



Motivational factors influencing behavioural responses to charging measures in freight operator sector

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Abstract

The present paper aims to provide insights into freight operators' attitudes with differentiated charges and their opinions about charges' effectiveness and future behavioural responses. Thereby, we investigate whether motivational factors, particularly acceptability towards road charges, play an important role on future behavioural adaptations according to charging schemes. Interview surveys have been conducted and have focused on freight operators and road hauliers' perception and attitudes towards differentiated transport charges and several aspects of differentiation. Results show that a global index of acceptability of differentiation elements is particularly strongly correlated to the likelihood of future behavioural changes in medium terms as well as in long terms. These findings indicate that positive attitudes towards differentiated prices are also in the freight sector relevant for prospective success and effectiveness of pricing measures. Differences in likelihood of behavioural responses between several time horizons imply that effects of differentiated pricing in the freight operator sector affect behaviour more in the long run than in short term. Further findings show that the attitudes of the surveyed freight companies towards various elements of differentiation differ. Results suggest that differentiation elements which relate to changes at vehicle side are rated as more acceptable than differentiation elements which refer to concrete behavioural changes.

Keywords: Price Differentiation; Road pricing; Freight Operators; Acceptability; Behavioural Change; Psychological Reactance.

1. Background

In the transport sector differentiated pricing is increasingly used to influence behaviour in order to manage users' demand for infrastructure capacity. However, there is a likely conflict between the theoretical desirability of highly differentiated pricing structures and the ability and the motivation of users to respond effectively to them.

Bonsall, Shires, Matthews, Maule & Beale (2004) have summarised some of the relevant cognitive aspects for pricing differentiation in transport and have drawn on

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other sectors for empirical evidence of people's response to differentiated pricing schedules. If differentiation becomes too extensive for individuals to understand, people tend to base their behaviour on a simplified and possibly erroneous mental model of the price structure. Bonsall, Stone, Stewart and Dix (2006) found that a significant proportion of consumers 'disengage' if they perceive cost structures to be too complex. This disengagement sometimes leads people to delay the decision, to avoid purchase, to opt for the simplest or least uncertain option (if there are alternatives), or just to pay up regardless. Qualitative evidence confirmed that a proportion of the population would respond to complex charges by disengaging. This disengagement will sometimes take the form of paying the charge irrespective of its size, and sometimes deciding to adopt an option which avoids exposure to the charge. This could have profound implications for the performance of pricing schemes and for the structure of models used to predict behavioural responses (Bonsall, Shires, Matthews, Maule and Beale, 2007). Rößger, Schade, Obst, Gehlert, Schlag, Bonsall and Lythgoe (2008) have shown that an increased differentiation of road pricing leads to an increased erroneous price estimation, slower response times in price estimations as well as to increased uncertainty and perceived difficulty in dealing with the schemes. In general, this study also suggests that people seem to prefer simple tariffs (e.g. flat rates) even if these tariffs are slightly more expensive than differentiated price schemes.

But there are not just cognitive aspects which relate to the ability to understand differentiated prices that have to be considered as constraints of behavioural adaptations to differentiated prices (Hoffmann, Schade, Schlag and Bonsall, 2006). Motivational factors also play an important role. I.e., even if transport users are able to understand a highly differentiated pricing system and to predict prices in advance, it does not mean that they are willing or motivated to deal with these charges and to adjust their behaviour. When people feel that they are treated unfairly (e.g. by a new pricing regime) behavioural disengagement becomes more probable, and thus, intended behavioural changes are likely to fail (Gehlert, Francke & Schlag, 2007). The Theory of Psychological Reactance (Brehm, 1966) provides a valuable approach to explain this phenomenon. The reactance theory is based on the observation that people want to perceive that their relevant behavioural options could be potentially implemented (behavioural freedom). If the behavioural freedom is perceived as threatened or restricted (e.g. by road pricing), individuals will experience an adverse motivational state called reactance. An important prerequisite for the development of reactance is that people perceive the threatening of their behavioural freedom as unfair or unreasonable. If, however, the restrictions are logical or otherwise made plausible less or no reactance is predicted (Miron & Brehm, 2006). Since reactance is an intense adverse motivational state which has strong motivational properties, experience of psychological reactance eventually leads to attempts to restore one's behavioural freedom. According to Brehm's theory, the restoration of freedom can be done in two distinguished ways. The restoration of perceived behavioural freedom via direct actions is seen as the most effective way of reducing reactance but because of situational and social constraints direct actions are less likely. Instead of direct actions, the restoration of behavioural freedom via indirect reactions is more likely. Thereby, one possibility of indirect reactions is restoration by implication. In this term implication includes refusing to act, watching others restoring the freedom or motivating others to restore freedom.

