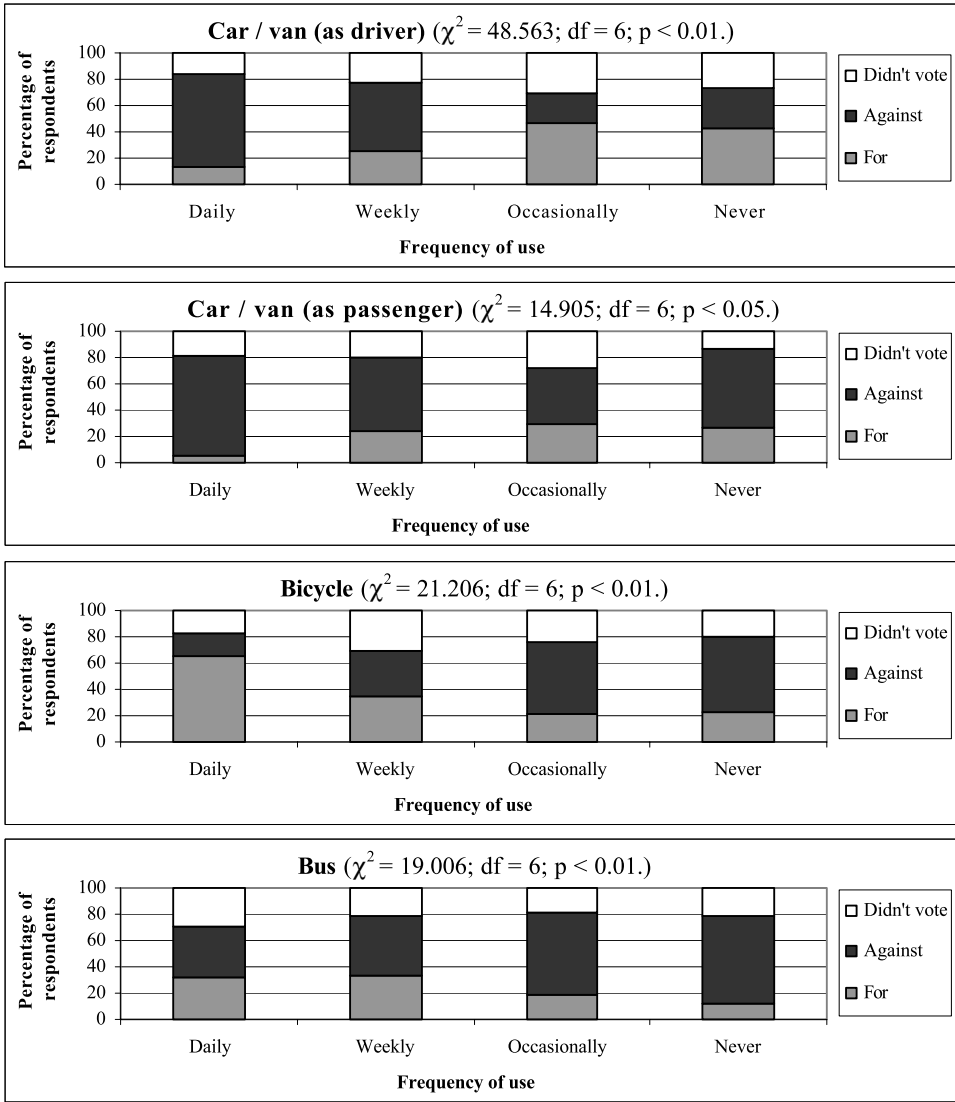


Figure 2. Voting behaviour of respondents in the Edinburgh congestion charging referendum shown by their frequency of use of each of the major transport modes. The outputs of chi-squared statistical tests of significance are shown beside the title of each graph. Graphs of the voting behaviour of respondents using motorcycle, train or taxi are not included due to insufficient respondents using these modes

voting behaviour, confirmed the above findings. It also showed that amongst those who walked, there was marginal support for congestion charging, although nearly one-third of this group did not vote, which was higher than for any other mode (data not shown).

