Short-term responses of Dutch vacationers to a sharp increase in transport costs

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Abstract

This paper investigates vacationers' short-term responses to a sharp increase in transport costs. It aims to (1) acquire an understanding of the relative popularity of the different types of responses among vacationers and (2) to explore whether there are distinct market segments of vacationers that respond differently to a sharp increase in transport costs. Data are obtained from a novel, tailor-made questionnaire which was done in The Netherlands in 2012. Results show that no single response is either very popular or unpopular. Furthermore, using Latent Class Cluster Analysis, four market segments (classes) of vacationers are identified that have markedly distinct response patterns. It was found that Age and Income explain class membership.

Keywords: Vacation behaviour, High transport costs, Peak oil, Latent class cluster analysis

1. Introduction

Tourism relies heavily on affordable mobility (e.g. Becken, 2011). While at present oil prices are historically low, as the oil crises in the 1970s well illustrated, affordable mobility is not a fact of life. In this context, recently, a growing number of studies have investigated the potential impacts of a sharp increase in oil prices on tourism. These studies have generally taken macro-level approaches that are based on price-elasticities of demand to examine the potential effects of high oil prices on tourism in terms of the total yearly tourism expenditure, the total annual number of tourist arrivals and the number of overnight stays. For instance, Logar and Van den Bergh (2013) used an Input-Output (I-O) model to investigate the effects of high oil price scenarios on the Spanish tourism industry; Yeoman et al. (2007) and Becken and Lennox (2012) used Computational General Equilibrium (CGE) models to assess the potential impacts of high oil prices on, respectively, the Scottish and the New Zealand economy.

While these studies, using macro-level approaches, provide valuable insights into the potential impacts of high oil prices on tourism and the wider economies, a potential shortcoming of these studies is that they assume that the behaviour of vacationers – expressed in terms of elasticities of demand – is unaffected by the substantial increase in transport costs. However, it seems quite likely that vacationers will change their behaviour quite fundamentally when confronted with high transport cost conditions. Vacationers may adopt complex substitution patterns that are unlikely to be accurately captured by elasticities of demand that are determined at current price levels. For instance, they may substitute one long intercontinental vacation for multiple short-stay domestic vacations or skip the winter vacation, while leaving the summer vacation unchanged. This increases the uncertainty associated with the outcomes of such macro-level approaches. Moreover, numerous studies have recently highlighted the presence of heterogeneity in vacation behaviour under vacationers and have demonstrated the existence of distinct market segments of vacationers (Alegre et al., 2011; Crouch et al., 2014; Kemperman and Timmermans, 2008; López-Bonilla and López-Bonilla, 2008). The possibility that different segments of vacationers exists that respond differently towards a sharp increase in transport costs – e.g. by adopting different substitution patterns – is generally not accounted for in macro-level approaches. This decreases the reliability of the outcomes of these macro-level approaches.

The present study aims to contribute to the understanding of the short-term impacts of a sharp increase in transport costs on tourism. In contrast to earlier studies, this study takes a micro-level approach; that is, we investigate the impacts of a sharp increase in transport costs at the level of the individual. More specifically, the objectives of this study are twofold. Firstly, we aim to acquire an understanding of the relative popularity among vacationers of different types of responses when they are confronted with a sharp increase in transport costs. Secondly, we aim to explore whether there are distinct segments of vacationers that respond differently towards a sharp increase in transport costs; and, when such segments do exist, we aim to relate these segments to observable characteristics, such as socio-demographic variables. To elicit how vacationers would respond to a sharp increase in transport costs, a self-administered questionnaire was conducted among Dutch vacationers. In this questionnaire respondents are presented with a fierce scenario in which transport costs are triple their current levels, irrespective of the mode of transport or destination. By presenting respondents with such a fierce scenario, the respondents are forced to reconsider their status quo, i.e. their current vacation plans and to actively think about how they will respond in the scenario presented. To enhance the respondent's comprehension of the fierce scenario, the questionnaire is tailored around each of the respondent's individual upcoming vacation plans.

The remainder of this paper is organized as follows. Section 2 starts by identifying potential short-term responses to a sharp increase in transport costs. Next, sections 3 and 4 present our methodology and results. Lastly, section 5 draws conclusions and provides a discussion.

2. Responses to a sharp increase in transport costs

What options do vacationers have when responding to a sharp increase in transport costs? In this section we identify the potential response dimensions that vacationers have to respond to an increase in transport costs in the short-term. We specifically focus on short-term response dimensions – as opposed to long-term response dimensions (such as buying a camper van, relocating to another area, buying a fuel-efficient car, to name but a few). In the context of this paper, a short-term response is defined as a response that a vacationer can reasonably take at short notice and which would change his or her planned vacation(s) within the coming year.

To identify potential short-term response dimensions we assessed current literature on tourism. The literature search was conducted using Google Scholar and Scopus. Combinations of words related to (high) transport costs and responses were used as search tags. Many of the relevant studies that were found have been conducted in the wake of the oil crises. Furthermore, reference lists from appraised papers were checked for further useful references.

We have identified eight potential short-term response dimensions from the literature we assessed. Below we briefly discuss each of the dimensions identified.

Dimension 1: Destination (distance)

It goes without saying that changing the vacation destination is one way for vacationers to deal with a sharp increase in transport costs. This response dimension has been studied in a study closely related to this one: Williams et al. (1979). Amid the second oil crisis, Williams et al. (1979) surveyed residents of Chicago, Dallas, Los Angeles and New York to investigate the reactions of vacationers under a variety of potential future fuel supply situations, including strong price increases ranging from $0.80 to $2.00 per gallon as well as and fuel rationing policies. They identified several response dimensions and found a strong relation between an increase in transport costs and a decrease in the propensity to travel for vacation purposes. A large majority of the sampled respondents (76%) indicated they would choose destinations closer to home. By and large, similar results were found three years later by Kamp et al. (1979), who interviewed 92 travellers at the Texas State Welcome Centre in Orange, Texas. Kamp et al. (1979) found that people travelling for pleasure would either eliminate the trip altogether or take a shorter trip when gasoline prices substantially increased. In a more recent study conducted by Van Cranenburgh et al. (2014a), vacation behaviour was inferred under high transport cost conditions using discrete choice methodology. They identified several interactions effects between the different components of vacation alternatives, such as mode of transport, distance, length of stay and accommodation type. In a follow up study, this model was used to investigate the impacts of a scenario in which – as a result of high aviation carbon taxes – air fares increased by 50% (Van Cranenburgh et al. 2014b). In this study, intercontinental destinations were found to lose considerable market share: between 7% and 26%, while the market share of destinations that were nearer (<200 km) was found to increase considerably: between 4% and 18%.

