



An investigation into the reasons for the rejection of congestion charging by the citizens of Edinburgh

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Abstract

In February 2005, residents of Edinburgh, a medium-sized city in the United Kingdom, 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. This paper describes the evolution of the scheme, and presents results of research to determine the principle factors responsible for the public's overwhelming opposition to the scheme. The research used a postal, self-completion questionnaire that was distributed to 1300 randomly-selected households in central and southern Edinburgh three months after the referendum. The questionnaire responses were analysed to assess the influence of several factors on the way respondents voted in the referendum. Car use was shown to be the principle determinant of voting behaviour, with car owners strongly opposing the scheme while non-car owners only weakly supported 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 reduced congestion and improved 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. Some other aspects of the scheme that militated against its successful introduction are also briefly identified.

Keywords: Congestion charging; Road user charging; Road pricing; Public acceptability; Edinburgh.

Introduction

Until 25 February 2005, the City of Edinburgh in Scotland, UK, had advanced plans for a congestion charging scheme. However, these plans were abandoned at that time due to public acceptability problems and in particular to a referendum on the issue, in which the public overwhelmingly rejected the proposed congestion charging scheme.

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This paper sets out the detail of the scheme and its development, and reports the results of a survey of Edinburgh residents, which was used to assess the importance of a range of factors that might have influenced the residents of Edinburgh to reject congestion charging 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 itself.

Road user charging and public acceptability

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 recognised 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, Stavanger and, most recently, London, 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 materialised proliferate: London (some quarter of a century prior to the successful introduction of an alternative scheme; May 1975), Kuala Lumpur (Jones 1998), Hong Kong (Hau 1990), the Netherlands (Stoelhorst and Zandbergen 1990, Emmerink et al. 1995) and several proposals in the United States (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 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.

It is recognised 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) 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). As Edinburgh can now testify, RUC, like other innovations, can rarely be imposed against the public will.

The City of Edinburgh's proposed congestion charging scheme

Transport governance in Scotland and Edinburgh

The City of Edinburgh is located in the south-east of Scotland; it has a population of 450000 and covers an area of 262 square kilometres (Marsden and May, 2004). Edinburgh is a unitary local authority, which is answerable directly to the devolved government for Scotland (the Scottish Parliament and Executive). There is no formal regional authority for transport since the local government reorganisation of 1996. However, a voluntary regional partnership, South East Scotland Transport Partnership (SESTRAN), exists and produces a Regional Transport Strategy.

There are three tiers of directly elected politicians. Local politicians, serving the City of Edinburgh Council and (excluding European representation) two layers of national government with Members of the Scottish Parliament and Members of the UK Parliament. The City of Edinburgh Council has established an 'arms-length' delivery company (TIE Limited) that has been given responsibility for managing the implementation of major infrastructure schemes, integrated ticketing and congestion charging (Marsden and May, 2004). Decisions taken by TIE must be ratified by the City Council, although TIE itself is accountable to a majority private-sector board, though funded wholly by the Council and the Scottish Executive (devolved government). It should also be noted that the City of Edinburgh is surrounded by other local authorities, many of whose residents commute to Edinburgh for employment.

Edinburgh has a rapidly expanding economy and is the focus of regional economic development. The Regional Transport Strategy states that it 'focuses more on strategic links to the capital in order to improve connections to Edinburgh as it is the focus of jobs and services within the SESTRAN area'. In this regard, Edinburgh parallels other regional cities in being the focus for the economic development strategy, from which the surrounding areas will benefit. Because of this economic growth, traffic congestion caused by commuting – especially in and from the west of the city – was perceived by the Council to be a serious problem and one that needed to be dealt with by means of a congestion charging scheme.

Details of the scheme proposed for Edinburgh

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 0700 to 1000, whilst the inner cordon would charge trips between 0700 and 1830. No residents' discount was proposed, other than for those City of Edinburgh residents living outside 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.