Car users, whether drivers or passengers, were very strongly opposed to the congestion charging scheme. Apparently, only a very small minority perceived the potential benefits of the scheme to outweigh the £2 daily charge. Many respondents cited the inadequacies of the scheme or the Council itself as reasons for opposing the proposal (as discussed below). Nevertheless, these reasons could

perhaps have been given as pretexts for natural opposition to an increase in the cost of car travel. Such opposition is perhaps inevitable when the financial cost to car users is so obvious, and the potential benefits so intangible.

Whereas the lack of support amongst car users is to be expected, the net opposition amongst bus users was really surprising. It would appear that bus users did not perceive it to be 'their' referendum. Turnout was relatively low amongst bus-using respondents, perhaps because they did not understand or believe in the benefits that congestion charging and the associated public transport improvements could bring to them. The socio-economic profile of the bus users probably also tended to produce the lower turnout compared with car users. However, despite a significant financial outlay, it seems that the Council may have failed to communicate effectively the significance of the referendum vote to bus users. More importantly, of those bus users who did vote, support was far from guaranteed. The proposal even failed to convince non-car-owning, daily bus users. In the case of bus users, a natural opposition to increased costs cannot be used to explain the significant levels of opposition. There must have been considerable reservations with the proposal, and perhaps some scepticism that the promised reduction in congestion and improvements in public transport provision would actually be achieved.

Influence of Public Understanding of the Proposed Scheme on Voting Behaviour

The study tested the public's understanding of two aspects of the proposed congestion-charging scheme:

- Level of the charge.
- Applicability of the charge to each respondent's most frequent journey.

If the scheme had been introduced, the congestion charge would have been set at £2. This represented a maximum amount chargeable per day, regardless of how many times either cordon was crossed. Respondents were asked: 'If the congestion charging scheme had been introduced, what would the maximum daily charge have been?' Figure 3 shows the percentage frequency distribution of responses to this question. The peak at £2 is immediately obvious. However, this represents less

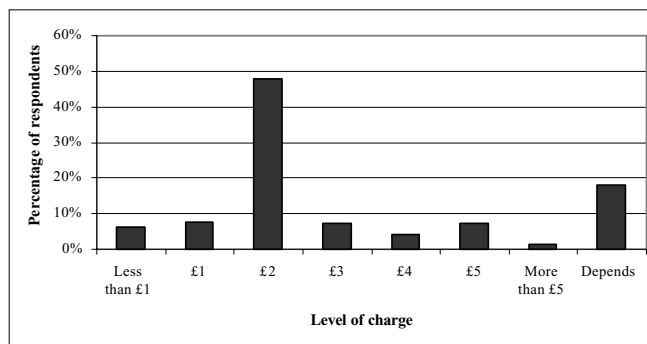


Figure 3. Percentage frequency distribution of respondents' responses to the question: 'If the congestion charging scheme had been introduced, what would the maximum daily charge have been?' Depends refers to: 'Depends on whether you entered a charging area more than once'

than half (47.8%) of respondents who correctly stated the charge at £2. Interestingly, 13.9% of respondents thought the charge would have been less than £2. It is conceivable that a small proportion of this figure consists of respondents who misread the question as 'what *would you like* the maximum daily charge to have been'. Naturally, for most people this would have been as low as possible.

A greater proportion, 20.2%, thought the charge would have been more than £2. This may have resulted from confusion with the Central London scheme. Indeed, in the run-up to Edinburgh's referendum, it was announced that the London charge was set to increase from £5 to £8. This served to nourish a belief that Edinburgh's charge would rise ('unfairly') too, despite a commitment only to increase it by the "percentage uplift in accord with changes in the retail price index" (Begg *et al.*, 2004).

Perhaps the greatest individual misconception uncovered by Figure 3 is the belief held by 18.2% of respondents that the maximum daily charge was dependent on whether a charging area was entered more than once. This suggests they perceived the charge to be applicable an unlimited number of times per day. In the light of this misconception, it is unsurprising that these residents opposed the scheme by a ratio of 3.5:1.

Table 4 shows the impact of misperceptions regarding the level of the charge on the voting behaviour of respondents. It is evident that those with a misconception over the level of the charge were slightly more opposed to the scheme than those with an accurate understanding. Nevertheless, opposition was still substantial amongst those respondents aware that the charge would have been £2. Misperceptions regarding the level of charge were, therefore, not the sole reason for the public rejection of the proposal. It was, however, one of a number of contributory factors that served to increase opposition to the scheme.

