THE INFLUENCE OF DISCOUNT AIRLINES ON TRAVEL BEHAVIOUR OF YOUNGSTERS: RESULTS OF A STATED CHOICE EXPERIMENT

Anna B. Grigolon
Faculty of Architecture, Building and Planning - Eindhoven University of Technology - P.O. Box 513 - 5600MB Eindhoven - The Netherlands – A.B.Grigolon@tue.nl

Astrid D.A.M. Kemperman
Faculty of Architecture, Building and Planning - Eindhoven University of Technology - P.O. Box 513 - 5600MB Eindhoven - The Netherlands– A.D.A.M.Kemperman@tue.nl

Harry J. P. Timmermans
Faculty of Architecture, Building and Planning - Eindhoven University of Technology - P.O. Box 513 - 5600MB Eindhoven - The Netherlands - H.J.P.Timmermans@tue.nl

ABSTRACT

This paper reports the results of an additive, non-linear, main-effects-only model of portfolio choices of youngsters. The portfolio model concerns the combined choice of destination type, transport mode, duration, accommodation and travel party for leisure trips/vacations. The model also includes several contextual and attribute variables for specific transport modes. Using stated choice experiment data as input, the estimated results indicate that the model performs satisfactory. In substantive terms, it seems that transport mode predominantly influences the portfolio choices. Most attributes are not significant for the current sample size of 154 respondents. The attributes that are significant tend to amplify the specific image and role of transport modes in general and discount airlines in particular.

Keywords: *recreation, travel behaviour, dynamics*

INTRODUCTION

Occasionally, the airfare from Eindhoven to London, a 50 minute flight is 0 Euros (only taxes need to be paid), and over the last five years or so, the fares for the flight are typically less than the cost of a taxi for a 5 km trip from the airport to the university, located in the city centre. No doubt, the appearance of discount airlines on the travel scene and their no thrills-very low prices strategy has caused fierce competition with regular airlines and has extended

travellers' choice sets. One may expect that discount airlines are especially appealing to some segments of the travelling population, such as youngsters. Discounts airlines however often offer less flights per day and sometimes the departure time may be less convenient. Moreover, in some cases they tend to use less accessible airports, increasing the hassle of getting there and possibly also total travel time. In that sense, travellers in general face a trade-off between costs, convenience and service when choosing between regular and discount airlines.

Discount airlines companies emerged in the 1990s with the specific aim of operating with a lower cost structure than traditional operators in order to create lower fares (Francis et al., 2004). The leisure market is the main target of these companies, although they have stimulated also the demand for business travellers. In an effort to compete with the discount airlines, some of the major airlines have responded by lowering prices, simplifying their price structure and improving internet sales facilities.

In Europe, especially, in addition to airlines, there is an extensive network of train and bus lines serving virtually all major cities and tourist areas. There is a choice between low costs and more service options, especially for buses. Thus, travellers face quite complex choice sets, with many different options.

For the Netherlands, this increase on the supply side has triggered or is accompanied with an increasing portion of leisure time away from home. Data from SPC (2001) show that although the average amount of leisure time has remained constant from 1975 to 1995, the way it is been spent has substantially changed. A larger proportion of the free time of Dutch people is spent away from home, and their mobility in off-work hours has increased. Over one-third of the leisure time spent away from home is used for transport to and from leisure activities. According to Harms (2006), 38% of the trips in The Netherlands are for leisure activities, 22% to shopping activities and only 17% of the trips are to and from work. This highlights the importance of a better understanding of recreational/leisure trips.

Relatively little is known in the literature on how especially youngsters make decisions among all these different options. Young people's views seems to be key in understanding how services should be developed, as they are current and future users of public and other modes of transport (Department for Transport UK, 2010). In addition, youngsters have more flexibility when choosing the date and time of the trip, making them a major target group for the discount airlines. Also, they have much more options of going on cheap trips compared to the youngsters of the past decades. These are some of the motivations underlying the present study.