There would have been no charge for driving wholly within one cordon or between cordons – this is a clear difference between the proposed Edinburgh and the successful London scheme. The reason for the choice of a twin cordon rather than area licence scheme was complex. Qualitative appraisal work carried out in 1999 found that multiple

cordon, screenline or area licence schemes would be more effective in traffic reduction terms than simple cordon schemes, but scored them low in relation to their public acceptability and ease of implementation. Modelling work carried out in 2001 and 2002 considered variations on only two basic options: a city centre cordon, and a city centre plus outer cordon. In congestion management and traffic reduction terms the outer cordon had a somewhat greater predicted impact than a single inner cordon, but it was predicted to generate twice as much revenue (TIE, 2002). Perhaps for these reasons, as the plans for the scheme progressed, they were expanded to include an outer as well as a city centre cordon.



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

This was also a politically expedient decision, since an area licence as in London would have affected many more Edinburgh residents (and therefore voters). In contrast, as proposed, the outer cordon would have mainly affected drivers from surrounding local authority areas, particularly those who commute into Edinburgh for work. However, this led to difficult relations with neighbouring local authorities, who perceived the scheme as unfairly penalising their residents, while not effectively controlling congestion, as Edinburgh residents could drive freely within the area between the inner and outer cordons without being subject to any charge.

Payment was to have been made at paypoints in retail outlets, by mobile phone Short Message Service (text messaging), on the Internet or via a telephone call centre. Automatic Number Plate Recognition technology (ANPR) was to have been employed for enforcement purposes. A vehicle whose number plate was registered on the database as having paid for that day would then have any record of its passing a cordon point immediately erased from the system. Vehicles for which there was no record of payment, and which crossed one or both cordons, would have had their numbers retained in the system and, ultimately, a penalty notice would have been issued for non-payment. The choice of technology was influenced by considerations of cost and practicality and by what was to be used in London. The biggest challenge for the system would have been to keep operating costs to around £0.67 per charge payer, thus retaining around 66% of the charge to spend on transport improvements. This contrasts with an operating cost of £2.67 per £5.00 charge in London. At the time of the referendum, the actual cost of operating the Edinburgh scheme had not been confirmed.

The predicted effects of the congestion charging scheme on traffic and transport

Traffic modelling forecast the following benefits, by 2011, compared with the do-nothing situation (TIE, 2002):

- A 21% reduction in city centre traffic delays.
- A 9% reduction in traffic delays city-wide.
- A 30% reduction in vehicles entering the city centre on a typical weekday, and an 8% reduction across the outer cordon.
- Increases of 22% and 8% in numbers of people entering the city centre and the city as a whole (respectively) by public transport on a typical weekday.

Over the modelled 20 year life of the scheme, it was predicted that it would raise £706 million at 2002 prices. The significant additional transport improvements that were forecast to be funded from this revenue included:

- Around £200 million for additional bus services.
- £154 million for a tram line to southeast Edinburgh.
- £111 million for additional road maintenance.
- £147 million for regional rail improvements.
- £17 million for additional accessible transport.
- £24 million for road safety projects.

It is a possible criticism of the scheme that, at the time of the referendum, plans for these schemes were not well-developed and therefore quite difficult to “sell” to the public. In particular, there was some doubt over the level of bus service that could be secured for the amount available.

A further issue that generated criticism was the nature of the projects that were to be put in place before the congestion charging scheme was due to start, that is, prior to April 2006. Such projects were required in order to satisfy the Scottish Executive’s policy guidance that a range of public transport improvements should be in place before charging was introduced. Between 2002 and 2006, the City Council has, or will have,