Respondents were asked to provide details of their most frequent journey. They were then asked whether they thought the proposed charge would be applicable to their journey, if they used a car to make that journey. Using an Automobile Association (AA) route planner, and an accurate knowledge of the scheme, each respondent's perception of the applicability of the charge to their most frequent journey was checked against reality. Figure 4 shows the comparison between the respondents' perception and reality. Just over one-third (34.9%) of respondents would have been liable to pay the charge if they used a car for their most frequent journey. Yet, substantially more residents thought they were liable to have been charged than was actually the case. While few respondents (6.0%) were unaware that they were liable to be charged, 20.2% of respondents wrongly thought they would have been charged for their journey. The respondents' misconception, therefore, tended to exaggerate the applicability of the charge beyond what was actually the case.

Table 4. Influence of the correctness of understanding of the level of the daily congestion charge on the voting behaviour of respondents in the Edinburgh referendum

Understanding of the level of the charge	Voted for (%)	Voted against (%)
Charge correctly identified as £2	35.0	65.0
Charge incorrectly identified	28.5	71.5

The difference in the voting behaviour between the two groups was not statistically significant.

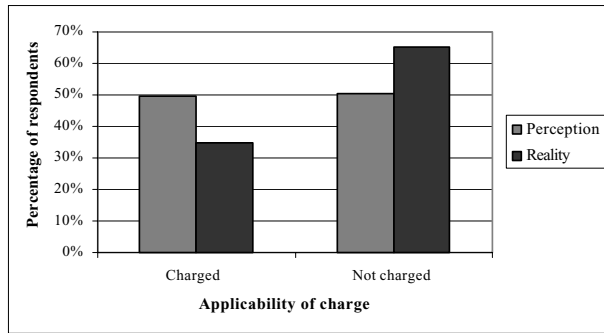


Figure 4. Percentages of respondents believing that they would or would not have been charged for their most frequent journey under the Edinburgh congestion charging scheme ('Perception') compared with the actual percentages of respondents who would or would not have been charged ('Reality')

It is interesting to compare the understanding of the applicability of the charge between residents inside and outside the inner cordon. Those living outside the inner cordon had a reasonable understanding of the applicability of the charge to their most common journey (78.6% were correct in their perception). Given the nature of the scheme and the question asked (outward journey only), none of the respondents living within the inner cordon would have been charged for their journey. Yet, surprisingly, 66.7% of inner-cordon residents wrongly thought that they would have been charged.

It is possible that some may have perceived the proposal to constitute an area-based scheme (along the lines of the congestion-charging scheme in London) and not the cordon-based scheme actually proposed. However, the cordons were a source of great controversy in the build up to the referendum. Indeed, a number of respondents made unprompted reference to them in the qualitative comments section of the questionnaire. As such, it seems that a misconception over the type of scheme can explain only part of the public's confusion.

It is also conceivable that some respondents were unaware that they lived within the proposed inner cordon. This probably partially explains the enormous misperception in the applicability of the charge seen amongst inner cordon residents. Similarly, suburban residents travelling towards the city centre may have been unaware quite where the inner cordon was due to be positioned.

Very few respondents made their journey outside of charging hours, so imperfect knowledge of this feature of the scheme cannot account for the widely held misperceptions over the applicability of the charge.

It seems likely that the single greatest source of confusion regarding the applicability of the charge was a misconception that the cordons were operational in *both* directions. There was a widely held belief that journeys crossing either the inner or the outer cordon in an outbound direction would be subject to a charge. This again probably partially explains the substantial confusion evident among city centre residents. However, the confusion was not limited to the inner cordon. Of those respondents whose journey quite obviously crossed the outer cordon in an outbound direction (i.e. those travelling to a non-Edinburgh postcode), 37.0% wrongly thought that they would be charged.

