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ASYMMETRIC TOURIST RESPONSE TO PRICE: LOSS AVERSION SEGMENTATION

Abstract

The objective of this article is look into heterogeneity in loss aversion in order to detect how dispersed loss aversion is in tourism and to observe whether different degrees of loss aversion can lead to the identification of loss-aversion-based segments. Loss aversion is a prominent psychological human trait which causes asymmetric price reactions. Tourism literature has shown it is a critical characteristic with a significant, but heterogeneous, effect on tourist destination choice. However, so far no attempt has been made to look into loss aversion heterogeneity, and this article contributes to the literature by exploring, for the first time, the potential existence of groups of tourists that show differentiated asymmetric responses to price. The empirical application estimates the individual degree of loss aversion for each tourist, and detects five segments with different sensitivities. Relevant managerial implications are drawn in terms of implementing pricing strategies.

Key words: Segmentation; Loss aversion; heterogeneity; destination choice; price.

1. INTRODUCTION

There is an increasing body of evidence supporting the idea that the carriers of utility are generally not states but rather changes relative to a reference point (Köbberling et al., 2007; Masiero and Hensher, 2010, 2011). This is a basic pillar of Prospect theory, which posits that people evaluate outcomes not on their absolute level but rather on their deviation from some reference level (Kahneman and Tversky, 1979). Derived from this theory, *loss aversion* has been one of the most relevant psychological effects in marketing: evidence of loss aversion implies that changes from reference points may be valued differently depending on whether they are gains or losses; in particular, people tend to be more sensitive to losses relative to their reference point than to gains. In practical terms, this property has important implications in markets in which individuals show themselves as loss averse: given that their final choice is greatly influenced by it, organizations can develop actions based on this phenomenon (for example, by implementing activities to modify their reference points). Among the different approaches to loss aversion, pricing is the most notable research field in marketing (Klapper et al, 2005).

In tourism, this interest is not an exception. On the one hand, implications of prices are multiple due to their influence on current issues such as competitiveness (Hiemstra and Wond, 2002; Lee, 1996 ; Tan et al., 2002; Stevens, 1992), business-to-business relationships (Law and Lau, 2004; Pearce, 2007), future intentions such as repurchase (Feng et al., 2006; Kao et al., 2008; Miller and Grazer, 2003; Petrick et al., 2001; Petrick and Backman, 2002; Petrick, 2004; He and Song, 2009), the design of bundling strategies (Hooper, 1995), and their dual function in terms of sacrifice incurred and quality expected (Murphy and Pritchard, 1997; Park et al., 2007); and on the other hand, today's research trends tend to introduce psychological elements in the traditional,

expected rational consumption of tourism, such as risk and uncertainty avoidance (Quintal, Lee and Soutar, 2010), or more controversially, the introduction of emotional aspects like “affect” that lead traditional cognitive-dominated theories to be revised (Walls et al., 2011).

Therefore, there is a body of tourism research that has focused on the psychological impact of prices (Al-Sabbahy et al., 2004; Crompton and Love, 1994; Lawson et al., 1995). In this context, the idea of potentially asymmetric responsiveness to prices derived from the existence of reference points (i.e. price loss aversion) is especially relevant as the increased promotional activity by competing destinations is likely to raise price elasticities (Crouch, 1994) and, as Kim and Crompton (2002) indicate, the challenge is to find ways to reduce individuals’ reluctance to accept increases in price. In this line, several authors have examined loss aversion in tourism: Oh (2003) analyzes room prices of a specific upscale hotel operating in a US city. This author estimates reference prices as the average value of: i) the fair rate suggested by the sample individuals for the room in which they were staying and ii) the mean market room rate for hotels similar to the sample hotel (also estimated by the sample individuals). This study does not find that asymmetric effects of price deviations exist in individual judgments of price perceptions. Although the study of Kim and Crompton (2002) in the context of admission fees to a Texas state park is based on reference prices, they do not estimate them. They operationalize the perceptions of the admission price to a Texas state park by asking sample visitors whether a specific admission fee is “much too low, too low, about right, too high, much too high” and recode them on a five-point Likert scale. They use this measure as the dependent variable in a regression model so as to find which independent variables have an influence on it. Their main result is that economic factors are better explanatory variables for perceptions of