spent £100 million on projects in an attempt to meet this requirement. These included a new bus station, three new rail stations and a cross-city rail service, real-time bus information, a short section of guided busway, four park and ride sites, and extensive bus priority on most radial road corridors. Critically, however, it was not possible for the City Council to fund additional bus services prior to the introduction of congestion charging, since (without congestion charging) it is dependent on the Scottish Executive for transport funding. For macro-economic reasons, most additional funding for transport from the Scottish Executive has been in the form of capital money, for infrastructure investment, and not revenue for the subsidy of additional services. Therefore, the Council was necessarily limited in what it could do to put public transport improvements in place prior to the introduction of congestion charging, and was open to criticisms from many residents that the £100 million of improvements were of little use to them, because they were, in many cases, geographically specific. Had revenue funding been available, the Council could have improved bus services on an area-wide basis (as was the case prior to the introduction of congestion charging in London, where the Mayor has control of bus services, unlike in all other parts of Britain outside London).

Public consultation and referendum

Although the Transport (Scotland) Act 2001 introduced legislation which 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 Limited) to determine the acceptability of the proposals.

Phase IV (2002) was the most comprehensive of the consultation phases, with 240000 leaflets 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). By phase V (2003), support amongst Edinburgh residents for the proposed double cordon scheme had increased very slightly to 36%. Following a Public Inquiry, the scheme was finalised and proceeded to a public referendum.

It is interesting to ask why a public referendum was held in Edinburgh, after the successful introduction of congestion charging in London (February 2003) without a public referendum. Despite interviewing the key actors involved, it has proved impossible to obtain a clear answer to this question. Upon granting 'Approval in Principle' for the City of Edinburgh Council's congestion charging proposal, the Scottish Executive stated: 'At the Approval in Detail stage, you should be able to demonstrate clear public support for the scheme' (Scottish Executive, 2002). However, the Council had, at its meeting on 17 October 2002, already taken the decision that

'clear public support' could be demonstrated by means of a referendum (CEC, 2002). Rye et al. (2005) therefore suggest that the decision to hold a referendum was not necessarily a response to the Scottish Executive's stated requirement. Rather, they suggest that the decision was in response to the press and public criticism that the Council had received in relation to the consultation exercises undertaken during 2002. Saunders (2005) was more explicit: 'the referendum was not necessary... it was a political decision taken to diffuse opposition [to the scheme] as a local election issue in 2003'.

The public referendum was conducted by post 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 the revenue raised by congestion charging. The participation in the vote was 179905 residents, a turnout of 61.8% of those registered. There were 133678 votes against and 45965 in favour. This represented a 74.4% public rejection of the proposal. Consequently, the proposed scheme, and indeed the entire concept of congestion charging in Edinburgh, was abandoned and instead a 'base' investment package has been adopted. A new Local Transport Strategy, without charging, is likely to be produced by the end of 2006.

Research methodology

A questionnaire was designed for completion by residents of Edinburgh to investigate their voting behaviour in the referendum on the congestion charging proposals. 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 multiple choice, with the exception of one question inviting further comments from respondents.

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, the questionnaire was sent by post to 1300 residents in the study area, randomly selected from the unedited electoral register (thus including potential voters, registered to vote in the referendum or otherwise). A response rate of 25.8% was achieved, with 336 residents returning useable responses in the reply-paid envelopes provided. 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 dataset comprised 368 completed questionnaires.

The representativeness of the sample was checked by comparison with census data for Edinburgh (CEC, 2001). The sample included an approximately equal number of males and females, consistent with the census data. Similarly, the age distribution of the sample was comparable with the census data. 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

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

Results and discussion

The influence of transport mode and frequency of use on voting behaviour

Table 1: The influence of car ownership on turnout and non-participation of respondents in the Edinburgh congestion charging referendum.

<i>Car ownership</i>	<i>Turnout</i>	<i>Chose not to vote</i>	<i>Not registered to vote</i>
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%

The simplest means of defining car availability is whether the respondent owns or shares a car or van (this will henceforth be referred to simply as car ownership). Table 1 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 a third of whom failed to use their vote. Clearly the motivation to vote in the referendum was greater amongst car owners.

Table 2: Influence of car ownership on the proportion of respondents voting for and against congestion charging in the Edinburgh referendum.