According to the noted theoretical approach and beside the cognitive aspects a central motivational factor that might influence user reaction toward differentiated pricing is

acceptability. If users do not accept the price system they may not make an effort to understand it (Rößger et al., 2008). In such cases they may not change their behaviour to the extent they could, or may even resist making any change. Acceptability is a hypothetical construct that refers to the (affirmative) attitude towards a specific attitudinal object. Within the heuristic model of acceptability by Schade and Schlag (2000, 2003) several factors have been identified which contribute to the acceptability of transport pricing measures. For the evaluation of such pricing systems, among others, relevant issues of acceptability seem to be perceived effectiveness and perceived fairness. Perceived effectiveness refers to the degree to which the aims of the measure can be reached. Whether the proposed measures are perceived as being effective or not determines the acceptability of the measure. Perceived justice or fairness also is an important prerequisite of acceptability. If fairness is tentatively operationalised as personal outcome expectations it is expected that the more people perceive advantages following the introduction of transport infrastructure use charges the more they will be willing to accept it (Schade & Schlag, 2003).

The empirical background to the above theoretical discussion is mostly research in the passenger travel market, and car drivers in particular. Freight is usually relatively essential movement (similar to commuting to work), and hence elasticities for freight movement in general can be expected to be low. But for commercial reasons, companies have various alternative options available as responses to increased transport costs, like changing vehicle type or switching to an alternative mode. Further, inaccurate perceptions and personal biases are likely to be less of a problem to freight than to most private travellers; freight operators in many cases use special software to calculate prices, or they use specialized staff for this task. These arguments would imply that actual elasticities for a particular mode in freight might be higher than for freight in general, and higher than expected from the essential nature of freight. The evidence on elasticities supports these views to an extent; see for example Graham and Glaister (2004).

Road freight is a market characterized by strong competition and well informed decision makers. Since profit maximization is a prime objective, operators are expected to act rationally to price differentiation measures. The present paper aims to examine if motivational factors like acceptability, perceived fairness and perceived effectiveness still have an effect on influencing future behavioural responses, and which factors are the most important ones.

Two interview surveys with freight operators have been conducted to obtain information on operators' views and opinions, one referring to an urban setting, and the other referring to an interurban setting. Because of the different nature of urban and interurban freight transport, the two surveys were different in the description of choice scenarios and certain options for price differentiation. For instance, an alternative free of charge route would not be available for the urban sample. The urban sample consisted in principle of local operators with local and regional distribution as their main business. The interurban sample would have long distance transport as their main business, and with international operation equally common as national operation. This sample would in general have prior experience with charging like motorway tolls and the German Maut, whilst only the Norwegian urban sample would have extensive experience with urban charging.

2. Survey 1: Interviews on urban settings

2.1. Method

The survey has been conducted by direct telephone interviews with key area managers of the firms contacted, or directly with single haulers. Together with the official invitation to take part in the survey, a self-administered version of a questionnaire was submitted by e-mail both to assist phone meetings and give the option of self completion (Tretvik, 2007).

Questionnaire. At the start section the questionnaire asks for information about the company (turnover, transport activities, type of hauled goods, fleets etc.). The second part of the questionnaire deals with some general questions about current practise regarding road tools, among others the way to calculate tolls.

Within the third part reactions and opinions towards an example scenario adopted from the Stockholm congestion trial has been applied to the participants. Referring to the scheme, the questionnaire sought for information about the understandability of the pricing scheme, ability of precise prediction of price calculation (How accurately COULD YOU predict costs?), engagement / motivation in of price calculation (How accurately WOULD YOU predict costs?) and perceived effectiveness of the pricing schemes.

Furthermore, freight operators were asked about the likelihood of several behavioural adaptations if differentiated charges were applied in the specified local urban areas. Respondents of the survey thereby were asked to rate the likelihood of reactions in short term, medium term and long term. The following behavioural reactions have been focussed on:

- Changes in delivery time,
- Use of intermodal services,
- Changes in frequency of consignment/departures,
- Optimisation of loads by restructuring services,
- Alliances / agreements with other transport operators,
- Change of road vehicle and
- Renewing of the vehicle fleet (e.g. cleaner vehicles)

The last part of the questionnaire focused on perceived effectiveness, perceived fairness and acceptability of the following elements of differentiation, if differentiated charges were introduced in the hauliers' local area:

- Vehicle class,
- Emissions,
- Time of day/night (peak/peak off hours),
- Type of traffic (crossing/internal),
- Types of road (motorway/express/local roads),
- Period of year/day/week

Participants. The sample contained a total of $n = 18$ (5 Italian operators, 5 operators from Norway, 3 operators from the UK and 5 Polish operators). 12 out of 18 participants stated that their annual turnover is larger than 500 k uro, 2 out of 18 stated

that their turnover is between 100 k and 500 k uro. 2 operators refused the question about annual turnover. Referring to the type of urban freight transport, about 55% of respondents stated that local distribution is most common for their firms with respect to the tolled (scenario) area. About 38% (7) stated that the most common type is regional distribution for their firms. Only one respondent stated all types (Local, regional, long distance road freight transport) are common for his firm with respect to tolled area.