Dimension 2: Length of stay

Another response dimension is the length of stay. As the tourism industry is facing a worldwide trend of decreasing length of stay (UNWTO 2006, UNWTO 2007), in the tourism literature substantial attention has recently been given to understanding the determinants of how long tourists stay at the vacation destination (e.g. Barros et al. 2010; Alegre and Pou 2011 Santos et al. 2014). However, despite this surge in interest to explain the length of stay, only a few studies *explicitly* investigate the relation between (a sharp increase in) transport costs and the length of stay (Mak et al. 1977; Williams et al. 1979; Van Cranenburgh et al. 2014a; Van Cranenburgh 2014b). Williams (1779) found a positive relation between transport costs and length of stay: over half of the respondents surveyed by Williams et al. (1979) indicated they would stay longer at the vacation destination if gasoline prices increased sharply. In line with these results, although not in the context of an increase in transport costs, Bell and Leeworthy (1990) found a positive relation between the transport costs and the length of stay (in their case: the number of beach days in Florida) using a hedonic cost model. Yet, various other studies have found a negative relation between transport costs and the length of stay, instead of a positive relation. For instance, in a simulation study conducted by Van Cranenburgh et al. (2014b) to assess the impacts of a sharp increase in airfares, it was found that the market share of vacations with a length of stay of 3 weeks or more dropped substantially. While not in the context of transport cost increases, Landry et al. (2007) investigated recreational demand for visiting a beach using a hedonic cost model and found a negative relation between transport costs and the demand. All in all, it is clear that the length of stay is a response dimension for vacationers to deal with an increase in transport costs. However, the direction of the relation between transport costs and the length stay is unclear.[1] Moreover, Barros and Pinto (2010) suggest that length of stay can also be a determinant of destination demand, rather than an economic constrain.

[1] Possibly it varies per destination.

Dimension 3: Number of vacations in one year

Another way in which vacationers can deal with a sharp increase in transport cost is by reducing the number of vacations taken in one year. This response dimension has been studied extensively in the context of the oil crises (Corsi and Harvey 1979; Kamp et al. 1979; Williams et al. 1979). Corsi and Harvey (1979) investigated shifts in vacation travel between 1973 and 1975 in response to the higher fuel prices caused by the first oil crisis. Corsi and Harvey (1979) conducted a survey of residents of Wisconsin and found that about one third of the respondents had cancelled a long-distance vacation during the period 1973 - 1975. Similar results were also obtained by Kamp et al. 1979 and Williams et al. (1979). Williams et al. (1979) reported that about 75% of the respondents surveyed indicated that they would take recreational trips less frequently if gasoline was rationed. Kamp et al. (1979) found that many respondents indicated that they would eliminate vacation trips if gasoline prices increased markedly.

Dimension 4: Cost of accommodation

Vacationers may also respond to a sharp increase in transport costs by reducing the amount of money spent on the accommodation. While no studies were found that explicitly relate sharp increases in transport costs to accommodation expenditure, a few studies have explored the cross-elasticities between transport cost and accommodation demand (Taplin, 1997; Taplin and Smith, 1997). Taplin (1997) and Taplin and Smith (1997) report a negative cross-elasticity between 'Overseas airfare' and 'Overseas hotel use' (-1.28), suggesting that accommodation expenditure is elastic towards 'Overseas airfare'. Furthermore, indirect evidence for this response dimension comes from several tourism studies that explicitly mention reducing accommodation expenditure in the context of financial adversity (e.g. Smeral 2009).

Dimension 5: Local spending

Vacationers may also respond to a sharp increase in transport costs by reducing their expenditure at the vacation destination, e.g. spending less on activities, food, excursions, etc. During our search through existing literature, a small number of studies were identified that investigate the effect of travels costs on local expenditure (Steinnes 1988; Taplin 1997; Taplin and Smith 1997; Shiff and Becken 2011). Steinnes (1988) conducted regression analysis to assess the effect of gasoline prices on tourism expenditure in Minnesota, USA. His results indicated that tourism expenditure is significantly related to (lagged) gasoline prices (as well as the employment rate). Shiff and Becken (2011) derived direct price-elasticities of demand for visitors to New Zealand as well as for on-the-ground consumption. Significant elasticities are reported for most market segments. Furthermore, on-the-ground consumption per tourist arrival is found to be more price sensitive than the number of arrivals. However, they conclude that it is unlikely that travel behaviour within New Zealand will greatly change due to higher (transport) costs.

Dimension 6: Mode of transport

Clearly, to respond to a sharp increase in transport costs vacationers may switch their mode of transport to reach their vacation destination. This response dimension was explicitly researched in a few studies. Corsi and Harvey (1979) found that 28% of the sample of respondents made changes from a private car to public transportation modes between 1973 and 1975. In line with these findings, Williams et al. (1979) reported that a substantial share of the respondents surveyed were willing to shift towards public transport modes if gasoline price levels were to increase further. Furthermore, Van Cranenburgh et al. 2014b found that travellers substituted air travel mainly by car travel when air fares increased by 50%.

Dimension 7: Postponement of a vacation

A seventh possible response that can be made by vacationers when confronted with a sharp increase in transport costs is to postpone the planned vacation. This response dimension is mentioned a few times in existing literature dealing with travel behaviour during the oil crises (e.g. Hunt 1974; Corsi and Harvey 1979). However, no studies were found in our literature assessment that investigated this response dimension more explicitly.

Dimension 8: Vacation period (high to low season)

The last response dimension identified for a sharp increase in transport costs concerns changing the vacation period from the high season to the low season. This response dimension was identified during the pre-test of our survey. Multiple respondents indicated that they would consider going on holiday during off-season periods to mitigate the increase in transport costs.

Table 2-1 summarizes the results of our assessment of existing literature. The first column shows the identifier of the vacationer response dimension – denoted by #. We henceforth use this identifier to refer to this type of response. The second column gives a brief description of the identified response dimension. The third column shows up to three relevant references (for those response dimensions that are identified through the literature). Lastly, the fourth column shows the context in which the response was discussed in the reference.

Insert here:

Table 2-1: Dimensions for responses to a substantial increase in transport costs

3. Methodology

3.1. The design of the vacation travel questionnaire

The vacation travel questionnaire was part of a larger survey that consisted of a stated choice experiment and the vacation travel questionnaire (see Van Cranenburgh et al. (2014a) for details on the stated choice experiment and the data collection). In turn, the vacation travel questionnaire consisted of two parts: (1) a part with questions that were tailored around the respondent's individual vacation situations, and (2) a part with general questions, mainly eliciting socio-demographic characteristics. We discuss these two parts in the next two sub-sections.