admission price than behavioral factors. Nicolau (2008) tests the existence of reference dependence and loss aversion in Spanish tourism, showing that tourists use reference prices to make their decisions; i.e. they take into account the magnitude of the difference between reference price and actual price, rather than absolute prices. This study also finds that tourists react more strongly to price increases than to price decreases relative to the reference price, which represents evidence in favor of loss aversion. It is important to note, however, that this author finds significant heterogeneity parameters, which reveals the existence of different degrees of tourist loss aversion.

Precisely, heterogeneity has been claimed to be a critical aspect in the analysis (and detection) of loss aversion, not only in tourism but in general consumption too. Klapper et al. (2005) empirically demonstrate that the inconsistencies found in empirical research on the relative size of loss aversion (e.g. Hardie et al. (1993) find evidence of loss aversion, while Kalyanaram and Little (1994) do not) are a consequence of not adequately accounting for consumers' heterogeneity in their response.

Stemming from previous empirical evidence of tourist loss aversion found by Nicolau (2008), the aim of this article is to look into heterogeneity in loss aversion in order to detect how dispersed loss aversion is in tourism and to observe whether different degrees of loss aversion can lead to the identification of loss-aversion-based segments. To the best of the author's knowledge, this is the first attempt to segment the tourism market through loss aversion intensity.

This study argues that the existence of the aforementioned heterogeneity in tourism demand, through which individuals display different behaviors (Dolnicar and Grün, 2008), has led segmentation to become a strategic approach and a critical long-term tool for destination decision makers (Dolnicar, 2004; Dolnicar and Leisch, 2003; Jeng and Fesenmaier 2002; Laesser and Crouch, 2006; Sarigöllü and Huand, 2005).

Paralleling this practical interest, academics have looked into heterogeneous preferences from different perspectives to segment the tourism market, such as demographics (Mudambi and Baum 1997), behavioral dimensions (Pritchard and Howard 1997; Laesser and Crouch, 2006), psychographics (Sirakaya, Uysal, and Yoshioka 2003), and benefits (Kastenholz, Davis, and Paul 1999). Note, however, that the formation of segments through price sensitivities is scarcer, and no attempt has been made to segment the market through loss aversion. The importance of segmenting the tourism market through loss aversion revolves around the idea that promotions are mainly based on price comparisons like the “was” and “now” or a comparison to a competitor. Knowing which segment can be more influenced by these comparisons would allow managers to clearly determine their target group.

3. RESEARCH DESIGN

3.1. Method

The method that allows us to estimate individual loss aversions based on real decisions consists of two stages: i) estimation of *individual loss aversion* through a Logit Model with Random Coefficients; and ii) application of a cluster analysis.

3.1.1. Estimation of individual loss aversion

In order to analyze reference dependence and loss aversion in an empirical setting, it is necessary to specify the utility structure in such a way that it depends on gains and losses relative to a reference point. Following the standard procedures by Bell and Lattin (2000) and Klapper et al. (2005), the utility function U_{int} for alternative i and individual n on occasion t is expressed as

$$U_{int} = \alpha_i + \beta_n GAIN_{int} + \gamma_n LOSS_{int} + \varepsilon_{int}$$