<i>Car ownership</i>	<i>Voted for</i>	<i>Voted against</i>
Own or share a car or van	24.7%	75.3%
Do not own or share a car or van	64%	36%

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 2 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:

- For every 1 car owner supportive of the proposal, 3.05 were opposed;
- For every 1 non-car owner opposed to the proposal, only 1.78 were supportive.

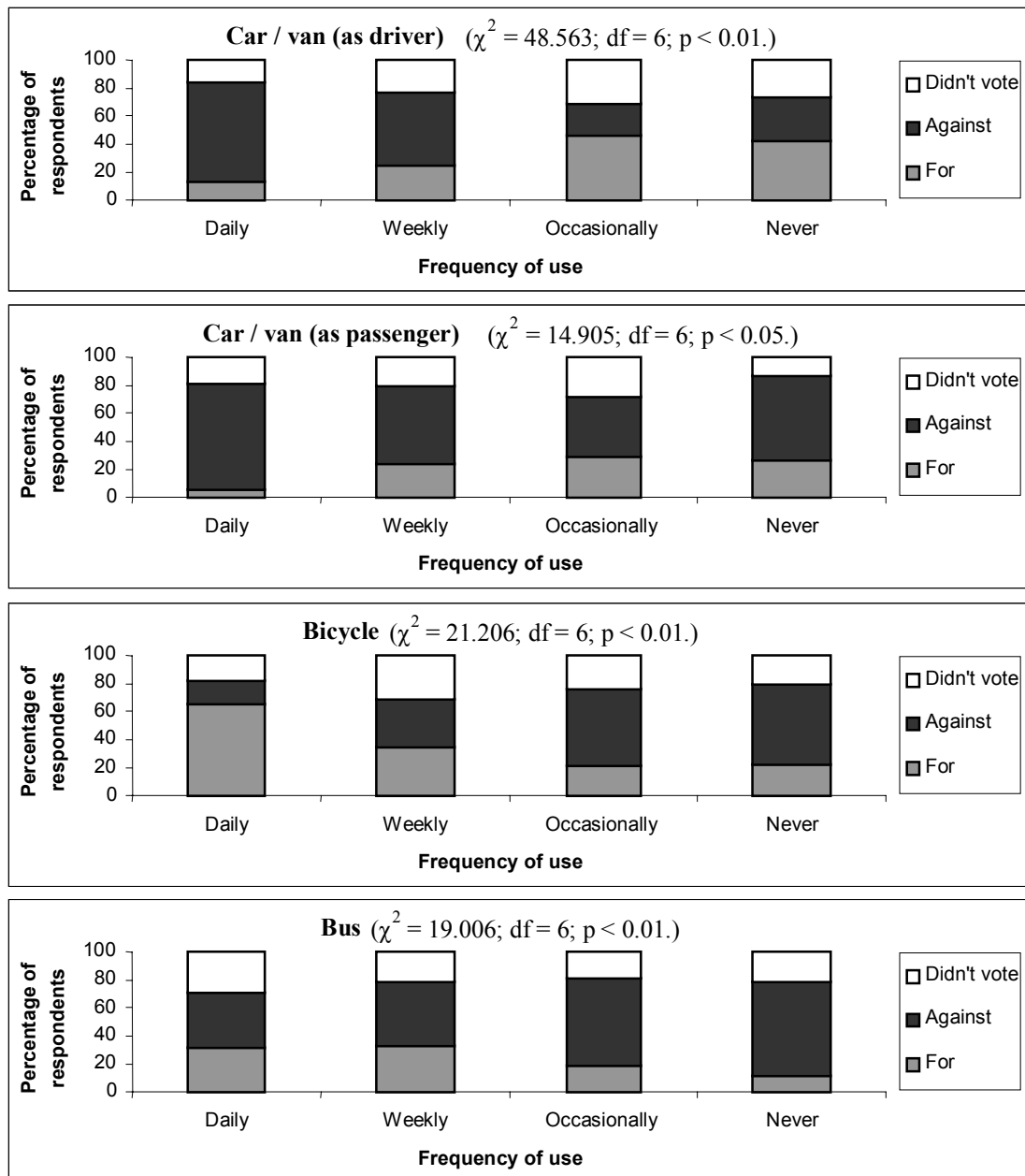


Figure 2: Graphs showing the voting behaviour of respondents in the Edinburgh congestion charging referendum by their frequency of use of each of the major transport modes. The outputs of chi squared statistical tests of significance are shown beside the title of each graph. Graphs of the voting behaviour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

In short, not only were car owners more likely to vote, their opposition to the proposal was far stronger than the support offered by non-car owners.

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. 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 didn't use their vote.

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 the referendum to be relevant to them. 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 socioeconomic profile of the bus users probably also tended to produce the lower turnout compared to car users. However, despite a significant financial outlay, it seems that the Council may have failed to effectively communicate the significance of the referendum vote to bus users. More importantly, of those bus users that 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.