3.1.1. The tailor-made questionnaire

In the tailor-made part of the questionnaire, respondents are presented with the scenario in which transport costs to all destinations are triple the current transport costs, irrespective of the mode of transport or distance to destination. Transport costs are tripled for two reasons. Firstly, a tripling of the transport cost is in line with two earlier studies that were conducted in the context of the oil crises (Kamp et al. 1979; Williams et al. 1979). At that time, a further increase of transport costs due to oil shortages by a factor of three was conceivable. The second reason for tripling the transport costs is that by confronting respondents with such a fierce scenario, the respondents are forced to reconsider their status quo – i.e. their current vacation plans – and to actively think about how they will respond to the sharp increase of transport costs presented. Needless to say, it is unlikely that a peak oil event or any other substantial change (Cranenburgh et al. 2012) will precisely lead to tripled transport costs for all modes, irrespective of the destination. However, this fierce scenario serves the principle objective of this paper: to acquire an understanding of the impacts of a sharp increase in transport costs on vacation behaviour.

The quite exotic scenario presented to respondents – which is inherent to the research objective of this paper – may render it difficult for the respondents to fully grasp the implications it will have on his or her vacation behaviour. Therefore, to enhance the comprehension of the fierce scenario, the questionnaire is tailored to each individual respondent. More precisely, respondents are confronted with the sharp increase in transport cost specifically in the context of their own upcoming vacation plan.

The respondents' upcoming vacation plans were elicited in the stated choice experiment prior to the vacation travel questionnaire (see Van Cranenburgh et al., 2014a). As part of this so-called "SP-off-RP stated choice" experiment, each respondent was asked to compose six relevant vacation alternatives for a future vacation period (within the next 12 months) and a travel party, both chosen up front by the respondent. Vacation alternatives were conceptualized to constitute a specific combination of destination, length of stay, accommodation type, mode of travel, associated transport cost and travel time. Figure 3-1 shows a screenshot of the screen in which respondents composed their vacations. As can be seen, a Google map application was used to elicit and pinpoint the vacation destinations. This application allowed us to infer the distance between the respondent's city of residence and the vacation destination. After having composed various vacation alternatives, each respondent was asked to indicate which of the composed vacations he or she intended to take for the given vacation period and travel party. This chosen vacation alternative was used to tailor-make the vacation travel questionnaire.

Insert here:

Figure 3-1: Screenshot of the screen in which respondents composed vacation alternatives

In the vacation travel questionnaire the following main question is asked:

"Suppose that, due to high oil prices, for example, the transport costs to your vacation in << chosen vacation destination >> with << selected travel party >> in << vacation period >> are

increased to << three times the transport cost that the respondent initially estimated >> per person. Below, a number of possible responses are given. Could you indicate, for each of the responses listed below, how likely it is that you would respond accordingly?"

Response statements were then formulated based on the 8 short-term vacation response dimensions that were identified and listed in Table 2-1 (see Table 3-1). Response statements were formulated in such a way that the expected directions[2] correlate positively with increasing transport costs. For example, based on response dimension 1 "Destination", we formulated the following response statement: "I do not go to my chosen destination; instead, I look for a destination that is closer-by". Finally, not all of the identified response dimensions listed in Table 2-1 are suitable, given the tailor-made questionnaire design. Response dimensions 7 and 8 are inconsistent with the questionnaire design as the vacation period was given in the context of the question. Therefore, no response statements were formulated based on these two response dimensions.

Insert here:

Table 3-1: Response-statements

To indicate the "likelihood" for each formulated response statement, a five-point interval-scale was used ranging from "highly unlikely" (-2) to "highly likely" (+2). Furthermore, a "does not apply" option was given in case the response statement did not apply to the respondent's situation. This could be the case for a vacationer staying at a friend's home, free of charge, for instance, where response statement 3 "*booking cheaper accommodation*" clearly does not apply.

[2] For response dimension 2 "Length of stay", the expected direction was a priori unclear (see section 2). We decided to go with the following statement: "I increase the length of stay".

3.1.2. Socio-demographic characteristics

The questionnaire was rounded off with a number of questions regarding the respondents' socio-demographic characteristics. There is ample evidence in existing literature showing that socio-demographic characteristics such as gender, age, income, household type and composition and level of education can help explain vacation decisions (e.g. Huybers, 2003; Nicolau and Más, 2006). Therefore, these variables might also help to explain vacationers' responses to a sharp increase in transport costs.

3.2. Data collection

The vacation travel questionnaire was part of a larger survey which was conducted online in June 2012 in The Netherlands. Respondents were recruited using a panel company[3]. Respondents younger than 18 years old were automatically excluded. Furthermore, only respondents that intended to go on vacation at least once in the coming year were allowed to take part in the experiment. In total, 419 vacationers completed the survey. Table 3-2 shows the sample characteristics. The outer left column also shows the sample statistics of the target population: the Dutch vacationers (CBS, 2011). Comparing the sample statistics obtained with those of the target population reveals that, by and large, a representative sample has been obtained.

Insert here:

Table 3-2: Sample characteristics (*N= 419*)

3.3. Data analyses

Data from the vacation travel questionnaire have been statistically analysed. First, to investigate the relative popularity of responses (research objective 1), univariate analyses were conducted. Second, to investigate the existence of distinct market segments of vacationers that respond

[3] see www.panelclix.com.

differently to an increase in transport costs (research objective 2), Latent Class Cluster Analyses (LCCA) were carried out (Hagenaars and McCutcheon, 2002 and see Kroesen et al., 2011 for an application in the field of transport). In LCCA it is assumed that a latent class directly underlies the responses to a set of indicators (in our case the responses to the 6 response statements). A key feature of LCCA compared to traditional cluster approaches is that LCCA is a model-based approach. Therefore, statistical criteria can be used to determine the optimal number of classes, for example, or to assess the statistical significance of the model parameters. Furthermore, since class membership and the measurement model are estimated simultaneously, LCCA offers a probability-based classification through a posterior probability of membership (Haughton et al., 2009) – in contrast to traditional cluster research in which identification of homogeneous clusters often relies on the ad-hoc, deterministic, classification methods.

Using LCCA we aim to identify latent market segments of vacationers – henceforth referred to as classes – that have distinct response patterns and to relate these classes to explanatory variables such as socio-demographics. Figure 3-2 depicts the LCCA model conceptually (adopted from Molin et al., 2016). To conduct our analyses we used the Latent Gold 5.0 software package. This software package is specifically developed to estimate various sorts of latent class models (Vermunt and Magidson, 2013).