where, RP_{nt} is the reference price for individual n on occasion t and $PRICE_{it}$ is the actual price of alternative i on occasion t , $GAIN_{int}$ and $LOSS_{int}$ are defined as follows: $GAIN_{int} = (RP_{nt} - PRICE_{it})D_1$, where $D_1 = 1$ if $RP_{nt} - PRICE_{it} > 0$ and $D_1 = 0$ otherwise; and $LOSS_{int} = (RP_{nt} - PRICE_{it})D_2$, where $D_2 = 1$ if $RP_{nt} - PRICE_{it} < 0$ and $D_2 = 0$ otherwise. Note that the prices of all alternatives are compared to a common reference price RP_{nt} for each individual, as each person has one reference point for all the alternatives (Tversky and Kahneman, 1991). Finally, α_i , γ_n , and β_n , are coefficients¹ to be estimated and ε_{int} is a random term. Loss aversion is detected if $\gamma_n/\beta_n > 1$; i.e. if the parameter associated with losses is greater than the parameter related to gains.

We assume that ε_{int} is a random term that is Iid extreme value, so that logit-type models are used (Costa and Manente, 1996; Tsaur and Wu, 2005; Winzar et al., 1993).

In particular, we utilize the Random Parameter Logit Model (RPL) because of the following reasons: i) as we are interested in modeling heterogeneity, the RPL explicitly models price response heterogeneity and, in line with Klapper et al. (2005), allows us to account for heterogeneity to the fullest possible extent; ii) RPL models permit the estimation of the proportion of sample individuals who show positive or negative preferences towards an attribute -parameters greater or lesser than zero, respectively-, through the normalization $b/\sqrt{W} \sim N(0,1)$ pointed out by Train (1998); where b and W are the mean and variance of the Normal distribution $\phi(\beta_{nh}|b,W)$, with β_{nh} being the parameter for individual n that measures the effect of attribute h ; iii) this model allows us to estimate individual parameters for each subject in the sample; and iv) RPL models do not have the restrictive substitution patterns of the traditional logit model, thus avoiding the assumption of Independence from Irrelevant Alternatives (IIA); note in the formula below that the ratio of probabilities $P(i)/P(j)$ depends on all the data and, contrary to the traditional logit, this ratio includes the attributes of alternatives other than i and j .

The introduction of heterogeneity in the choice model leads coefficients θ to vary over decision makers with density $f(\theta)$ and θ is not observable, the probability $P_{nt}(i)$ of an individual n choosing alternative i on occasion t is the integral of $P_{nt}(i/\theta)$ over all the possible values of θ .

$$P_{nt}(i) = \int_{\theta} \frac{\exp\{U_{int}\}}{\sum_{j=1}^J \exp\{U_{jnt}\}} \phi(\theta | b, W) d\theta$$

where J is the number of alternatives and ϕ is the density function of θ , assuming that θ is distributed Normal with average b and variance W . To estimate the individual loss aversion parameters we apply Bayesian estimation methods.

3.1.2. Cluster analysis

We use the individual loss aversion parameters as inputs for a subsequent cluster analysis. To this end, we apply the Ward hierarchical algorithm to the matrix of these individual parameters. The final number of segments is reached when the segments observed explain at least 65% of the global variance and, when another segment is added, the increase in the total variance is less than 5% (Lewis and Thomas, 1990). According to Grande and Abascal (2009), Gené (2002) and Sorensen (2003), this method is efficient and appropriate when using variables derived from previous statistical procedures. Also, an ANOVA is performed to confirm the segment differences.

3.2. Sample, Data and Variables

To reach the objective, we use information on tourist choice behavior obtained from the national survey “Spanish Holidaying Behavior (III)”, which was carried out by the Spanish Centre for Sociological Research. This is due to the following reasons: i) The availability of information on individual tourist destination choice behavior in terms of types of destinations, in particular, the types “coastal” and “inland”. The examination of destination choices of a “coastal-inland” type is relevant because of the tendency of people to look for alternatives to the sun, sea and sand type holiday which predominates in countries like Spain. Moreover, the development of these alternatives is largely found in inland areas, as it allows a destination typically known for its coast to diversify its “product portfolio” as well as an inland economy to be revitalized. In this context, the study of prices is crucial for the development of tourism policies by public bodies and for the implementation of strategies in the tourism industry. And ii) The survey is directed at a sample (over 18 years old) obtained at each individual’s home, which avoids the characteristic selection bias of destination collected samples, leading to a more precise analysis of tourist demand. The sample is taken by using multistage