The 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:

- The level of the charge
- The applicability of the charge to each respondent's most frequent journey.

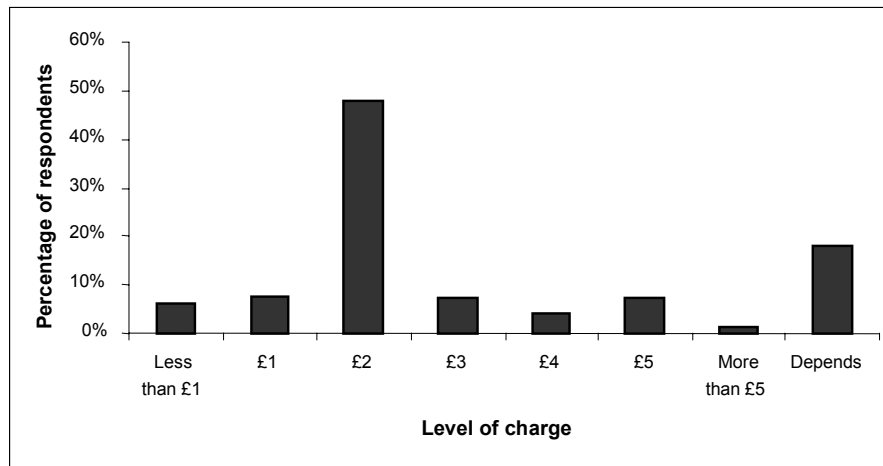


Figure 3: Percentage frequency distribution of respondents' responses to the question: 'If the congestion charging scheme had been introduced, what would the maximum daily charge have been?'. Depends refers to: 'Depends on whether you entered a charging area more than once'.

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 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 to only 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 that 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 3: The influence of correctness of understanding of the level of the daily congestion charge on the voting behaviour of respondents in the Edinburgh referendum. The difference in the voting behaviour between the two groups was not statistically significant.

<i>Understanding of the level of the charge</i>	<i>Voted for</i>	<i>Voted against</i>
Charge correctly identified as £2	35.0%	65.0%
Charge incorrectly identified	28.5%	71.5%

Table 3 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.