2.2. Results

Overall, differentiation based on emission standards or peak/off-peak hours were perceived to be the most effective in affecting road hauliers' actions, whilst measures believed to be the least effective were differentiation based on vehicle class or type of road. Interestingly, one of the measures perceived to be the most effective (emission standards) was perceived to be the most acceptable, whilst the other (peak/off-peak hours) was the most unacceptable (Figure 1). Still, only the peak/off-peak measure showed a significant correlation (at the 5 % level) between perceived acceptability and effectiveness. There were in general strong positive correlations between responses to the questions about acceptability and fairness of measures. Correlations for each measure ranged between 0,6 (significant at the 5 % level) and 0,9 (significant at the 1 % level).

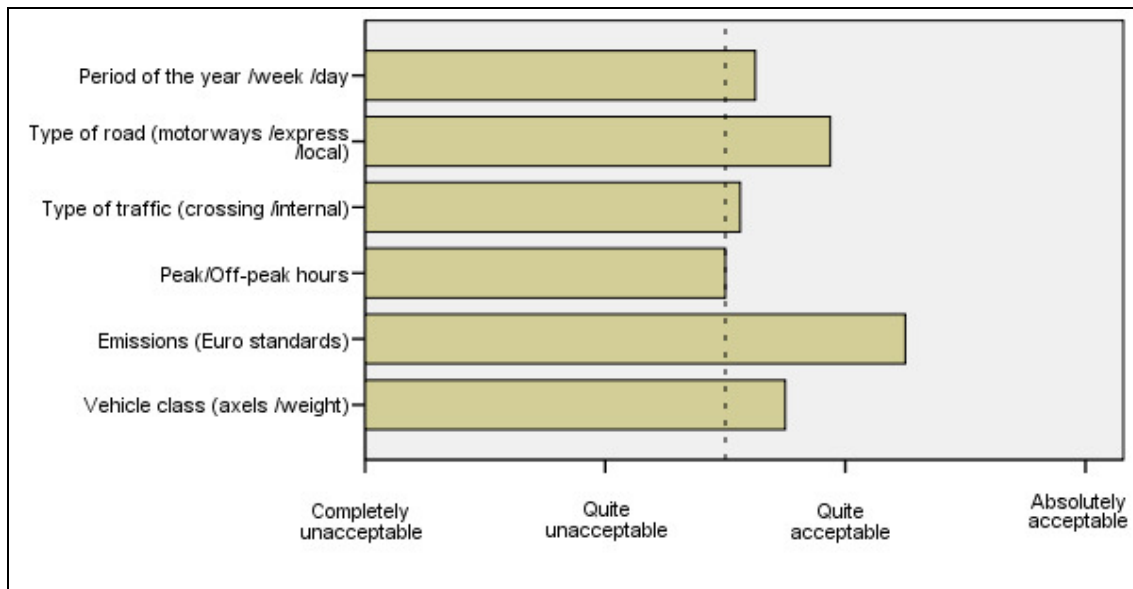


Figure 1: Acceptability toward types of differentiation in an urban setting.

Figure 2 shows clearly that long term responses were more likely than medium term responses and that medium term responses were more likely than short term responses. Overall, long term fleet renewal (according to EURO standards) was the most likely response. Even fleet renewal in the medium term ranked third overall. In the short term, the optimisation of loads and change of frequency of services were ranked highest.

Other options that ranked high overall were changes in delivery times and change of frequency of services, both in the long run. Alliances, change of vehicles and use of intermodal services, all in the short run, were the most unlikely adaptations.

Larger companies were in general more likely to indicate behavioural changes for the majority of measures, compared to smaller size companies. It was in fact only changes in delivery times in the short, medium and long term that smaller companies indicated more frequently than larger companies. This might be because larger firms are in a better position to adapt to price differentiation measures in a variety of ways, or psychological factors may to a larger extent act as constraints for smaller companies than for larger ones. Sample sizes were too small for making a statistical investigation of this issue.