sampling, stratified by conglomerations, with proportional selection of primary units - cities- and of secondary units -censorial sections-. The strata are formed by crossing the 17 Spanish autonomous regions and the city size, resulting in seven categories: less than 2,000 inhabitants; between 2,001 and 10,000; between 10,001 and 50,000; between 50,001 and 100,000; between 100,001 and 400,000; between 400,001 and 1,000,000; and over 1,000,000. The individuals were selected through random routes and through quotas defined by gender and age. The information was collected through personal, at home, interviews with a structured questionnaire. By considering individuals who provide information on at least two consecutive holiday periods (regardless of whether they went, after the first time, on holiday or not), the sample size is of 410 individuals. There were no list of destinations constrained to certain locations, rather the respondents were free to list any destination. We base the analysis on domestic destinations because: i) considering international destinations would notably increase the number of locations to be taken into account; and ii) the distinction between “coastal” and “inland” for Spanish destinations is deeply rooted in people’s minds. In fact, even though there might be differences between destinations that can be attributed to more than just being “coastal” or “inland” locations, the impact on the Spanish case is minimized on account of this traditional distinction.

Variables: In order to make the choice model operative, we will define the variables used and identify the dependent and independent variables.

1) *Dependent variable*. To represent the set of alternatives (destination types) available to the individual, we use the following three dummy variables: i) coastal, which takes a value of 1 when this type of destination is chosen and 0 if not; ii) inland, where a value of 1 shows that this kind of destination has been selected and 0 if not; iii)

not going on holiday (at the last vacation occasion), which takes a value of 1 when chosen and 0 if not.

2) *Independent variables for the choice model.* a) *Prices.* Since the alternatives are “types of destinations” (coastal and inland) we have to build up a price index for each type. We measure prices of destination types using the specific cost index for each type of destination and each individual proposed by Eymann and Ronning (1997). The procedure used to form this index has sometimes been called “quasi-hedonic” regression technique due to its resemblance to the hedonic regression introduced by Rosen (1974). In fact, the index proposed by Eymann and Ronning (1997) is an application to tourism destinations of the well-known hedonic price index widely used in the literature in different fields (Izquierdo and Matea, 2004). It implies following a two-stage procedure (Eymann and Ronning, 1997): i) a regression model is estimated $E_{int} = \delta_{i1} + \delta_{i2} X_{int}^{(1)} + \delta_{i3} X_{nt}^{(2)} + \varepsilon_{int}$ where E_{int} are the tourism costs (expenditures) of each individual n in each destination type i on occasion t , $X_{int}^{(1)}$ is the consumption intensity in the corresponding destination type i based on the number of days the individual n spent there on occasion t , and $X_{nt}^{(2)}$ are the socio-demographic characteristics of individual n on occasion t (household size, marriage status, education and income). Note that although the utility function does not directly use the variable “income”, we are indirectly dealing with it by inserting income in this price index, which in turn will be ultimately introduced in the utility function; and ii) the estimated parameters δ_{i1} , δ_{i2} and δ_{i3} are used to construct the specific cost indices -or quasi-hedonic prices QHP_{int} - for each type of destination and each individual at a specific occasion using the expression $QHP_{int} = \delta_{i1} + \delta_{i2} \bar{X}_i^{(1)} + \delta_{i3} X_{nt}^{(2)}$ where $\bar{X}_i^{(1)}$ represents the average consumption of variable $X_{it}^{(1)}$ in destination i in period t^2 .