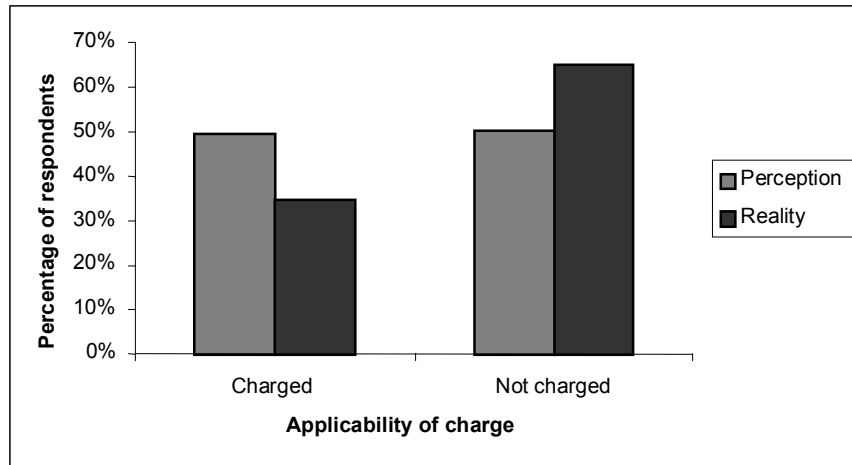


Figure 4: Percentages of respondents believing that they would or would not have been charged for their most frequent journey under the Edinburgh congestion charging scheme ('Perception') compared to the actual percentages of respondents that would or would not have been charged ('Reality').

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 a 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 a 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%) 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.

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 outer cordon in an outbound direction would be subject to a charge. 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% wrongly thought that they would be charged.

Table 4: The influence of 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. The difference in voting behaviour between the two groups is statistically significant ($\chi^2 = 4.432$; $df=1$; $p<0.05$).

<i>Understanding of applicability of charge</i>	<i>Voted for</i>	<i>Voted against</i>
Correct	36.0%	64.0%
Incorrect	22.1%	77.9%

Table 4 shows the effect that the misperception of the applicability of the charge had on respondents' voting behaviour in the referendum. The strength of opposition was significantly ($p < 0.05$) greater amongst those respondents with an incorrect understanding of the applicability of the charge. Indeed, if we consider for a moment only those that thought they would have been charged, when in fact they wouldn't, 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 4 than is evident in Table 3. 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. If anything, the scheme became more complicated and confusing as the referendum approached, as the Council made desperate final concessions (e.g. proposing one 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.

The influence of public attitudes to congestion and to the City of Edinburgh Council on voting behaviour

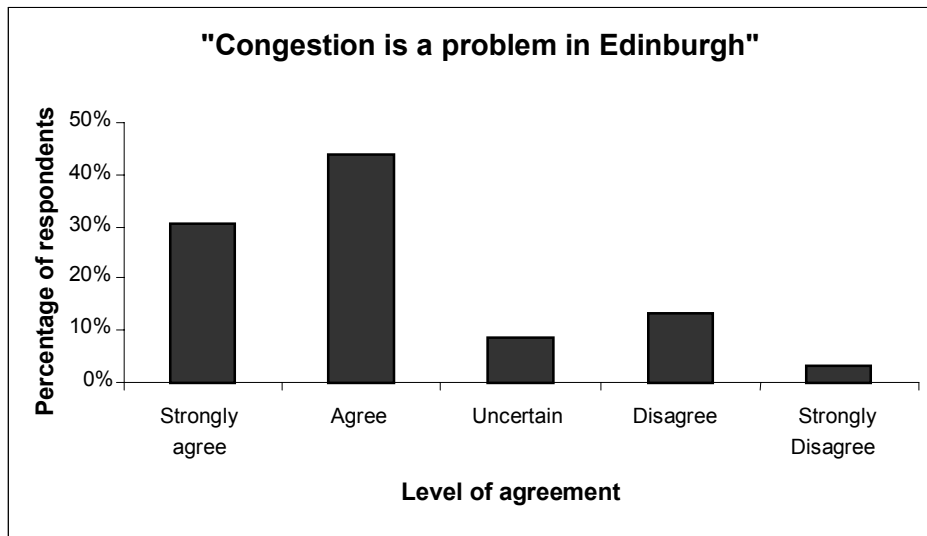


Figure 5: Percentage frequency distribution of respondents' level of agreement with the statement: 'Congestion is a problem in Edinburgh'.

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, who 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 congestion *is* a problem in Edinburgh. 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.