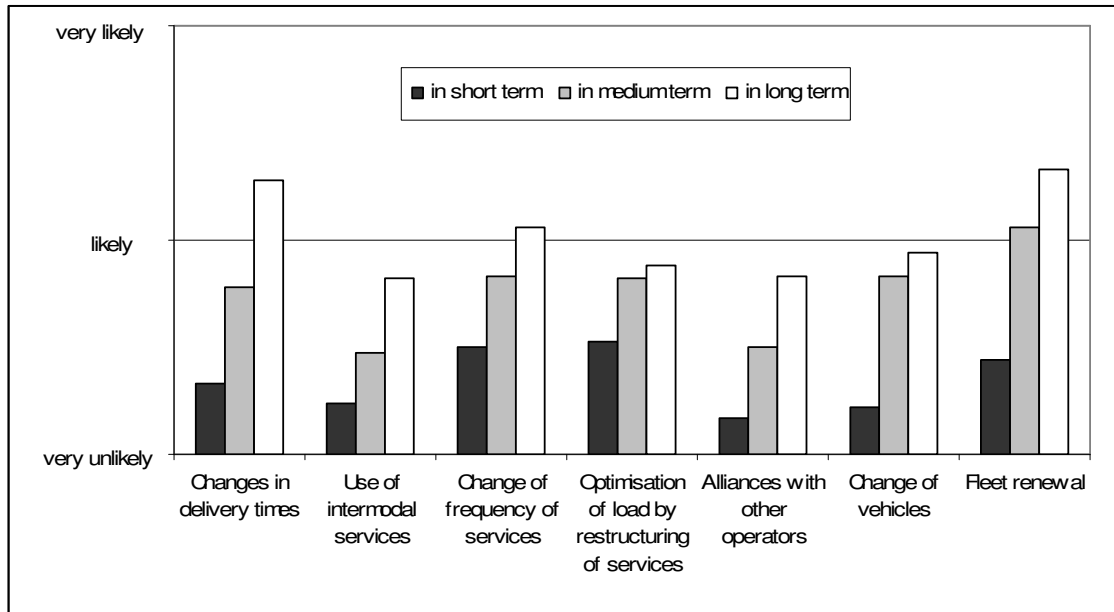


Figure 2: Stated likelihood of behavioural responses if pricing schemes would be applied on urban areas.

3. Survey 2: Interviews on interurban setting

3.1. Method

Questionnaire. The questionnaire for the second survey was almost identical with regard to the relevant items with the questionnaire used within study 1. Reference schemes were adapted to the characteristics of respondents. Participants were polled on the understandability of reference schemes, perceived effectiveness and engagement / motivation in prediction of tolls (Martino, 2008).

As in study 1, freight operators were asked about the likelihood of several behavioural adaptations if differentiated charges were be applied on a certain corridor, and in addition to this, on the whole European network. Respondents were asked to estimate the likelihood of their reactions in short term, medium term and long term. In addition to the items used in study 1, the questionnaire included re-routing to other motorways and respectively re-routing to express / parallel roads as possible behavioural responses. Further, this questionnaire distinguished the use of accompanied intermodal services (Rolling Motorway / Ro-Ro) from the use of non-accompanied intermodal services.

As in study 1, the last part also sought for information about perceived effectiveness, fairness and acceptability on differentiation elements. In addition to the differentiation elements presented in study 1, an item referring to differentiation based on geographical aspects (mountainous or sensitive area) was added.

Participants. The sample contained $n = 17$ participants. 30 questionnaires were sent out, a total of 17 were returned (9 by Polish operators, 8 by Italian operators). 9 out of 12 respondents stated that their annual turnover is larger than 500 k Euro, 5 participants refused the question about yearly turnover. Half the respondents operate mainly on international level; about 50% of operators are mainly active on national level.

3.2. Results

Differentiation elements according to emission, and respectively, to vehicle class (e.g. axels, weight) were more acceptable than other differentiation types. The acceptability of differentiation according to period of the year / week and according to geographical sensitive areas received the lowest ratings by the freight operators (see Figure 3). There were slight differences between the ratings referring to the interurban corridor and ratings referring to the network setting but these differences were not statistically significant.