b) *Reference prices*. It is important to stress that reference prices are not only quantities generally unavailable from conventional data sources, but they are difficult to measure (Winer, 1986). We propose and try one internal reference price and two external reference prices, to empirically determine which one is best. We define the one internal memory-based reference price as the price a consumer paid at the last purchase incidence (Klapper et al., 2005; Mazumdar et al., 2005). On the other hand, we determine the two stimulus-based reference prices as: i) the current price of the last product purchased (Hardie et al., 1993; Bell and Lattin, 2000), as it is easier for the consumer to remember the product bought at the last purchase occasion than to remember the last price paid; and ii) the average of the current prices of the available alternatives (Moon et al. 2006), as individuals may observe to what extent a price stands out in comparison with other product prices.

Regarding their measurement, the reference prices for the destination types coastal and inland are, as in the case of prices, measured using the quasi-hedonic prices of Eymann and Ronning (1997) obtained from the two-stage procedure laid out before. Note that, by employing this technique, we are able to estimate the price QHP_{int} for each destination type i , each individual n and every purchase occasion t . Therefore, the internal reference price, defined as the price a consumer paid at the last purchase incidence is expressed as $RP_{nt} = QHP_{jnt-1}$, where j is the alternative bought at the last occasion; the external reference price defined as the current price of the last alternative purchased as $RP_{nt} = QHP_{jnt}$; and the external reference price defined as the average of the current prices of the available alternatives as $RP_{nt} = \overline{QHP}_{nt}$.

c) Descriptive variables for the segments: 1) *Income*. Monthly income levels are placed into the following categories: *Income 1*, up to 600€ per month; *Income 2*, between 600 and 1200€; *Income 3*, between 1200 and 2400€; *Income 4*, between 2400

and 4500€; and *Income 5*, more than 4500€. 2) *Age*. Apart from its quantitative measurement, four categorical variables are used: *Age 1*, under 25 years old; *Age 2*, between 26 and 45; *Age 3*, between 46 and 65; and *Age 4*, over 65 years old. 3) *Household size*. This is measured by the number of people living in the house. 4) *Single*, whether the interviewee is single or not. 5) *Secondary home*, whether the interviewee owns a secondary home or not. 6) *Organization*, whether the tourist uses a travel agent and 0 if he/she organizes his/her own vacation. 7) *Length of stay*, a quantitative variable of the number of days that a tourist spends outside the usual place of residence. 8) *Accommodation type*. The type of accommodation selected by the tourist is classified as “hotel”, “camping site”, “own apartment or villa”, “rented apartment or villa” and “family or friends’ house”. 9) The variable relative to tourism expenditures is found by a quantitative variable which represents costs incurred during the holiday. 10) The motivations “resting”, “climate”, “cultural interest”, “interest in new places”, “doing sports” and “visiting friend and relatives” are measured through dummy variables.

4. RESULTS

The first action is to empirically test the best reference price alternative. We estimate -with each of them- the equation (2), which incorporates the effects of gain and loss. Regarding the internal reference price “*price paid at the last purchase incidence*” the likelihood function is -408.54. As for external reference prices “*Current price of the last product purchased*” and “*Average of current prices of the available alternatives*” the likelihood functions arrived at are -413.13 and -418.52, respectively. These results show that the internal reference price measured by the price paid at the last purchase incidence presents the best fit (this superiority of the internal reference price is also found when quadratic terms are introduced (see Nicolau (2008))). This result is in accordance with the widely found evidence that the last price paid takes part in the formation of the reference price (Briesch et al., 1997; Kalyanaram and Winer, 1995; Mazumdar et al. 2005). Having empirically determined that, in this application, the internal memory-based reference price is best, Table 1 presents the global results for an average tourist. The parameter estimates refer to the utility function shown in the method section, where the gain and loss parameters are assumed to follow a normal distribution; accordingly, the second row in Table 1 presents their mean parameters and the third row their standard deviations (the parameters of the constants are assumed to be fixed).