Insert here:

Figure 3-2: LCCA model

4. Results

4.1. Relative popularity of responses

Table 4-1 depicts histograms to show the relative popularity of the responses. As histograms reveal the underlying frequency distribution of the responses, they provide more information about the response behaviour than a table reporting the means and standard deviations. The first thing that catches the eye, looking at Table 4-1, is that all responses are relatively uniformly distributed. This shows that none of the responses is either relatively very popular or unpopular among the respondents. This is also signalled by the means and the standard deviations (depicted in the histogram). The means are mostly quite close to zero. The standard deviations – which indicate the dispersion – are all larger than 1. Interestingly, this finding is in accordance with the findings of studies conducted during or in the aftermath of the oil crises (Corsi and Harvey, 1979; Kamp et al., 1979; Williams et al., 1979).

The two most popular responses are: to book cheaper accommodation (Response 4) and to reduce local spending (Response 5) – although both responses have means just slightly larger than zero (which corresponds to a neutral likelihood). Reducing local spending also has the smallest standard deviation across all responses. The two least popular responses are: to increase the length of stay at the destination (Response 2) and to pick another mode of transport if that is considerably cheaper (Response 6). These responses have means of -0.33 and -0.19, respectively. The relatively unpopular response of picking another mode of transport (Response 6) was to some extent to be expected since for many destinations – particularly intercontinental destinations – air travel is generally considered to be the only viable alternative (Hares et al., 2010). However, even when we only consider those vacationers whose destinations are less than 1 500 kilometres away, changing the mode of transport is still relatively unpopular (having a mean of -0.13, not shown).

Insert here:

Table 4-1: Histograms of responses

4.2. Segments of vacationers

4.2.1. Model development

To develop our LCCA model, an exploratory approach is used. Age, income[4], household type, household composition, and level of education were used as explanatory variables (covariates) in the structural model. To identify the optimal number of classes, successive models were estimated starting with a model with one class, up to a model with six classes. To evaluate and compare the performance of these latent class models the Bayesian Information Criterion (BIC) index was used (Schwarz, 1978). This index weighs both model fit and parsimony of the model (i.e. the number of estimated parameters) and has proved to perform relatively well in the context of latent class models (Nylund et al., 2007). The best performing model is the model with the lowest BIC.

Based on our analysis, we found the optimal model to have 4 classes. Since only Age and Income level were found to be significant in explaining the class membership, we omitted the other socio-demographic covariates and report the results of the model with only Age and Income as explanatory variables.

Table 4-2 shows the performance of this model as a function of the number of classes. Columns 1 to 6 present respectively; the Number of classes, the Final Log-Likelihood (LL) of the estimated model, the BIC, the Number of parameters, the R^2 (a qualitative variance-based measure, see Magidson (1981)) and the Classification error (i.e. the proportion of cases that are misclassified by the model). Table 4-2 shows that each new class adds nine extra parameters.[5] Due to the extra parameters, the model fit – as measured by the LL – increases each time a class is added.

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[4] Note that we treated Income and Age as interval variables, despite the fact that the intervals of Income and Age are not precisely equal (see Table 3-2).

[5] i.e. 6 parameters for the measurement model (i.e. 1 regression parameter for each of the 6 indicators) and 3 parameters for the structural model (1 intercept and 2 regression parameters: one for age and one for income).

However, that does not imply that the model gets better in the statistical sense. In fact, the BIC shows that when model parsimony is also taken into account, the 4-class model performs best. Furthermore, the relatively low classification error of 0.072 and the relatively high R^2 of 0.79 indicate that a substantial proportion of the variability in class membership is explained in the 4-class model.

Table 4-3 shows the estimated parameters of the 4-class LCCA model. First, we look at the results of the measurement model. The Wald statistics and the associated p-values indicate that all 4 classes exhibit significantly different responses to each of the response dimensions. To see whether each individual class-specific parameter is statistically significant from the grand mean, z-values are reported. As can be seen, most z-values are larger than 1.96, indicating that there is substantial heterogeneity in the responses of vacationers when confronted with a sharp increase in transport costs. Finally, for completeness, the intercepts are also reported.

Now we turn to the results of the structural model. The Wald statistics and the associated p-values indicate that Age and Income profiles are significantly different across the classes. The negative estimates of Income for classes 1 and 2 indicate that a higher income results in a lower probability of being a member of class 1 or 2. The positive estimates of Age for class 1 and 2 indicate the opposite: a higher age results in a higher probability of being a member of class 1 or 2.

Insert here:

Table 4-2: Model fit of latent class models

Insert here:

Table 4-3: Parameter estimates of the 4-class LCCA model with covariates

4.2.2. Classes of vacationers

Table 4-5 presents the conditional response probabilities of the 4-class model, i.e. the probabilities of a certain response by a vacationer given that he or she belongs to a specific class. To enhance interpretation, next to the tables the response probabilities are also visualized. Below we discuss the results of Table 4-5 and provide an interpretation of each class. Our interpretation of the classes is based on the mean response, the grand mean across all response dimensions and on the shape of the response patterns. However, it should be noted that alternative interpretations of the latent classes are possible.

The four latent classes identified have distinct response patterns and range in size from 6% to 66% of the sample. The first class (depicted in blue) is by far the largest class and comprises 66% of the sample. As shown by the mean responses (which are close to zero for all responses) and the grand mean of 0.01, vacationers in this class are moderately inclined to change behaviour when confronted with a sharp increase in transport costs. Furthermore, inspection of the graphs in Table 4-5 reveals that the response patterns of this class are either flat or arched-shaped (hence, not U-shaped, for example). This signals that vacationers belonging to this class are not very outspoken in their behavioural responses.

The second class (depicted in red) comprises 17% of the sample. The highly negative means (i.e. close to -2), the grand mean of -1.28 and the negative slopes signify that vacationers in this class are generally not inclined to change their behaviour (or at least not in accordance with the responses presented in the survey) when confronted with a sharp increase in transport cost. Inspection of the parameter estimates confirms this inference (see the measurement model results in Table 4-3). All except one of the parameter estimates are negative and significantly different from the grand mean. As can be seen, vacationers in this class are particularly unlikely to: look for destinations that are closer-by (Response 1), skip the vacation (Response 3), book cheaper accommodation (Response 4) or to change the mode of transport (Response 5).

The third class (depicted in green) comprises 12% of the sample. The high means (all well above zero) and the grand mean of 0.93 indicate that vacationers belonging to this class are generally highly inclined to change their behaviour in accordance with the responses presented. Furthermore, in relation to vacationers belonging to other classes, vacationers belonging to class 3 are especially likely to respond by booking cheaper accommodation (Response 4) and by reducing local spending (Response 5).