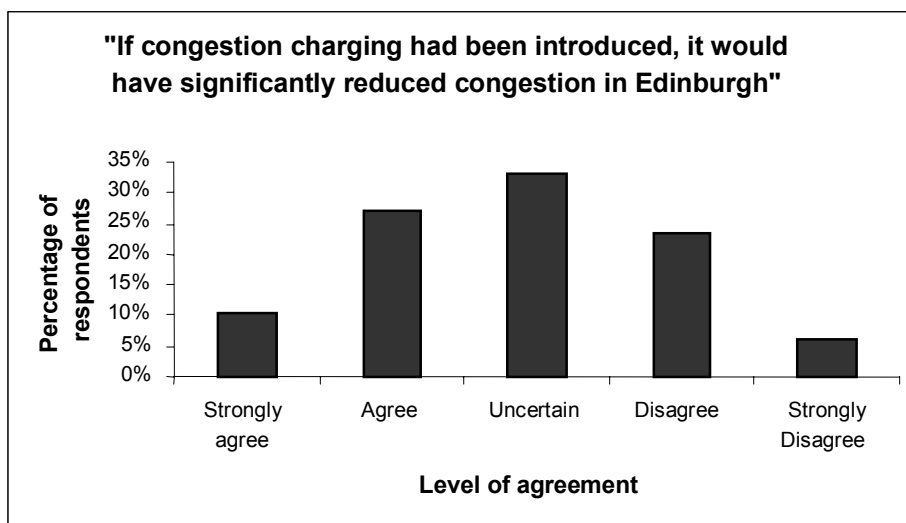


Figure 6: Percentage frequency distribution of respondents' level of agreement with the statement: 'If congestion charging had been introduced, it would have significantly reduced congestion in Edinburgh'.

The questionnaire included questions to assess whether the respondents were convinced that the proposal would be able to achieve its two principle aims: to reduce congestion; and to improve public transport, using the revenue generated (CEC 2004a). Figure 6 shows that considerably fewer than half (37.4%) of the respondents expressed confidence that the scheme would have significantly reduced congestion.

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. Thus there was a 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.

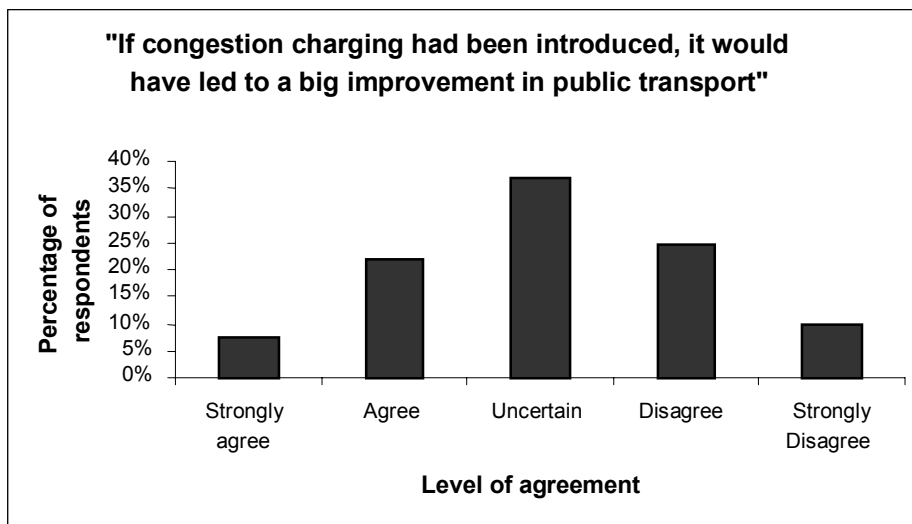


Figure 7: Percentage frequency distribution of respondents' level of agreement with the statement: 'If congestion charging had been introduced, it would have led to a big improvement in public transport'.

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, 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. Firstly, 56.3% of residents already considered public transport to be '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 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 ill-defined nature of the proposed public transport improvements; Saunders (2005) 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, they were divided into three groups, namely those who stated that the scheme would:

- 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).