[Table 1 about here]

The global result for an average tourist shows that the mean loss aversion is 0.021 and a standard deviation standing at 0.028, both being significant at 1%. Concerning the parameter associated with gains, it is not significantly different from zero. The fact that the loss parameter is greater than the gain parameter supports the idea that tourists are loss averse. In real terms, this means that, when individuals encounter

actual prices above their reference prices they opt for a cheaper alternative (for a broader discussion of this result, see Nicolau (2008)).

At this point, however, the important result that we are focusing on and further exploring is the significance of the standard deviations $SD(\beta)$ of loss aversion. Its significance shows that the loss aversion parameter follows a distribution, wherein the theoretical proportions of people that have a higher-than-zero parameter stands at 77.3% [$\phi(0.021/0.028)=0.773$], and the effect of the loss aversion parameter is different for each individual, which reflects the existence of heterogeneity in price responsiveness to the negative difference between reference and actual prices. By applying Bayesian estimation methods we estimate the individual parameters of loss aversion³, which are used as inputs for the cluster analysis.

To this end, we apply the Ward hierarchical algorithm to the matrix of the positive loss aversion parameters of each individual (as the negative parameters represent a loss aversion reversal, we treat this segment separately). By applying the two criteria described in the method (explanation of at least 65% of the global variance and increase in less than 5%), we select five segments. Table 2 summarizes the results of the application; the shaded area represents the number of segments selected. Note, however, that one segment contained only one individual (clearly an outlier), so we have added this subject to the nearest segment. Therefore, we are left with four segments with a positive loss aversion parameter, plus the segment with a negative loss aversion parameter.

[Table 2 about here]

These five segments are described in Table 3 and are significantly distinct at a level of 1% ($F=74.27$). This confirms the existence of differences in the price

responsiveness of the sample individuals. In particular, and focusing on the input used to obtain the segments (i.e. the average loss aversion identified for each cluster (second column in Table 3)), there are 28% of the sample with reverse loss aversion and 72% with positive loss aversion (quite in line with the theoretical proportion 77.3%). The latter can be divided into four groups depending on the degree of loss aversion intensity: very little loss aversion (13.4%), little loss aversion (9.7%), normal loss aversion (45.2%) and high loss aversion (3.7%).

[Table 3 about here]

Table 4 describes the descriptive statistics for each segment, in terms of demographics, tourist behavior and motivations. Among the four demographics, income is not significantly different among the segments, but age, household size and being single show differences in loss aversion sensitivity: the youngest group is the “normal loss aversion” segment, who live in the largest household and has a greater proportion of singles; and the oldest group is the “high loss aversion” segment, with the lowest number of people at home and the lowest proportion of singles.

As for tourist behavior variables, “organization”, “length of stay” and “accommodation type” do not show differences. However, expenditures are clearly contingent on loss aversion sensitivity: the “reverse loss aversion” segment presents the highest level of expenses at the destination; as expected, the “high loss aversion” segment has the lowest level of expenditures. Regarding motivations, only “doing sports” shows differences, with the “very little loss aversion” segment having the highest proportion of people taking part in sports activities.

[Table 4 about here]

5. CONCLUSIONS

The prevalent use of psychological characteristics in tourism behavior and the growing relevance of segmentation on account of the extant heterogeneity, have led this article to look for segments built on loss aversion sensitivities. The empirical application has been carried out by employing Random Parameter Logit models that allow the analyst to capture the individual heterogeneity in people's choice behavior.

The results show that three quarters of the sample behave in line with the loss aversion principle when making decisions on destination types. Most importantly, however, is the fact that these loss averse people display different degrees of sensitivities: very little loss aversion (13.4%), little loss aversion (9.7%), normal loss aversion (45.2%) and high loss aversion (3.7%).

In an attempt to describe these segments in terms of demographics, tourist behavior and motivations, we find that income is not relevant to elicit differences in loss aversion, while age, household size and being single are. Also, we observe that different sensitivities to loss aversion produce distinct level of expenditures, and regarding motivations, only "doing sports" seems to be relevant.