The fourth and smallest class (depicted in purple) comprises just 6% of the sample. Just as in class 1, the grand mean of this class is close to zero (-0.06). This suggests that vacationers belonging to this class are *on average* moderately inclined to change their behaviour when confronted with a sharp increase in transport costs. However, in contrast to class 1, vacationers belonging to class 4 are much more outspoken in their responses and have 'mixed' preferences. They are highly inclined to respond by changing the destination (Response 1) and by skipping the vacation (Response 3) but are not inclined to respond by increasing the length of stay at the destination (Response 2). So, despite the fact that that vacationers belonging to class 4 are, on average, roughly equally inclined to change behaviour as vacationers in class 1, vacationers in class 4 have very different response patterns.

Insert here:

Table 4-5: Conditional response probabilities of the 4-class model

4.2.3. Covariates

In line with the results of a recent methodologically related study conducted by Crouch et al. (2014), two covariates have been identified that help explain class membership: Age and Income. Table 4-5 shows the Age and Income profiles for each class. However, as can be seen, the differences between classes in terms of the age and income profiles are relatively small. This signals that the strength of the covariates in explaining the class membership is relatively low – despite the fact that both covariates are significantly associated with class membership (see the Wald statistics in Table 4-3).

Nonetheless, with regard to Age, Table 4-5 shows that classes 1 and 4 have distinct age profiles, while classes 2 and 3 have to some extent fairly balanced age profiles. Class 1 contains a relatively large number of middle-aged vacationers and a relatively small number of older vacationers, whereas class 4 is quite the opposite and contains a relatively small number of middle-aged vacationers and a relatively large number of older vacationers. Also, with regard to income levels, we see that the classes have different profiles. Classes 1 and 2 are associated with higher incomes, while classes 3 and 4 are associated with lower income levels.

The association between income profile and, to a lesser extent, age profile and the response patterns seems to be intuitive. Vacationers belonging to class 2 have relatively high income levels and are not inclined to change behaviour when confronted with a sharp increase in transport costs, while vacationers belonging to class 3 have relatively low income levels and are highly inclined to change behaviour when confronted with a sharp increase in transport costs. Also differences in income and age profiles between class 1 and 4 are echoed in the differences in response patterns between these two classes. Therefore, we may infer that although differences between classes in terms of the age and income profiles are relatively small, age and income are relevant to explain the class membership of vacationers.

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Table 4-5: Profiles of 4-class model

5. Conclusions and discussion

Tourism relies heavily on affordable mobility (e.g. Becken, 2011). While at present oil prices are historically low, the oil crises in the 1970s gave a good illustration of the fact that affordable mobility is not a fact of life. As oil prices are erratic, transport costs may sharply increase in the future. This study provides insights into the nature of a sharp increase in transport costs on tourism. While most studies have taken a macro-level approach to investigate the impacts of increases in transport costs on tourism, the present study has taken a micro-level approach. To elicit how vacationers would respond in the short-term to a sharp increase in transport costs, we conducted a tailor-made questionnaire. Respondents were presented with a fierce high transport cost scenario and were subsequently asked to indicate how likely he or she would respond in accordance with a number of presented responses. Data from the questionnaire were statistically analysed with the objective of (1) acquiring an understanding of the relative popularity of different potential responses among vacationers and (2) exploring whether there are distinct market segments of vacationers that respond differently towards a sharp increase in transport costs.

Firstly, with regard to research objective 1, somewhat surprisingly we find that no single response is either very popular or unpopular. This result signals that a range of responses can be expected when transport costs to tourist destinations increase sharply. Secondly, regarding research objective 2, using latent class cluster analyses we have identified four distinct segments of vacationers. Vacationers belonging to the first and largest segment (66%) are moderately inclined to change behaviour when confronted with a sharp increase in transport costs and they respond somewhat reservedly; vacationers belonging to the second segment (17%) are generally not inclined to change behaviour; vacationers belonging to the third segment (12%) are highly inclined to change behaviour and vacationers belonging to the fourth segment (6%) are moderately inclined to change behaviour, just the same as vacationers belonging to class 1. However, they are much more outspoken in their responses and have 'mixed' preferences.

The findings derived from this study are relevant to both tourism managers and policy makers. Insights into how vacationers may respond may enable them to anticipate a high transport cost scenario. For instance, our LCCA analyses revealed that three out of four segments of vacationers – which together account for more than 83% – indicated they would look for destinations that are closer-by. This signals a substantial threat for destinations whose source market is not nearby (e.g. the Maldives, Cape Verde, etc.) yet provides market opportunities for destinations that are close to their source market (e.g. Cambodia) (see also Ringbeck et al., 2009). A sensible strategy for the destinations that are not able to penetrate nearby source markets is to specifically target the segment of vacationers which does not look for destinations that are closer-by. Income level is found to associate positively with this segment. However, a follow-up study specifically targeted at this segment is needed to acquire a better understanding of the composition and the needs of this segment. Furthermore, the finding that young vacationers are relatively more inclined to change the mode of transport may provide opportunities for destinations that are at a medium distance away from the principle source market (750 – 1500 km) and can be reached overland. A possible strategy for these destinations is to target those young vacationers and to ensure that the infrastructure for overland travel is in place.

The results of this study are limited in several respects, leaving room for future research efforts. Firstly, the relatively small sample size is a limitation of this study, especially for our LCCA. A larger sample would have allowed analysing the validity of the model - e.g. using a hold-out sample - and would perhaps have helped to more strongly relate the classes of vacationers to observable characteristics, such as socio-demographic variables. Secondly, travel motives and the attitudes of vacationers (Castro et al., 2007; Lee, 2009) or intra-household dynamics and social interactions (Wu et al., 2013) may play a role in explaining the vacationers' response behaviour but these were not considered in this study. Lastly, this study is based on the responses stated in the context of a highly hypothetical scenario. Despite our efforts to enhance the comprehension of the fierce high transport cost scenario for the respondent by tailoring the questions around the individual's vacation plan, an important question in the context of our study remains: how reliable are the intentions that they have stated as a predictor for future behaviour? This question touches upon a fundamental concern regarding stated behaviour; a concern which is widely debated in existing literature and for which different scientific disciplines hold strongly different beliefs. A discussion of this topic goes beyond the scope of this study but we would refer any reader who is interested in this topic to Manski (1990) and Sutton (1998).