Table 5 shows the effect that the misperception of the applicability of the charge had on respondents' voting behaviour in the referendum. The strength of

Table 5. Influence of the correctness of understanding of the applicability of the congestion charge to each respondent's most frequent journey on their voting behaviour in the Edinburgh referendum

Understanding of applicability of charge	Voted for (%)	Voted against (%)
Correct	36.0	64.0
Incorrect	22.1	77.9

The difference in voting behaviour between the two groups was statistically significant ($\chi^2 = 4.432$; degrees of freedom = 1; $p < 0.05$).

opposition was significantly ($p < 0.05$) greater amongst those respondents with an incorrect understanding of the applicability of the charge. Indeed, if one considers for a moment only those that thought they would have been charged, when in fact they would not, opposition increases to 80.8%. The divergence in voting behaviour between the respondents with a correct understanding and those with an incorrect understanding was greater in Table 5 than is evident in Table 4. This suggests misconceptions over the applicability of the charge had a greater effect on the referendum result than those concerning the level of the charge. However, net opposition to the scheme is apparent regardless of the understanding of the applicability of the charge. This again suggests that this misconception was a contributory, rather than the fundamental, factor in the public rejection of congestion charging.

It seems logical that the greatest source of confusion was the scheme itself. The Edinburgh proposal, with its double cordon, inbound only charging system, with exemptions for 'outer Edinburgh residents' (but only for the outer cordon), was simply too complex for the public to grasp. There were of course technical justifications for the complexity of the proposal. What is more, the public inquiry found in favour of retaining the vast majority of the scheme details (Begg *et al.*, 2004). Yet, despite the decision to hold a referendum on the introduction of the scheme, there appeared to be insufficient consideration of the impact of the complexity on how people would vote. After all, the public are not transport planners, and are unlikely to think like transport planners. If anything, the scheme became more complicated and confusing as the referendum approached, as the Council made 'last ditch' concessions (e.g. proposing 1 hour's free city-centre parking for those who had paid the charge) in an attempt to gain greater support. A simpler scheme may not have so effectively fulfilled the dual objectives of reduced congestion and revenue generation. Yet, it almost certainly would have produced greater public support by avoiding opposing votes from residents who erroneously believed that they would be subject to the charge.

Influence of Public Attitudes to Congestion and the City of Edinburgh Council on Voting Behaviour

It is interesting to consider whether the Edinburgh public's perception of the level of congestion in the city matched that of the Council's, which considered it serious enough to propose congestion charging. Respondents were asked their level of agreement with the statement: 'congestion is a problem in Edinburgh'. The percentage frequency distribution of responses by level of agreement is shown in Figure 5. A large majority (74.7%) of respondents agreed or strongly agreed that

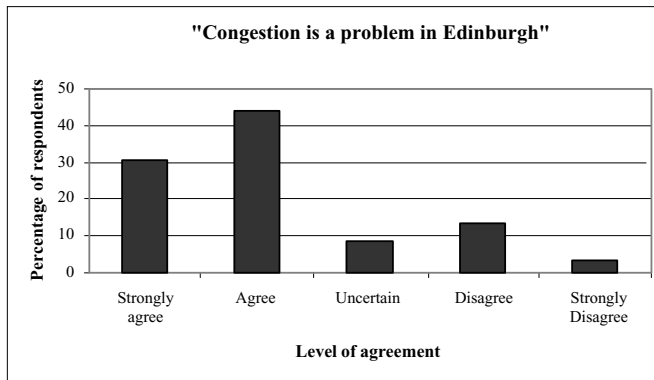


Figure 5. Percentage frequency distribution of respondents' level of agreement with the statement: 'Congestion is a problem in Edinburgh'

congestion is a problem in Edinburgh. Interestingly, there was no significant difference in the perception of congestion between city-centre (those living inside the proposed inner cordon) and suburban respondents. This perhaps suggests that congestion exists at problematic levels throughout the study area. Alternatively, it may indicate that attitudes towards congestion are not dependent upon the proximity to the region where congestion is perceived to be worst, namely the city centre. Unsurprisingly, those who voted in favour of the congestion-charging scheme were strongly in agreement that congestion is a problem. Of greater significance, those who were opposed to the proposal actually still tended to agree that congestion is a problem.

Of course, the analysis does not quantify the problem of congestion. In any case, it would be difficult to determine a threshold at which charging becomes acceptable. Nevertheless, the vast majority of Edinburgh residents perceived congestion as a problem. As is so often the case with proposed RUC schemes, it is the unattractiveness of the solution, rather than the perception of the problem, that is the principal barrier to implementation.