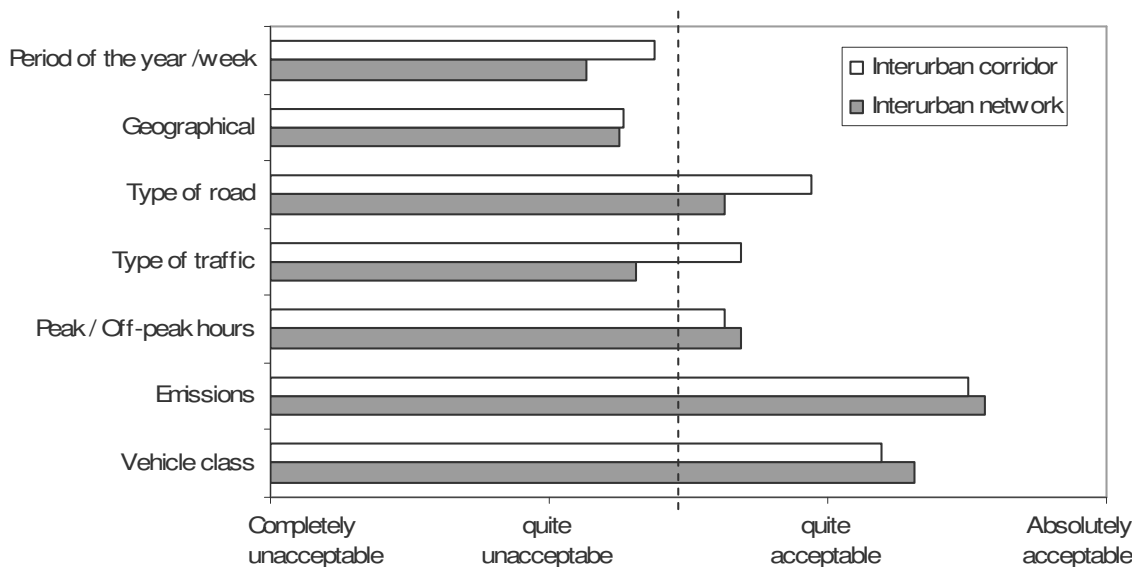


Figure 3: Acceptability towards differentiation types in interurban settings.

Correlation analyses further emphasized that stated acceptability of specified types of differentiation were strongly related to perceived fairness. This held true for statements referring to the corridor case as well as for statements referring to the EU road network. The fairer differentiation elements were assessed, the more these aspects have been accepted. Tests of correlations between acceptability and perceived effectiveness showed weaker associations. Average correlation coefficients were computed via Z – transformation: the correlation between acceptability and perceived fairness was $r = 0.80$ if the setting referred to an application of charging schemes on the whole EU road network. If the setting referred to an application of charging schemes on a single corridor, the correlation coefficient between acceptability and perceived fairness $r = .47$ was smaller but remained considerably. The average values for correlation coefficients

between perceived effectiveness of differentiation types and acceptability towards differentiation types were $r = 0.24$ for the EU road network and $r = 0.28$ for the application on an interurban corridor.

Concerning the stated likelihood of future responses, there were no significant differences between the ratings with respect to a certain corridor and the ratings with respect to the European road network. As an example for the interurban setting, Figure 4 provides an overview of respondents' statements on behavioural adaptation strategies if charges would be applied on the EU network. Like results in study 1 already indicated – and not surprisingly, the most apparent effect on the likelihood of behavioural changes seemed to have the time horizon. Regarding a short time perspective, behavioural responses to charging schemes were rather unlikely whereas the likelihood increased with an increasing time horizon across all behavioural categories. However, these increases in the likelihood seemed to be different for certain behavioural categories. While “Alliances with other operators” was (relatively) rated as the most probable strategy referring to a short time perspective, in medium and in long terms “Fleet renewal” became the most probable behavioural adaptation strategy. Re-routing, changes in delivery times and optimisation of load by restructuring also became more probably over the time than the use of intermodal services or making alliances with other operators respectively. Obviously, behavioural strategies in adapting to charging schemes will change over time.