Tables and figures

Table 2-1: Short-term response dimensions

#	Short-term response dimensions	Reference	Context in reference
1	*Destination (distance)*	Williams et al. (1979)	First oil crisis
		Kamp et al. (1979)	First oil crisis
		Van Cranenburgh (2014b)	Aviation carbon taxes
2	*Length of stay*	Mak et al. 1977	First oil crisis
		Williams et al. (1979)	First oil crisis
		Van Cranenburgh (2014a)	Aviation carbon taxes
3	*Number of vacations per year*	Corsi and Harvey (1979)	First oil crisis
		Williams et al. (1979)	First oil crisis
		Kamp et al. (1979)	First oil crisis
4	*Cost of accommodation*	Taplin, 1997	-
		Taplin and Smith, 1997	-
		Smeral (2009)	2007 - Global financial crisis
5	*Local spending*	Steinnes (1988)	Second oil crisis
		Taplin, 1997	-
		Schiff and Becken (2011)	Various recent events
6	*Mode of transport*	Corsi and Harvey (1979)	First oil crisis
		Williams et al. (1979)	First oil crisis
		Van Cranenburgh (2014b)	Aviation carbon taxes
7	*Postponement of vacation*	Hunt 1974	First oil crisis
		Corsi and Harvey (1979)	First oil crisis
8	*Vacation period (high or low season)*	-	-

Figure 3-1: Screenshot of the screen in which respondents composed vacation alternatives

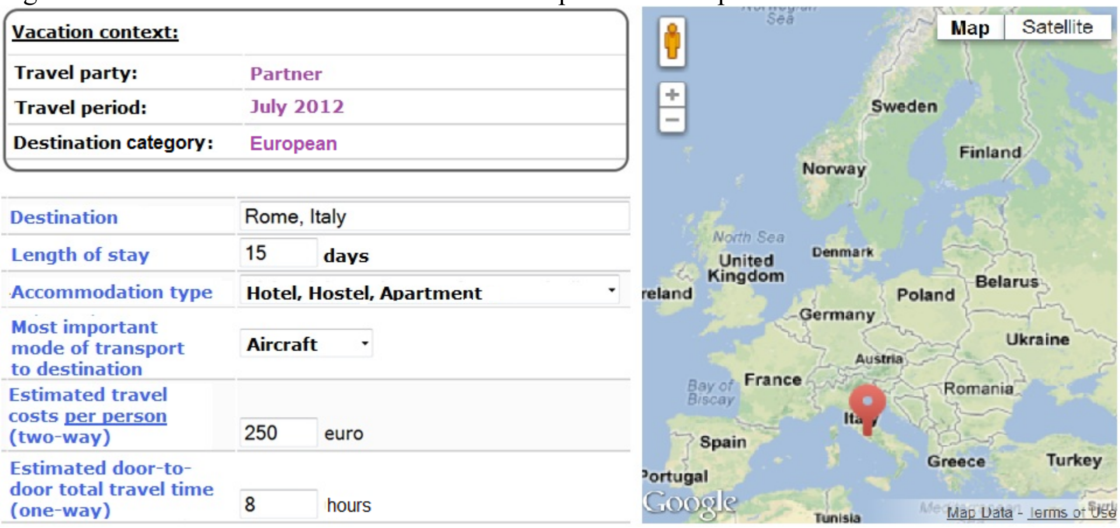


Table 3-1: Response-statements

#	*Response dimension*	*Response-statement*
1	Destination (distance)	I do not go to my chosen destination. Instead, I look for a destination that is closer-by
2	Length of stay	I increase the length of stay at the destination
3	Number of vacations per year	I skip this vacation (no replacement)
4	Cost of accommodation	I book cheaper accommodation
5	Local spending	I reduce local spending
6	Mode of transport	I pick another mode of transport if that is considerably cheaper

Table 3-2: Sample characteristics ($N = 419$)

Variable	Sample frequency	Percentage [%] in sample	Percentage [%] in target population
Gender			
Female	197	47%	50%
Male	222	53%	50%
Age			
18 to 24 yr.	44	11%	10%
25 to 34 yr.	57	14%	14%
35 to 44 yr.	80	19%	17%
45 to 54 yr.	89	21%	20%
55 to 64 yr.	95	23%	21%
65 to 74 yr.	48	12%	12%
75+ yr.	6	1%	7%
Completed education			
Elementary school	12	3%	5%
Lower education	99	24%	21%
Middle education	160	38%	38%
Higher education	99	24%	23%
University education	49	12%	12%
Discretionary household income			
I < 10 000	22	5%	4%
10 000 ≤ I < 20 000	84	20%	19%
20 000 ≤ I < 30 000	86	21%	21%
30 000 ≤ I < 40 000	80	19%	18%
40 000 ≤ I < 50 000	63	15%	15%
50 000 ≤ I < 75 000	69	16%	17%
I ≥ 75 000	15	4%	6%
Household type			
Multiple adult members	194	46%	N/A
Single member household	98	23%	N/A
Household with children	127	30%	N/A
Number of household members			
1 member	98	23%	N/A
2 members	163	39%	N/A
3 members	65	16%	N/A
4 members	61	15%	N/A
more than 4 members	32	8%	N/A