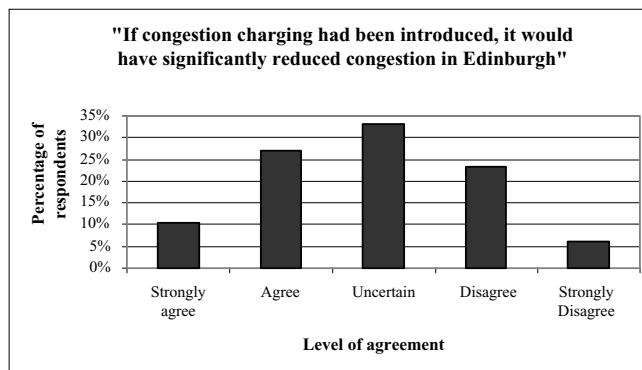


Figure 6. Percentage frequency distribution of respondents' level of agreement with the statement: 'If congestion charging had been introduced, it would have significantly reduced congestion in Edinburgh'

The proposed congestion charging scheme had two principal aims: to reduce congestion; and to improve public transport, using the revenue generated (City of Edinburgh Council, 2004). The questionnaire included questions to assess whether the respondents were convinced that the proposal would have been able to achieve these targets. Figure 6 shows that considerably fewer than one-half (37.4%) of the respondents expressed confidence that the scheme would have significantly reduced congestion. Of course, the statement refers only to the overall effectiveness of the scheme, and makes no allowance for spatial variations in congestion levels. Indeed, a common criticism of the scheme was that many drivers would simply have altered their route, in order to avoid crossing the inner cordon, the effect being merely to displace rather than reduce congestion. Supporting focus group research (Gaunt, 2005) identified a public perception that the scheme would have failed to reduce congestion between the two cordons (i.e. in the suburbs). Although proponents may argue that the outer cordon would have reduced the total number of vehicles entering the city, the fact remains that if Edinburgh residents had wanted to make a trip entirely between the cordons, there would have been no charge payable to discourage them from using their cars. Of course, charging for such journeys would have been likely to reduce public acceptability even further. Nevertheless, the perception that congestion levels were unlikely to improve outside of the city centre was a major constraint to the perceived effectiveness of the proposal.

Apparently unconvinced by the effectiveness of charging to reduce congestion, Figure 7 shows that respondents were equally sceptical of any improvements in public transport that the scheme may have induced. Despite a great deal of uncertainty (that in itself is interesting), it is apparent that an overall majority of respondents disagreed with the statement that congestion charging ‘would have led to a big improvement in public transport’. Indeed, just 28.9% of residents agreed with the statement. A number of factors may account for this high degree of scepticism. First, 56.3% of residents already considered public transport to be of ‘a good standard’. This would perhaps imply that a ‘big improvement’ would not be possible. While this argument would seem to infer that the Council was a victim of its own success, a more realistic explanation relates to the issue of trust. Just 14.4% of respondents agreed that ‘the Council’s transport policy in the last

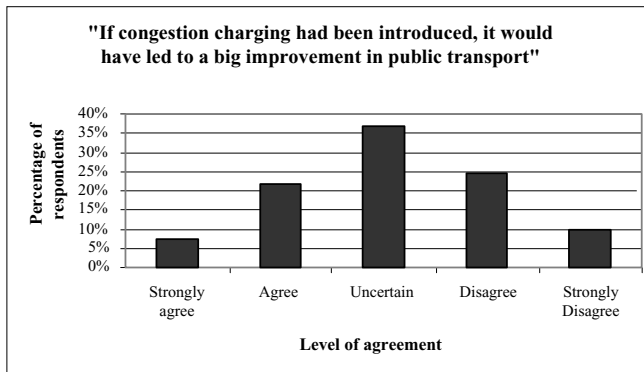


Figure 7. Percentage frequency distribution of respondents' level of agreement with the statement: 'If congestion charging had been introduced, it would have led to a big improvement in public transport'