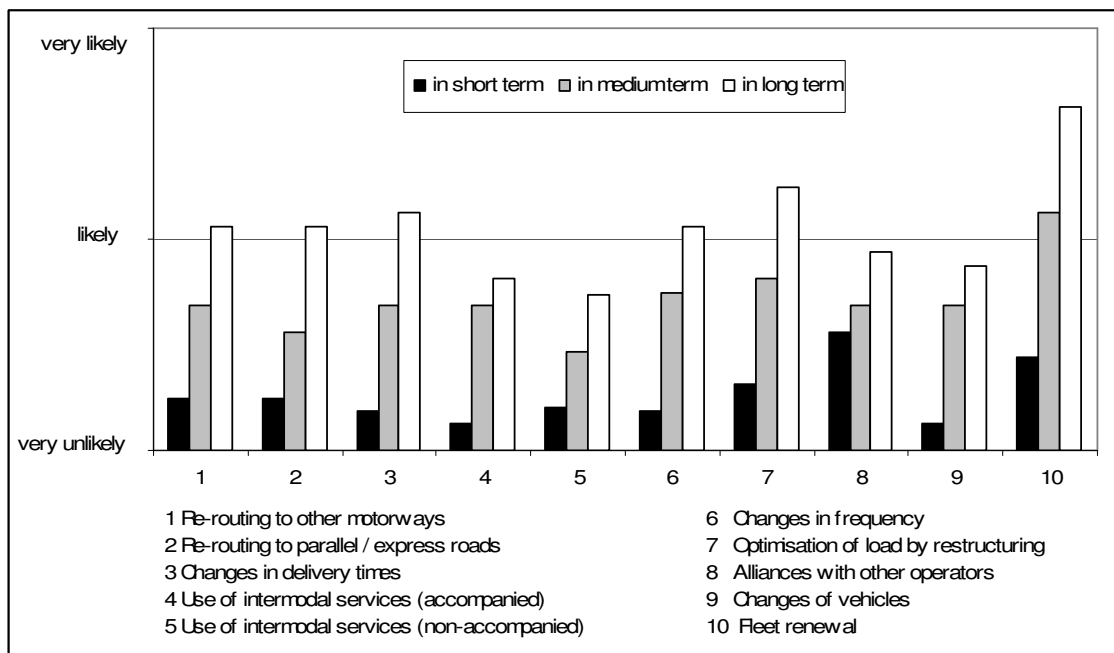


Figure 4: Likelihood of future behavioural responses if charging scheme would be applied on the EU network.

4. Further analyses

Datasets of both surveys were merged together into a joint dataset. The purpose for this procedure was to get more generalisable valid results for freight operators and to get

a more reasonable sample size for interference statistical analyses. Furthermore a joint dataset provides the possibility to compare responses between the urban and interurban setting. Since the statements within study 2 considering behavioural strategies and attitudinal variables do not differ in respect to the reference areas (interurban corridor vs. EU road network), for the joint data analyses only statements referring to the EU network have been used.

Comparisons between the urban and the interurban setting show differences in the acceptability of differentiation elements. So, differentiation according to the vehicle class (axels / weight) and differentiation according to emissions were rated significantly more acceptable if the respondents were exposed to an interurban setting than to an urban setting (see Table 1).

Table 1: Differences in acceptability statements between urban and interurban setting.

<i>Differentiation element</i>	<i>Setting</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>	<i>Signif.</i>
Vehicle class (axels / weight)	Urban	2,78	,647	,152	.011
	Interurban	3,31	,479	,120	
Emissions (Euro standards)	Urban	3,22	,428	,101	.043
	Interurban	3,56	,512	,128	
Peak / Off peak hours	Urban	2,47	1,179	,286	.555
	Interurban	2,69	,873	,218	
Type of traffic (crossing /internal)	Urban	2,65	1,169	,284	.375
	Interurban	2,31	,946	,237	
Type of road (motorways /express /local)	Urban	2,94	,873	,206	.256
	Interurban	2,63	,719	,180	
Period of the year /week /day	Urban	2,56	,984	,232	.159
	Interurban	2,13	,719	,180	

Differences between the urban and the interurban setting also have been found with respect to the likelihood of certain future behavioural adaptation strategies. Considering the likelihood of short term responses, in the urban setting participants tended to rate “Changes in frequency” and “Optimisation of load by restructuring” more probable than participants in the interurban setting. On the contrary, respondents in the interurban setting rated it more probable to make alliances with other operators than respondents within the urban setting. This difference was significant at 5% significance level (Figure 5).

Prediction of Stated Likelihood of Behavioural Changes. Future behavioural responses to reference pricing schemes have been obtained in order of short term, medium term and long term responses separately. As descriptive results from study 1 and study 2 show, behavioural changes in the short term were rather unlikely, whereas the likelihood of behavioural changes increased with enlarged time horizon. Moreover, fleet renewal seemed to be the most probable response in the long term as well as in the medium term. For the short time perspective, not only fleet renewal but also changes in frequency of consignments / departures showed slightly higher values of stated likelihood compared to other responses.