To what extent do discount airlines compete with regular airlines on the one hand and transport modes such as the train, bus and car on the other? To what extent does this competition depend on other choice facets such as duration, destination, travel party and accommodation? This paper reports the results of an analysis that was conducted to address the above research questions. More specifically, the goal of this study is to develop a

portfolio model of longer-distance leisure choices for youngster. Portfolio choice in this context is defined as a combination of destination, transport mode, duration, accommodation and travel party.

The model will be estimated using a stated choice experiment. The literature on creating such experiments for portfolio choice is very rare (Wiley and Timmermans, 2009). The fact that a huge number of portfolio choice can be made creates various challenges in the design of these experiments and the estimation of the underlying choice models.

The paper is organised as follows. First, we will discuss the experiment for portfolio choices that was designed. Next, we will report the survey design and sample characteristics. This is followed by a discussion of the estimated coefficients of the portfolio choice model. The paper is concluded with a summary of the results and a brief discussion of future analyses.

THE PORTFOLIO CHOICE EXPERIMENT

To better understand preferences and choices of youngsters regarding vacation trips, we estimated a tourist portfolio choice model that includes their major choices as a tourist. The estimation was based on a portfolio choice experiment (Wiley and Timmermans, 2009). The identification of the attributes that influence individuals' vacation behaviour was based on a literature survey (Dellaert et al. 1997; Decrop, 2006; Lyons et al. 2009; Pearce and Lee, 2005, Hess et al. 2007, Collins et al. 2007, Hensher et al. 2001, Hensher et al. 2005).

From the long list of choices, included in the above studies, the following were selected: destination, transport mode, accommodation, duration of the stay and travel party. To design the experiment, a distinction was made between four types of transport modes: regular airlines, discount airlines, train/bus and car. For each of these transport modes, a set of attributes was systematically varied: costs, travel time, time of the day of the departure and time to get to the station/airport/pick-up point. The primary goal of the analysis was to understand transport mode choice decisions embedded in other facets such as destination, duration of the trip, travel party and choice of accommodation. Figure 1 gives a schematic overview of the experiment.

An extensive discussion was made about the best sequence to present the attributes in the experiment. For example, for some people the first choice related to a vacation plan is related to the travel party, for others, the duration of the trip etc. In Dellaert et al. (1998), Bargeman and Poel (2006) and Wiley and Timmermans (2008) there are some discussions about the sequence of tourist choices. In the present study, the sequence destination, transport mode, duration of the trip, travel party and accommodation was adopted. Future research should examine whether any particular sequence of representation has any influence on estimated utilities. The variables and their levels, varied in the experiment are presented in Table 1 and will be discussed in the following sub-sections.