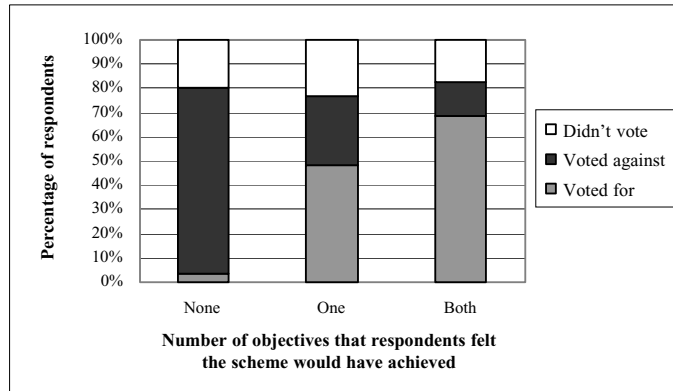


Figure 8. Voting behaviour of respondents grouped according to the number of objectives they felt the Edinburgh congestion charging scheme would have achieved

ten years has been successful'. Similarly, only 16.8% agreed that 'the Council can be trusted to improve the welfare of Edinburgh residents'. The negativity expressed towards the Council's preceding transport policies (apparently despite a positive perception of public transport) would be unlikely to induce much confidence that substantial improvements would be forthcoming. This was not helped by the abstract nature of the proposed public transport improvements; in a personal communication, John Saunders (2005), formerly Project Manager at Tie Ltd, accepted that many of the proposals were 'vague and non-specific'.

To assess the effect of respondents' perceptions of the effectiveness of the scheme on voting behaviour, respondents were divided into three groups, namely those who stated that the scheme would do the following:

- Reduce congestion and improve public transport (achieve both objectives).
- Reduce congestion or improve public transport (achieve one objective).
- Neither reduce congestion nor improve public transport (achieve no objectives).

Figure 8 shows the voting behaviour of respondents falling into each of these groups. It is interesting to note that the net opposition was only witnessed amongst respondents who stated that the scheme would achieve neither of its main objectives. Amongst respondents who expressed confidence that the scheme would achieve one objective, but fail in the other, support for the proposal outweighed opposition by a ratio of around 1.7:1. This would suggest that to have gained over 50% support in the referendum, it was not necessary to propose a perfect scheme. It was merely necessary to present one where a majority of residents could perceive a single, major, tangible benefit.

Conclusions

A lack of public acceptability is widely acknowledged as the single greatest barrier to the implementation of RUC (e.g. Jones, 1998, 2003; Schade and Schlag, 2003; Jaensirisak *et al.*, 2005). The present paper has discussed and evaluated the importance of a number of factors that contributed to the lack of acceptability of

the proposed scheme in Edinburgh in Scotland, UK, which ultimately manifested itself in the public's rejection of the scheme in the referendum.

The principal determinant of voting behaviour was car use. In short, and with exceptions, car owners opposed the scheme, while non-car owners supported it. Car owners did not appear to recognize, or appreciate, the potential benefits that congestion charging may have brought about. While reduced congestion and improved alternatives to the car were abstract possibilities, the prospect of being charged was very much more tangible. Indeed, not only was it tangible, but also it was perceived to be more costly, and more frequently applied than would actually have been the case. Only a small minority of car owners were willing to embrace the concept of charging. Yet critically, support amongst public transport users was not nearly as reliable, or as enthusiastic, as the opposition of motorists.

While natural opposition to an increase in the cost of car travel was fundamental to the public's rejection of the proposal, opposition was clearly exacerbated by the limitations of the scheme. It was clear that it was too complicated to be understood, never mind supported, by a majority of the public. Although the public accepted that congestion was a significant and growing problem, they were unconvinced that the proposal represented an effective means of combating it. Indeed, the planned public transport improvements were perceived by many as arriving too late; and by others as insufficient, irrelevant or ill-defined. The importance of this last point is rather compounded by an apparent widespread distrust of the Council. Considering a referendum was ultimately held, the scheme should perhaps have been designed with a greater consideration for public acceptability. Strong public opposition to a double-cordon scheme was evident as early as 2002.