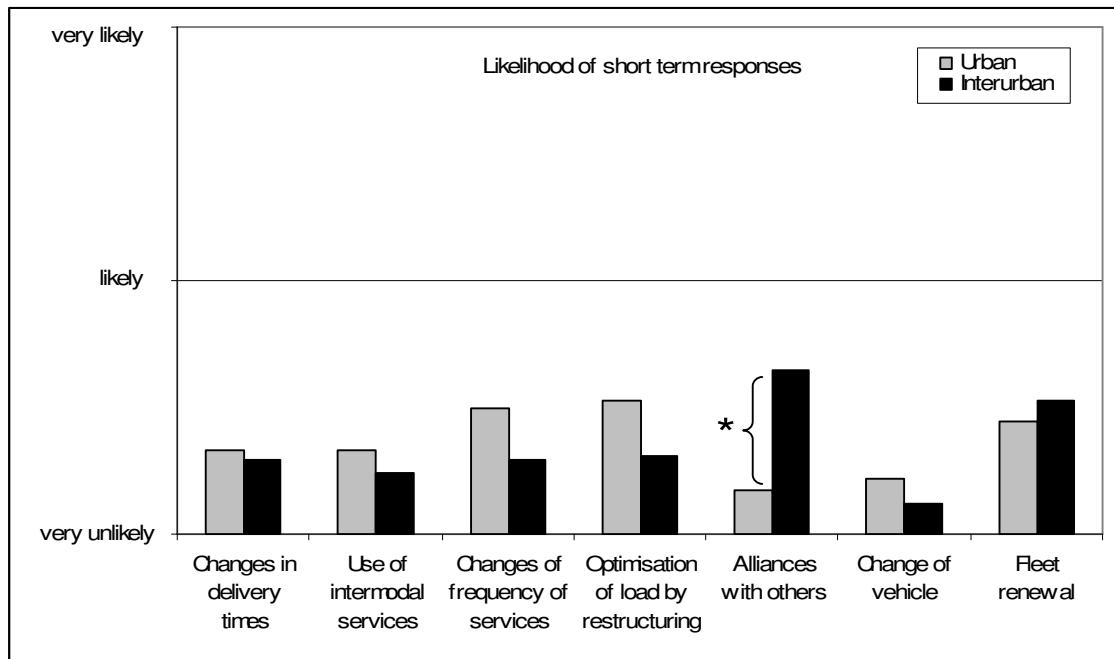


Figure 5: Differences in behavioural strategies as response to charging schemes between urban and interurban setting.

Based on the complete data set (study 1 and 2), three indices by means of average values of all used items for short term, medium term and long term responses have been computed serving as comparable indicators of the behavioural responses' likelihood. So, we produced three indices which provide approximations of the likelihood of future behavioural changes (LBC): LBC short term, LBC medium term, LBC long term. These indices were used in the following regression analyses as dependent variables.

Potential factors have been tested simultaneously regarding their impacts on prediction of likelihood of behavioural change indicators by stepwise regression analyses. Unfortunately, items considering acceptability had not been similarly obtained within both studies. As described above, both surveys however obtained acceptability toward several differentiation aspects similarly. An approximation of a global value of acceptability towards differentiated toll charges has been computed by means of an average value of these items. So, this acceptability indicator has served rather as an approximation of a more general attitude toward differentiated charges than an attitude toward a specific charging scheme.

In sum, theoretically relevant variables were included in a start regression model in an explorative way. After that, the number of predictors was stepwise reduced by criteria of non-significant changes in total explained variances. The start regression model included the following predictors:

- Global acceptability towards differentiated toll charges
- Understandability of reference scheme
- Engagement / motivation to deal with reference scheme
- Perceived effectiveness of reference scheme.

A regression model to predict LBC short term provided unsatisfactory results (Table 2). This result has suggested that the likelihood of short term response was not

predictable by independent variables included in the regression equation. None of the predictors showed a beta-weight at significant level. Based on this result, it has to be noted that operators' perceptions respectively opinions about a differentiated pricing scheme did not affect their (stated) likelihood of behavioural changes in the short term.

Table 2: Regression coefficients Prediction of Likelihood of Short Term Responses (LBC short term).

<i>Start model</i>	<i>Standardised coefficients</i>	<i>T</i>	<i>Significance</i>
(constant term)		6.578	.000
Acceptance	.259	1.384	.178
Understandability	.154	.704	.488
Engagement	-.134	-.624	.538
Effectiveness	.153	.804	.429

Results of regression analysis of LBC medium term showed a significant multiple correlation coefficient between obtained values and values predicted by all independent variables together (start model, $R = 0.618$, $p = 0.012$, see Table 4). The explained variance of this model (adjusted R^2) was 0.287: suggesting that about 29% of the variance in stated likelihood of behavioural changes was explainable by variances of the predictor variables. Moreover, the stepwise reduction of predictors did not change the value of explained variances significantly. In terms of tested variables this means that the likelihood was solely predictable by operators' index of acceptability towards differentiated toll charges. The coefficient for perceived effectiveness achieved significance only at the 12.5% level, but was the second most important factor (Table 3).

Table 3: Regression coefficients Prediction of Likelihood of Medium Term Responses (LBC medium term).

<i>Start model</i>	<i>Standardised coefficients</i>	<i>T</i>	<i>Significance</i>
(constant term)		3.883	.001
Acceptance	.523	3.363	.002
Understandability	.239	1.317	.199
Engagement	-.230	-1.285	.210
Effectiveness	.251	1.586	.125

Table 4: Summary of Regression Models: Prediction of Medium Term Responses.