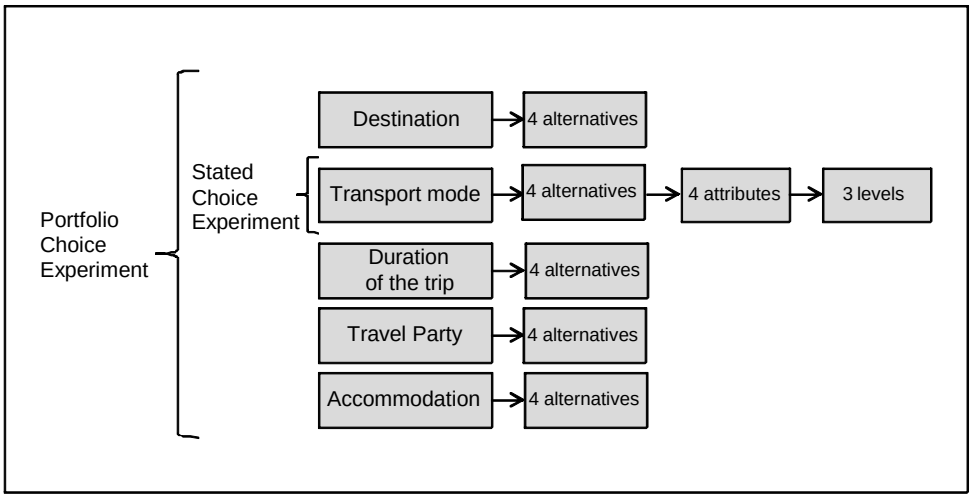

Figure 1: Conceptual framework of the portfolio choice experiment

Table 1: The choices, alternatives, attributes, their levels, and coding

Choices	Alternatives/ Attributes/ Levels	Coding		
Destination	• Group 1: Barcelona, Madrid, Alicante, Porto	1	0	0
	• Group 2: Rome, Milan, Marseille, Pisa	0	1	0
	• Group 3: London, Stockholm, Dublin	0	0	1
	• Group 4: Budapest, Prague, Katowice	-1	-1	-1
Transport mode	• Regular airlines			
	• (1) Cost: Destination specific (low, medium, high)	Transport modes:		
	• (2)* Travel time: Destination specific (low, medium, high)	1	0	0
	• (3) Time of the day: morning, afternoon, evening	0	1	0
	• (4) Time to get: 60, 90, 120 minutes	0	0	1
	• Discount airlines	0	0	0
	• (5) Cost: Destination specific (low, medium, high)			
	• (2)* Travel time: Destination specific (low, medium, high)	All attributes:		
	• (6) Time of the day: morning, afternoon, evening	1	0	
	• (7) Time to get: 60, 90, 120 minutes	0	1	
	• Train/ bus	-1	-1	
	• (8) Cost: Destination specific (low, medium, high)			
	• (9) Travel time: Destination specific (low, medium, high)			
	• (10) Time of the day: morning, afternoon, evening			
	• (11) Time to get: 60, 90, 120 minutes			
	• Car			
	• (12) Cost: Destination specific (low, medium, high)			
	• (13) Travel time: Destination specific (low, medium, high)			
Duration of the trip	• 1 day	1	0	0
	• 1-3 nights	0	1	0
	• 4-8 nights	0	0	1
	• 9 nights or more	-1	-1	-1
Travel party	• Alone	1	0	0
	• With partner	0	1	0
	• With family	0	0	1
	• With friend(s)	-1	-1	-1
Accommodation	• Hotel/ rented apartment	1	0	0
	• Hostel	0	1	0
	• Camping	0	0	1
	• Friend's/ relative's house	-1	-1	-1

* Note for both Regular and Discount airlines, the travel time is the same.

Destination

In the portfolio choice experiment, respondents were asked to plan their first holiday in 2010. First, they were asked to choose the Destination of this trip. To define the list of 14 destinations it was assumed that they had to be within Europe and could be reached by both Discount and Regular airlines, Train, Bus or Car from an origin in the Netherlands. Although in principle, destination specific models can be estimated, if the sample is large enough, in the present study we assumed that the destinations can be grouped according to some underlying dimension. It should be noted that consequently the estimated utilities depend on the classificatory principle used to group the destinations (by distance, or travel time, or culture, or image etc.). In this paper, we report the results based on a classification of these cities into four groups, related to their geographical position. Figure 2 show the location of these cities in relation to the Netherlands. The following groups were created:

- Group 1: Barcelona, Madrid, Alicante, Porto
- Group 2: Rome, Milan, Marseille, Pisa
- Group 3: London, Stockholm, Dublin
- Group 4: Budapest, Prague, Katowice (Krakow)

Figure 2: European cities included in the experiment

Transport mode – The stated choice experiment

The attribute levels of the transport modes in the choice sets were varied according to a 3^{13} design, as there were 13 three level attributes (see Table 1). It is important to reinforce that for both Regular and Discount airlines, the travel time was considered to be the same, leading to 13 attributes instead of 14. An orthogonal fraction of the resulting full factorial design, consisting of 1,594,323 (3^{13}) attribute profiles, was created. This fraction consisted of 27 choice sets with each representing the attributes for each of the transport mode alternatives. The levels were determined as follows:

- Cost: represents the cost of a return ticket for the airplane and train/bus options and the fuel expenses in case of the car option. For Discount Airlines: the first and third levels were defined as respectively -60% and +60% of the middle level, which was equal to the medium price of the ticket extracted from the airlines' webpage's. For Regular Airlines, Train/Bus, this variation was -20% and +20%. The variation used for car was also -20% and +20%, and the price of the trip was calculated on the basis of average fuel costs in European cities (AAIreland, 2010).