National political support for Edinburgh's proposed scheme was minimal. Even at a local level, the Executive Member for Transport, Councillor Andrew Burns, appeared isolated in his commitment and belief in the scheme. Under such conditions, and with a weighty history of failed RUC schemes elsewhere, it may perhaps be regarded as surprising that the scheme progressed as far as it did. While the decision to persist with congestion charging may, in the circumstances, be considered brave, the decision to hold a referendum was not. It appears to have been a rather blatant, though perhaps understandable, attempt to limit opposition to the Labour Party majority that controls the City of Edinburgh Council by placing the onus of making the final decision on congestion charging on the residents of Edinburgh. In this respect, it was a resounding success. As the culmination of a democratic process in which the public become engaged in an issue of economic, social and environmental importance it was also a success. However, as a means to legitimize a controversial proposal that had commendable objectives (if controversial means of achieving them) it was, obviously, a resounding failure.

The present study suggests some lessons for other cities considering the introduction of RUC as a means to solve the problem of traffic congestion. First, the design of schemes should avoid unnecessary complexity: they should be simple, especially at first (the possibility of increasing complexity is much greater once an initial, simple, scheme is in place and accepted). The findings of this study clearly show that in the Edinburgh case the strength of the negative vote was enhanced by residents' misunderstanding of the scheme, causing a substantial number to believe that the daily charge would be both higher, and applied more frequently, than in reality. These individuals might conceivably have voted for the scheme if they had understood the details clearly.

Second, while the strong opposition arising from the narrow economic self-interest of motorists is unsurprising, the weakness in support for the scheme from bus users who stood to gain from the public transport improvements that would have been funded by congestion charging was unexpected. This appears to have arisen from apathy, a lack of belief in the success of the proposed public transport improvements and a lack of trust in the City of Edinburgh Council.

Third, there is a need to balance consultation against awareness raising—less of the former, and more of the latter, may increase the probability of scheme implementation. In short, a simpler scheme that everyone fully understood, a specific programme of guaranteed public transport improvements, and even more active promotion of the scheme's benefits may have led to a different outcome.

References

- Bartley, B. (1995) Mobility impacts, reactions and opinions. Traffic demand management options in Europe: the MIRO project, *Traffic Engineering and Control*, 36, pp. 596–603.
- Begg, H. M., MacBryde, J. and Patterson, W. M. H. (2004) *Inquiry Into Proposed Congestion Charging Scheme* (Edinburgh: Scottish Executive Development Department).
- Bell, M. G. H., Quddus, M. A., Schmöcker, J.-D. and Fonzone, A. M. (2004) *The Impact of the Congestion Charge on the Retail Sector*. Working Paper (London: Centre for Transport Studies, Imperial College).
- Cain, A., Celikel, N. and Jones, P. (2002) Incorporating public participation into the detailed design of a congestion charging scheme for Edinburgh. Paper presented at the 34th UTSG Annual Conference, 3–5 January 2002, Transport Research Institute, Napier University, Edinburgh, UK.
- City of Edinburgh Council (2001) *Edinburgh 2001 Census Atlas*. Available at: http://www.edinburgh.gov.uk/downloads/CensusAtlas/CA_Content.pdf
- City of Edinburgh Council (2004) *The Integrated Transport Initiative for Edinburgh and South East Scotland, Proposed Congestion Charging Scheme: Statement of Case* (Edinburgh: Tie Ltd/City of Edinburgh Council).
- Commission for Integrated Transport (CfIT) (2002) *Public Attitudes to Transport in England: The CfIT Report 2002*. Survey carried out by MORI for the Commission for Integrated Transport, May 2002 (London: CfIT).
- Department for Transport (DfT) (2004) *Feasibility Study of Road Pricing in the UK* (London: DfT). Available at: http://www.dft.gov.uk/stellent/groups/dft_roads/documents/divisionhomepage/029709.hcsp
- Emmerink, R. H. M., Nijkamp, P. and Rietveld, P. (1995) Is congestion pricing a first-best strategy in transport policy? A critical review of arguments, *Environment and Planning B: Planning and Design*, 22, pp. 581–602.
- EUROPrice (2002) *Consultation with the Business Community*. Guidance Paper No. 2 (Bristol: EUROPrice Initiative Phase 2).
- Gaunt, M. (2005) Congestion charging and the Edinburgh 2005 Referendum. Unpublished MSc thesis, CECS, University of Edinburgh (available at: t.rye@napier.ac.uk).
- Glazer, A., Link, H., May, A. D., Milne, D. and Niskanen, E. (2001) Barriers to transport pricing: review of research. Paper presented at the IMPRINT-EUROPE Seminar, Brussels, Belgium, 21–22 November 2001.
- Gray, D. and Begg, D. (2001) *Delivering Congestion Charging in the UK: What is Required for its Successful Introduction?* Policy Paper Series No. 4 (Aberdeen: The Centre for Transport Policy, Robert Gordon University).
- Harrington, W., Krupnick, A. and Alberini, A. (2001) Overcoming public aversion to congestion pricing, *Transportation Research Part A*, 35, pp. 93–111.
- Hau, T. D. (1990) Electronic road pricing: developments in Hong Kong, *Journal of Transport Economics and Policy*, 24, pp. 203–214.
- Jaensirisak, S., Wardman, M. and May, A. D. (2005) Explaining variations in public acceptability of road pricing schemes, *Journal of Transport Economics and Policy*, 39, pp. 127–154.
- Jones, P. M. (1998) Urban road pricing: public acceptability and barriers to implementation, in: K. J. Button and E. T. Verhoef (Eds) *Road Pricing, Traffic Congestion and the Environment. Issues of Efficiency and Social Feasibility*, pp. 263–284 (Cheltenham: Edward Elgar).