Figure 3-2: LCCA model

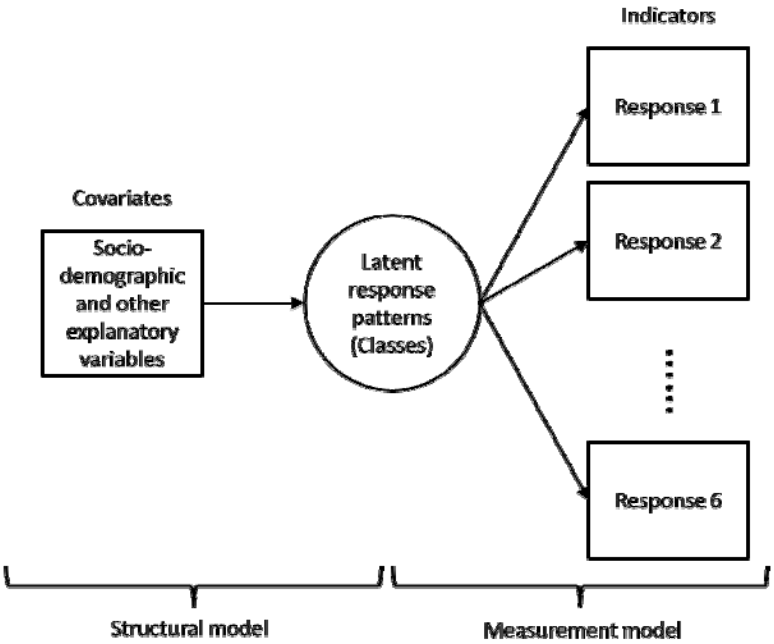
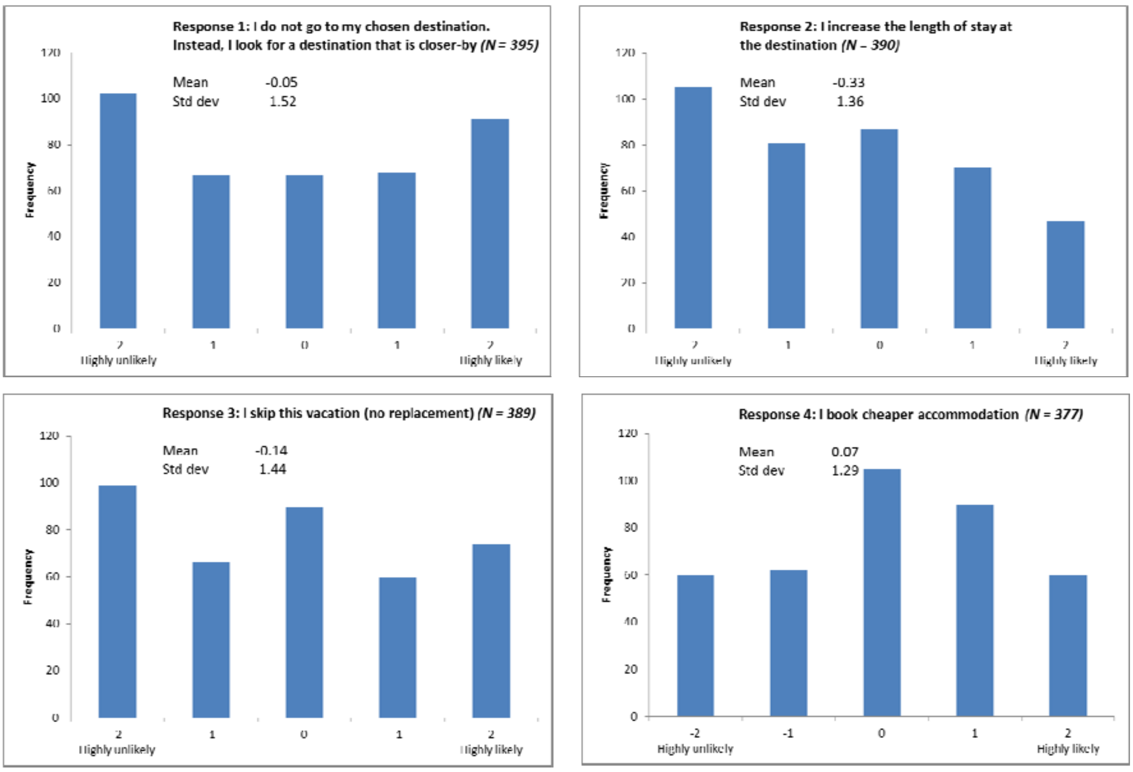
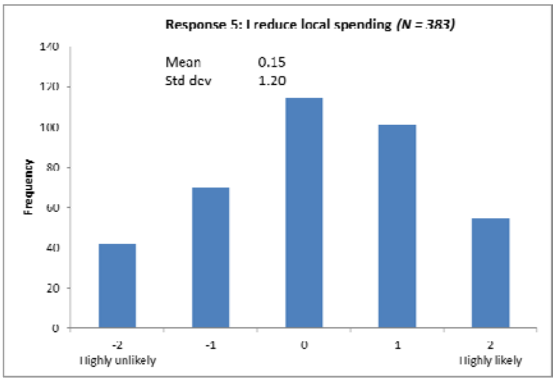


Table 4-1: Histograms of responses





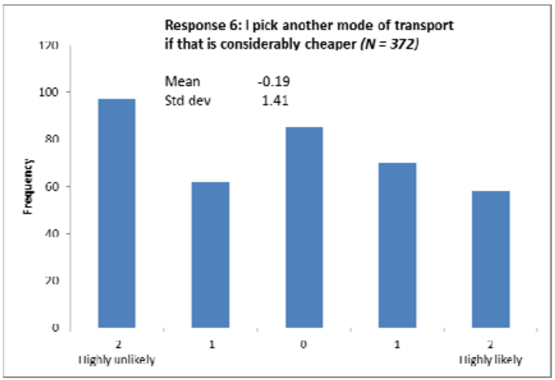


Table 4-2: Model fit of latent class models

Number of classes	LL	BIC(LL)	Number of parameters	R^2	Classification error
1-Class	-3232.6	6605.3	24	-	-
2-Class	-3142.9	6478.4	33	0.73	0.063
3-Class	-3086.2	6417.5	42	0.79	0.061
4-Class	-3050.9	6399.3	51	0.79	0.072
5-Class	-3027.3	6404.8	60	0.83	0.062
6-Class	-3007.6	6417.7	69	0.83	0.065

Table 4-3: Parameter estimates of the 4-class LCCA model with covariates

Prediction of the indicator (measurement model)										
	Cl.1	**z-val**	**Cl.2**	**z-val**	**Cl.3**	**z-val**	**Cl.4**	**z-val**	**Wald**	**p-val**
1. Destination	-0.633	-1.739	-1.831	-3.980	-0.441	-1.186	2.906	2.754	17.463	0.001
2. Length of stay	0.532	2.255	0.208	0.829	0.811	3.135	-1.551	-2.254	14.516	0.002
3. No. of vacations per year	-0.104	-0.742	-1.139	-5.515	0.137	0.854	1.106	3.070	31.976	0.000
4. Cost of accommodation	-0.139	-0.539	-2.129	-6.721	3.768	6.132	-1.500	-4.001	54.011	0.000
5. Local spending	-0.327	-1.756	-1.588	-6.365	2.978	6.404	-1.063	-4.081	51.360	0.000
6. Mode of transport	0.122	1.265	-0.925	-5.406	0.798	4.879	0.006	0.037	36.573	0.000

Intercepts

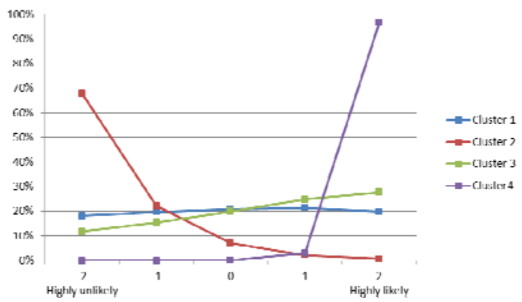
	1. Destination		2. Length of stay		3. No. of vacs.		4. Cost of accom.		5. Local spending		6. Mode of transp.	
Wald	3.748		18.52		10.05		60.68		77.01		16.86	
p-value	0.44		0.00		0.04		0.00		0.00		0.00	
	Overall	z-val	Overall	z-val	Overall	z-val	Overall	z-val	Overall	z-val	Overall	z-val
-2 highly unlikely	-1.360	-1.891	1.132	2.461	-0.142	-0.508	-1.479	-3.285	-1.714	-5.035	0.236	1.341
-1	-0.648	-1.665	0.703	2.559	-0.132	-0.750	-0.067	-0.218	-0.163	-0.758	0.074	0.512
0	0.045	0.371	0.279	2.637	0.342	3.130	1.024	6.891	0.969	7.608	0.321	2.961
1	0.704	1.794	-0.486	-1.862	0.009	0.044	1.008	3.460	1.170	4.929	-0.015	-0.108
2 highly likely	1.258	1.748	-1.628	-3.330	-0.077	-0.303	-0.487	-1.000	-0.263	-0.771	-0.616	-3.190