<i>Model</i>	<i>R</i>	<i>Adjusted R²</i>	<i>Changes in F</i>	<i>Changes in significance of F</i>
Start model (a)	.618*	.287		
2 (b)	.585**	.269	1.650	.210
3 (c)	.573**	.280	.583	.451
4 (d)	.536**	.262	1.721	.200

Notes: a) Predictors: Acceptance, Understandability, Engagement, Perceived Effectiveness

b) Predictors: Acceptance, Understandability, Perceived Effectiveness;

c) Predictors: Acceptance, Perceived Effectiveness;

d) Predictor: Acceptance

Regression analysis of LBC long term also showed significant multiple correlation coefficient between obtained and predicted values of behavioural changes' likelihood (Table 6). Compared with the results above, the fit of regression equation was even stronger: correlation coefficient $R = 0.674$ and adjusted explained variance by all predictors together (start model) in index LBC long term was $R^2 = 0.371$. Stepwise reduction of predictors by above named criteria suggested that again mainly acceptability contributed essentially to the prediction of the behavioural change index. Changes in explained variances were not significant by reduction of predictors - except the variable acceptability. So, this finding was very similar to the result of regression analysis concerning medium term responses. Again, perceived effectiveness was the second best explanatory variable, but the coefficient achieved significance only at the 10% level (Table 5).

Table 5: Regression coefficients: Prediction of Likelihood of Long Term Responses (LBC long term).

<i>Start model</i>	<i>Standardised coefficients</i>	<i>T</i>	<i>Significance</i>
(constant term)		2.047	.051
Acceptance	.580	3.971	.001
Understandability	.212	1.243	.225
Engagement	-.256	-1.520	.141
Effectiveness	.255	1.714	.098

Table 6: Summary of Regression Models Prediction of Long Term Responses.

<i>Model</i>	<i>R</i>	<i>Adjusted R²</i>	<i>Changes in F</i>	<i>Changes in significance of F</i>
Start model (a)	.674**	.371		
2(b)	.650**	.358	1.544	.225
3(c)	.633**	.357	1.048	.315
4(d)	.597**	.334	2.054	.163

Notes: a) Predictors: Acceptance, Understandability, Engagement, Perceived Effectiveness

b) Predictors: Acceptance, Understandability, Perceived Effectiveness;

c) Predictors: Acceptance, Perceived Effectiveness;

d) Predictor: Acceptance

5. Discussion

The present paper considers freight operators' opinions and perceptions of road pricing charges as well as their views on selected elements of differentiation. Results show that a global index of acceptability of differentiation elements is particularly strongly correlated with the likelihood of future behavioural changes in medium terms as well as in long terms. These findings indicate that positive attitudes towards differentiated prices are also in the freight sector relevant for prospective success and effectiveness of pricing measures. Perceived effectiveness was the second most important motivational factor for all three time horizons, even if the estimated effect on the likelihood of behavioural change was only close to being significant, given the relatively small sample size. This gives some support to the hypothesis that a belief in

the effectiveness of price differentiation measures, in terms of providing more efficient transport operation, is important for behavioural changes to happen.

Further, variables investigating aspects of direct handling with toll charges by operators (e.g. understandability, engagement to deal with schemes) do not considerably contribute to the prediction of stated likelihood of behavioural changes. That might suggest that the understandability of charging schemes respectively the engagement to deal with them is less important for freight operators than for individual car users or transport passengers. A further fact supports this assumption: a vast majority of respondents' states that they have special staff calculating and evaluating road toll expenditures. So, cognitive burden by differentiated pricing schemes seems not to be a major issue for freight companies. It seems to be identified as a necessary separate task - allocated in companies' structures separately. Moreover, differences in likelihood of behavioural responses between several time horizons imply that effects of differentiated pricing in the freight operator sector affect behaviour more in the long run than in short term. This is comparable with the typical finding that long-term elasticities are usually higher than short-term elasticities (e.g. Nijkamp & Pepping, 1998).

Additional findings show that the attitudes of the surveyed freight companies towards various elements of differentiation differ. E.g., differentiation according to emission or vehicle class seems to be more acceptable than any other differentiation element. Differentiation in terms of geographic (e.g. mountainous or sensitive areas) or time aspects (period of year / week / day) are rather less acceptable to road freight operators. It is interesting to note that differentiation elements which relate to changes at vehicle side are rated as more acceptable than differentiation elements which refer to concrete behavioural changes. One possible explanation might be that freight operators perceive more control to respond towards vehicle based price differentiation than to a price differentiation which relates to changes in the operation of HGV. Comparison of certain future responses hints also in this direction: so, fleet renewal is seen as the most likely response to reference schemes in medium terms as well in long terms.

Due to the correlative design of the survey, further studies are needed to examine casual relationships between motivational factors and behavioural responses towards differentiated charging schemes. It might be possible that acceptability affects behavioural responses in sense of a higher willingness to deal with charges and thus behavioural adaptation will become more likely. On the other hand it might be also plausible that certain kinds of behavioural adaptation strategies are perceived as more realisable and therefore certain charging schemes corresponding to realisable adaptation strategies are more accepted. Finally, it is probable that both variables interact.

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