- Travel time: is the time spent on travelling in a one-way trip. The 3 levels are specific to the destination, with a +10% variation for the second level and +20% for the third level.

- Time to get to airport/station: is the time required to reach the airport in the case of use of Regular or Discount Airlines, and the time to reach the train or bus station, for train/bus modes. This attribute is not relevant for the car option because it is assumed that the starting point of a trip by car is the traveller's house. The levels varied in the experiment were respectively 60, 90 and 120 minutes. The range would cover for the sample respondents all main and regional airports, train station and international bus travel stations.

- Time of the day: is the time of the day (morning, afternoon, evening) of the beginning of the trip by plane, train or bus. This attribute was not varied for the car as travellers do not face any limitations when choosing this option.

Duration of the trip

Based on official classifications of the Central Bureau of Statistics (CBS, 2010), the following definitions and classifications were used:

- Long Holidays: Absence from home for leisure or recreation purposes with at least four consecutive nights spent away from home. Staying at the homes of relatives or friends abroad is included.

- Short holidays: Absence from home for leisure or recreation purposes with a minimum of one and a maximum of three consecutive nights spent away from home. Staying at the homes of relatives or friends abroad is included.

- Day trip: A recreational activity for which a person is away from the usual environment for at least two hours, without an overnight stay.

Using these definitions, duration was varied in the experiment in terms of four levels: one day (without overnight); 1 to 3 nights, 4 to 8 nights, more than 9 nights.

Travel Party

Travel party is the person/ people with whom the trip is made. In this experiment, the following options could be chosen: alone, with partner, with family or with friend(s).

Accommodation

The choice of accommodation was varied in terms of hotel/ rented apartment, hostel, camping and at friend's/ relative's house.

SAMPLE

An Internet-based survey was implemented and administered. Dedicated software developed by and for our research group was used for that purpose. The software can be best viewed as a platform for creating and managing internet-based surveys and supports a series of templates for specific types of questions, including choice-based experiments.

Because the target audience was youngsters, invitations were sent to students from a sample of schools in the province of Brabant, The Netherlands. In addition, invitation cards were personally given to youngsters at train stations and city centers. They were briefly explained about the aims of the project and if interested guided to a web-site for the survey and the experiment. Five 100 euro's travel vouchers were raffled among participants.

A total of 154 responded to the invitation and participated in the experiment. The profile of the respondents is presented in Table 2. It shows an almost equal mix of women and men. Almost fifty percent is in the 19-24 age group, while another thirty five percent is between 25-30 years of age. Most of the households consist of one to three people. The largest group of youngsters has a high education level, and almost seventy percent has less than €1000 per month to spend on their activities including leisure.

Table 2 Sample characteristics

Variables	**Levels**	**%**
Gender	female	46.1
	male	53.9
Age	14 < 18 years	9.7
	19 < 24 years	48.1
	25 < 30 years	35.1
	31 < 36 years	7.1
Education level	low	0%
	medium	5.8%
	high	92.8%
	not informed	1.3%
Income	< €1000	69.5%
	€1001 < €2000	24%
	> €2001	3.9%
	Not informed	2.6%
Number of people in household	< 4	70.8
	4 < 6	25.3
	≥ 6	3.9

N = 154

ANALYSIS AND RESULTS

Because we are interested in the portfolio decisions, respondents could choose between 1024 different choice options (5 choices with 4 alternatives each; $4^5 = 1024$). To make matters more complicated, attributes were only systematically varied for the transport mode options. The estimation of a choice model for such a portfolio task is not standard. For the present analysis, we used the following approach. For each choice, a choice set was created, consisting of the chosen portfolio choice (the combination of the 5 choices), the non-chosen transport modes, keeping all other choices the same, and a randomly selected portfolio. The adequacy of this approach was tested using known data and parameters. It was found that even for relatively small samples, the original parameters could be reproduced within acceptable margins.