- Jones, P. M. (2003) Acceptability of road user charging: meeting the challenge, in: J. Schade, and B. Schlag (Eds) *Acceptability of Transport Pricing Strategies*, 27–62 (Oxford: Elsevier).
- Link, H. and Polak, J. (2001) How acceptable are transport pricing measures? Empirical studies in nine European countries. Paper presented at the Proceedings of the 29th European Transport Conference, PTRC, London.
- Luk, J. and Chung, E. (1997) *Public Acceptance and Technologies for Road Pricing*. Research Report No. 307 (Vermont South: ARRB Transport Research Ltd).
- May, A. D. (1975) Supplement licensing: an evaluation, *Traffic Engineering and Control*, 16(4), pp. 84–87.
- Ministry of Transport (1964) *Road Pricing: The Economical and Technical Possibilities* (London: HMSO).
- PATS Consortium (2001) *Recommendations on Transport Pricing Strategies*. Final Report of the PATS Project (Brussels: European Commission).
- Pigou, A. C. (1920) *Wealth and Welfare* (London: Macmillan).
- PRIMA (2000) *Deliverable D4. Ways and Means to Improve the Acceptance of Urban Road Pricing*. PRICing Measures Acceptance Project, Inregia, Stockholm.
- PRoGRSS (2004) *Deliverable D4.3. Social and Political Issues. Pricing Road Use for Greater Responsibility, Efficiency and Sustainability in Cities* (Bristol: PRoGRSS).
- Schade, J. (2003) European research results on transport pricing acceptability, in: J. Schade and B. Schlag (Eds) *Acceptability of Transport Pricing Strategies*, pp. 109–124 (Oxford: Elsevier).
- Schade, J. and Schlag, B. (2000) *Acceptability of Urban Transport Pricing*. Research Report 72 (Helsinki: VATT).
- Schade, J. and Schlag, B. (2003) Acceptability of pricing reform. Paper presented at the IMPRINT-EUROPE Seminar, 13–14 May 2003.
- Schlag, B. and Schade, J. (2000) Public acceptability of traffic demand management and pricing measures in Europe, *Traffic Engineering and Control*, 41, pp. 314–318.
- Stoelhorst, H. J. and Zandbergen, A. J. (1990) Development of a road pricing system in the Netherlands, *Traffic Engineering and Control*, 31, pp. 66–71.
- Tie Ltd (2002) Integrated Transport Initiative for Edinburgh and South East Scotland. Unpublished Report. Available at: http://www.tie.ltd.uk/pdf/suppl_report.pdf
- Vickrey, W. (1955) Some implications of marginal cost pricing for public utilities, *American Economic Review*, 45, pp. 605–620.
- Viegas, J., Macario, R., Goller, L., Raux, C., Link, H., Peter, D., Polak, J., Turner, J., Herry, M., Schuster, M., Van der Berg, T., Gleijm, A. and Yousefzadeh, M. (2000) *Deliverable D3: Empirical Studies on Price Acceptability*. European Union Project PATS, funded by the European Commission, 4th Framework Transport RTD (Lisbon: Transportes Inovacao e Sistemas).