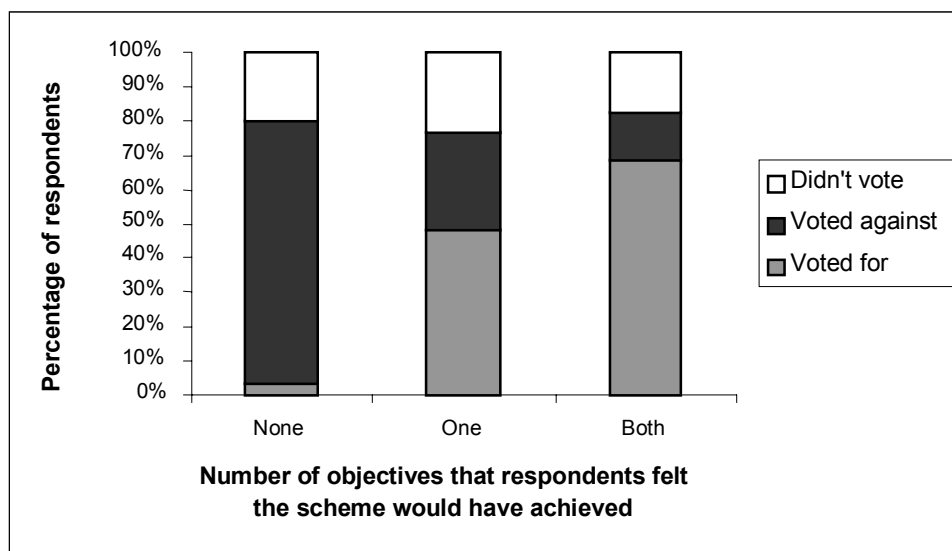


Figure 8: The voting behaviour of respondents grouped according to the number of objectives they felt the Edinburgh congestion charging scheme would have achieved.

Figure 8 shows the voting behaviour of respondents falling into each of these groups. It is interesting to note that 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

This paper has described the design and development of the proposed Edinburgh congestion charging scheme, noting several aspects which militated against its eventual introduction. There was no single implementing agency for the scheme. It was very

much dependent on the Scottish Executive for funding, and the bus and rail operators to undertake to improve public transport services prior to the introduction of the scheme. In addition, the delivery of public transport improvements outside the City of Edinburgh was dependent on neighbouring authorities, many of whom were hostile to the congestion charging scheme. The perception of surrounding local authorities was that the scheme (especially the outer cordon) was set up in such a way so as to charge their residents, whilst allowing City of Edinburgh residents to drive without paying, even though both groups could be seen to be contributing to congestion. Many people viewed the scheme as aimed only at revenue raising; moreover, they did not trust the Council to spend the revenue correctly. Further barriers to the implementation of the scheme, mainly related to local political issues, inadequate resourcing of the planning phase and complexity of the legislative framework are detailed by Rye (2005).

A lack of public acceptability has been widely acknowledged as the single greatest barrier to the implementation of road user charging (e.g. Jones 1998, 2003, Schade and Schlag 2003, Jaensirisak et al. 2005). This paper has presented the results of research to evaluate the importance of a number of factors that contributed to the lack of acceptability of the proposed scheme in Edinburgh, 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 recognise, nor 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 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 that 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.

This study suggests some lessons for other cities considering the introduction of RUC as a means to solve the problem of traffic congestion. Firstly, the design of schemes should avoid unnecessary complexity. 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. Secondly, 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. This suggests that the promoters of RUC need to engage strongly with public transport users using participative consultation processes to build ownership and trust, and show the flexibility and willingness to incorporate the outcomes of these processes into the final proposal. Furthermore, effective strategies should be developed to actively communicate the benefits of congestion charging to public transport users, building stronger support amongst a constituency that ought to be favourable, and thereby counterbalancing the inevitable opposition from motorists.

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