An additive main-effects-only model was estimated using this stated choice data. The Log likelihood of the estimated model was -1,531.364; the Log likelihood for the null model was -3,581.7272. Thus, the estimated model represents a significant improvement over the null model. Rho-square was equal to 0.57, suggesting a satisfactory goodness-of-fit.

Table 3 displays the estimated coefficients. To interpret the results, it is important to realize that the attribute levels for the stated choice experiment were effect-coded. This means that for every three level attribute, two indicator variables were constructed. The first of these is associated with the corresponding attribute level. The second indicator variable is associated with the associated second attribute level. The third attribute level was coded (-1, -1) on these two indicator variables. Note that consequently the estimated utilities for each attribute sum to zero across the attribute levels of that attribute. Finally, the t-statistics should be interpreted in terms of significant differences of the estimated attribute level utility against a coefficient of zero.

Table 3 indicates that the estimated utilities for the four groups of destinations do not differ that much. On average, the estimated utility is slightly higher for Italy and North-West Europe, but these differences are not significant at the 5% probability level. This may be indicative of a substantial amount of heterogeneity in taste preferences or of the existence of variety-seeking behaviour.

As for duration, estimated utilities tend to increase with longer duration. However, the estimated coefficient for a 1 day trip is slightly higher than the estimated coefficient for 1-3 nights. This may indicate that variety is also sought in this regard. None of the estimated coefficient is significant at conventional levels.

The third facet of the portfolio choice is accommodation. Consistent with the literature, youngsters prefer staying at a friend or relative's house, followed by camping. Although the variation in estimated coefficients is somewhat higher than the variation in the previously discussed coefficients, still the results are not significant for the current sample size.

As for travel party, the estimated utility is lowest for respectively travelling alone and travelling with friends. Coefficients are higher for travelling with family and especially for travelling with a partner. The estimated coefficients for the two extreme cases are significant at conventional levels.

The main focus of our interest is concerned with the transport modes. The estimated constants suggest that youngsters prefer discount airlines, followed by regular airlines, car and train/bus. The size of these constants is relatively high and all are significant, suggesting that youngsters have clear preferences for particular transport modes, and are less sensitive to their attributes, except for some as we will discuss later. The estimated constant for "None" is also quite high, indicating that under a broader set of circumstances, youngster decide not to go on vacation.

It is interesting to examine and interpret the estimated coefficients for the attribute levels of the transport options. Both in case of regular and discount airlines, utility almost linearly decrease with costs levels. However, the degree of decrease is steeper for discount airlines than for regular airlines. Hence, youngsters tend to be more sensitive to the costs/airfares of discount airlines. Estimated "Time of day" coefficients are not significant. However, for both types of airlines, youngsters demonstrate a slight preference for afternoon flights. Remarkable findings were obtained for the "Time to get to the airport" attribute. Sensitivity for this attribute is very low in case of discount airlines. On the other hand, in case of regular airlines, there is a sharp decline in estimated utility from 90 minutes to two hours. Surprisingly and unexpectedly, the preference for a relatively close airport is also negative. Perhaps, the response patterns in part reflect the actual choice context as opposed to underlying preferences. Further analysis should rule out the alternative possibility that these effects were caused by specific data points. Compared to other transport modes, sensitivity to travel time is low for the Regular and Discount airlines.

Considering the estimated coefficients for train/bus and car, Table 3 shows that youngsters are less sensitive to the costs of bus/train and especially car. In case of bus/train, estimated part-worth utilities tend to decrease with increasing costs, except for high costs, although differences are not significant. In case of the car, on the other hand, estimated part worth utilities nonlinearly decrease with increasing cost levels.

As for time of day, Table 3 demonstrates that in case of train/bus, youngsters prefer leaving in the morning or in the evening. Recalling that in case of airlines, the afternoon was preferred, this finding suggest that youngster prefer the most efficient departure time, considering the travel time involved.

In case of bus/train, estimated coefficients almost linearly decrease with increasing travel time levels. However, in case of choosing the car, a high, albeit non-significant coefficient is found for high travel time. It may be an artefact of the model, but this requires further investigation.