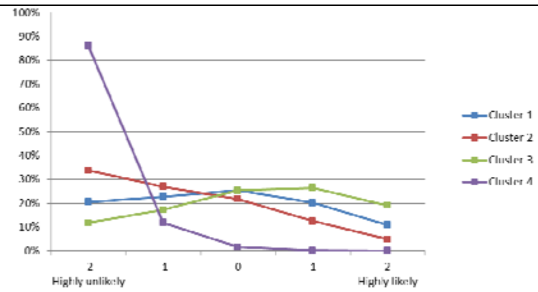
Prediction of the latent class membership (the structural model)

	Cl.1	**z-val**	**Cl.2**	**z-val**	**Cl.3**	**z-val**	**Cl.4**	**z-val**	**Wald**	**p-val**
Intercept	1.253	2.983	-0.488	-0.897	-0.256	-0.447	-0.509	-0.641	10.275	0.016
Income	-0.188	-2.611	-0.057	-0.613	0.126	1.292	0.119	0.960	7.902	0.048
Age	0.233	2.585	0.205	2.003	-0.158	-1.389	-0.280	-1.415	10.994	0.012

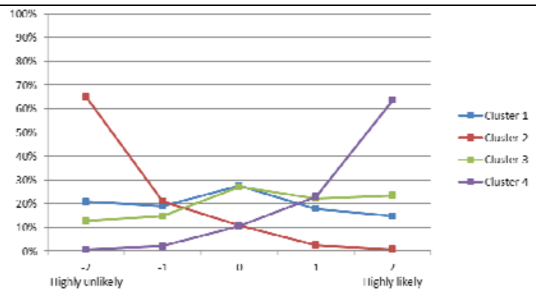
Table 4-4: Conditional response probabilities of the 4-class model with covariates

N = 342		Class 1	Class 2	Class 3	Class 4
Cluster size		66%	17%	12%	6%
Response 1: I do not go to my chosen destination. Instead, I look for a destination that is closer-by					
	-2	18%	68%	12%	0%
	-1	20%	22%	16%	0%
	0	21%	7%	20%	0%
	1	21%	2%	25%	3%
	2	20%	1%	28%	97%
	Mean	0.06	-1.55	0.40	1.97
Response 2: I increase the length of stay at the destination					
	-2	21%	34%	12%	88%
	-1	23%	27%	17%	11%
	0	25%	22%	25%	1%
	1	20%	13%	27%	0%
	2	11%	5%	19%	0%
	Mean	-0.23	-0.72	0.24	-1.86

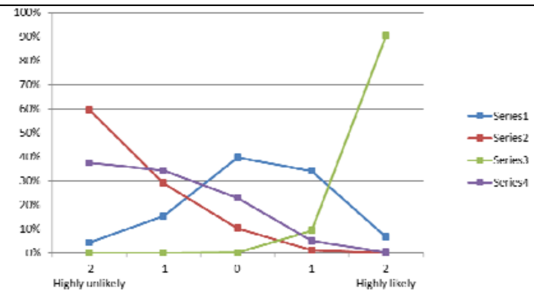




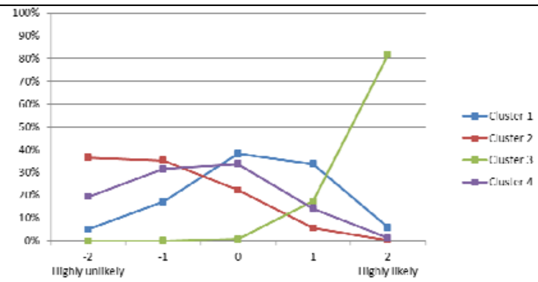
Response 3: I skip this vacation (no replacement)				
-2	21%	65%	13%	1%
-1	19%	21%	15%	2%
0	27%	11%	27%	11%
1	18%	2%	22%	23%
2	15%	1%	23%	63%
Mean	-0.13	-1.47	0.28	1.45



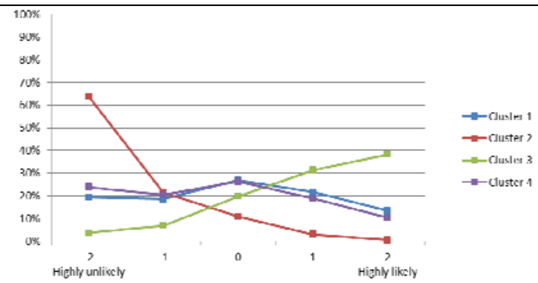
Response 4: I book cheaper accommodation				
-2	4%	60%	0%	40%
-1	15%	29%	0%	35%
0	40%	10%	0%	21%
1	34%	1%	9%	4%
2	7%	0%	91%	0%
Mean	0.24	-1.47	1.90	-1.10



Response 5: I reduce local spending				
-2	5%	36%	0%	19%
-1	17%	35%	0%	31%
0	38%	22%	1%	34%
1	34%	6%	17%	15%
2	6%	0%	82%	1%
Mean	0.18	-1.02	1.81	-0.53



Response 6: I pick another mode of transport if that is considerably cheaper				
-2	19%	64%	4%	24%
-1	19%	22%	7%	21%
0	27%	11%	20%	26%
1	22%	3%	31%	19%
2	13%	1%	38%	10%
Mean	-0.09	-1.44	0.94	-0.31



Grand mean	0.01	-1.28	0.93	-0.06

Table 4-5: Profiles of 4-class model

Covariates	Class 1	Class 2	Class 3	Class 4	Mean
Age					
18 to 24 yr	11%	13%	5%	10%	10%
25 to 54 yr	61%	45%	52%	39%	49%
55+ yr	27%	43%	43%	52%	41%
Income					
I < 10 000	3%	7%	7%	0%	4%
10 000 ≤ I < 20	13%	16%	27%	45%	25%
20 000 ≤ I < 30	21%	14%	34%	30%	25%
30 000 ≤ I < 40	23%	23%	12%	14%	18%
40 000 ≤ I < 50	17%	14%	13%	7%	13%
50 000 ≤ I < 75	18%	24%	7%	3%	13%
I ≥ 75 000	4%	2%	0%	0%	2%

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