Finally, youngsters seems to be rather insensitive to travel times up to 90 minutes to reach a major train/bus station but after that, estimated part-worth utility drops.

Table 3: Parameter estimates and their significance

Attributes	Estimates	t-statistics
Destination:		
Group 1	-0.017	-0.094
Group 2	0.073	0.334
Group 3	0.003	0.013
Group 4	-0.059	-
Duration of the trip		
1 day	-0.209	-0.432
1-3 nights	-0.350	-1.405
4-8 nights	0.1630	0.654
9 nights or more	0.3962	-
Accommodation:		
Hotel/ rented apartment	-0.271	-1.156
Hostel	-0.425	-1.87
Camping	0.088	0.212
Friend's/ relative's house	0.607	-
Travel party		
Alone	-1.138	-3.853
With partner	0.816	3.595
With family	0.499	1.445
With friend(s)	-0.177	-
Transport mode:		
Constants:		
Regular airlines	4.077	8.982
Discount airlines	5.892	13.041
Train/bus	2.239	4.728
Car	2.602	5.569
None	2.469	6.732

Regular airlines:		
Cost		
Low	0.483	4.992
Medium	-0.022	-0.213
High	-0.460	-
Time of the day		
Morning	-0.069	-0.691
Afternoon	0.101	0.956
Evening	-0.032	-
Time to get		
60 minutes	-0.164	-1.593
90 minutes	0.300	2.948
120 minutes	-0.136	-
Discount airlines:		
Cost		
Low	0.798	8.632
Medium	0.023	0.279
High	-0.821	-
Time of the day		
Morning	-0.014	-0.172
Afternoon	0.094	1.182
Evening	-0.081	-
Time to get		
60 minutes	0.030	0.376
90 minutes	0.030	0.378
120 minutes	-0.059	-
Regular and Discount airlines:		
Travel time		
Low	0.000	0.004
Medium	-0.124	-1.143
High	0.124	-
Train/bus:		
Cost		
Low	0.234	1.124
Medium	-0.283	-1.298
High	0.049	-
Travel time		
Low	0.158	0.761
Medium	-0.026	-0.124
High	-0.132	-
Time of the day		
Morning	0.064	0.298
Afternoon	-0.081	-0.375
Evening	0.017	-
Time to get		
60 minutes	0.254	1.185
90 minutes	0.324	1.564
120 minutes	-0.578	-
Car:		
Cost		
Low	0.132	0.725
Medium	0.106	0.566
High	-0.238	-
Travel time		
Low	-0.054	-0.285
Medium	-0.130	-0.693
High	0.185	-

CONCLUSIONS AND DISCUSSION

The purpose of this study has been to gain more insight into portfolio choice of the young adult travel segment. When making travel choices decision for leisure/vacation, how do they combine destination, transport mode, duration, travel party and accommodation decisions and within this content what is the role and significance of discount airlines? In addition, this study sought to investigate the importance of several contextual and attribute variables on portfolio decisions.

To the end, using the response patterns to a stated choice experiment, an additive, non-linear, main-effects-only model was estimated. Results indicate that the youngsters' choices seem primarily driven by transport modes. Discount airlines and costs considerations in general play a major role influencing their portfolio decisions.

The estimated model performed satisfactory. Results indicate that on average most attribute levels, except for those articulating the specific profile of the transport mode were not statistically significant. At least three reasons can be mentioned to explain this finding. First, this is a true result, suggesting that costs considerations and clear preferences for particular transport modes dictate the choices of youngsters. Secondly, it may be the estimated coefficients, which are based on the overall sample, hide taste variation, either inter-personal or inter-temporary. Future research should therefore include personal characteristics or allow for heterogeneity (random effect or latent classes). Thirdly, the non-significance of parameters may be simply due to the relatively small sample size. Future research should therefore test the results against those involving a larger sample.

It should also be emphasized that the results pertain to the specific specification of the model. In future analyses, we plan to specify interaction terms to examine interdependencies in the components making up the portfolio choice.

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