These findings have relevant practical implications: i) loss aversion is expected to appear in tourism consumption; however, consideration of its different degrees of intensity is important as it implies differentiation in certain variables. For example, we have found that expenditures at the destination vary according to loss aversion sensitivity. Consequently, detecting people with different behavioral patterns is per se fundamental for destinations, but when it comes to price-related aspects, this relevance becomes higher as it implies dealing with one of the most determining factors when choosing a destination and an important driver of income generation for the destinations; ii) for promotional price strategies, the result that tourists looked at

reference points indicates that lowering price can generate new reference prices in people's price schemes; thus, when putting the prices back up to normal levels it could produce negative reactions in demand. Nevertheless, these negative reactions are not of the same intensity among the tourist segments. Managers are sometimes afraid to raise prices, but the potential negative impact they could expect might be overestimated as they should first look at the type of segment that goes to their destinations to gauge the impact an increase in price can have.

Among the limitations of the study, three stand out: First, the use of secondary information sources, as it does not allow us to work with dimensions specific to our investigation (especially regarding alternative reference price proposals). Second, despite the deeply rooted traditional distinction between "coastal" and "inland" for Spanish destinations, some differences between both destination types might have been overlooked. Third, using price indexes for coastal and inland destinations can be problematic as prices can vary within these categories. Even though this is the only alternative we have to generate proxies of prices for "destinations types" and its use is standard in the literature, it is ultimately a proxy, and as such, it is bound to have measurement errors.

For further research would remain testing the range-frequency theory by which people make judgments on a value in comparison to the most extreme values and considering its rank in a series of prices (Moon and Voss, 2009; Niedrich et al., 2009). Also, recent research (Saini et al., 2010) shows that the dominance of referent thinking over relative thinking and vice versa depends on the existence and degree of the deviation between actual and expected prices; thus, it would be relevant to analyze whether the referent thinking tested in this article holds when relative thinking is included. It would provide a comprehensive perspective of tourists' reactions, especially

in the context of promotional activities. Finally, Abe (1998) suggests that, the price factor in the realm of packaged goods and services is critical and the findings of people's reactions provide marketers with distinct advantages. Therefore, identifying non-linear responses to the price of a product included in a package can help managers make efficient decisions. Consequently, it would be relevant to explore people's subjective price perceptions in the context of tourism packages in order to design efficient promotional programs for bundling strategies. Obviously, all of these future lines of research could be complemented by testing different "reactions to prices" in international destinations (Eugenio-Martin and Campos-Soria, 2011).

Notes

¹ Endogeneity is to some extent controlled by the introduction of constants specific to each product that pick up any correlation between prices and unobserved attributes (Train, 2009).

² The description of the variables used in the estimation of the quasi-hedonic prices QHP_{int} can be found in Nicolau (2008).

³ As convergence problems were found for some observations, we restricted the estimation of individual loss aversion parameters to 217 individuals.

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Table 1. Loss aversion estimates

(Standard error in parenthesis)

	Gain	Loss	Coastal constant	Inland constant	ML
Parameter	0.002 (0.004)	0.021 ^a (0.006)	1.205 ^a (0.263)	0.955 ^a (0.265)	
Standard Deviation of β	0.027 ^b (0.011)	0.028 ^a (0.006)	-	-	-408.54

a=prob<1%; b=prob<5%

Table 2. Segments based on loss aversion

N. of Segments	σ^{2*}	$\sigma^2(\%)*$	Explained Variance	$\Delta\sigma^{2*}$
10	0.005	0.718	0.226	99.28
9	0.007	0.945	0.404	99.05
8	0.010	1.349	0.573	98.65
7	0.014	1.922	1.018	98.07
6	0.021	2.941	2.201	97.05
5	0.037	5.142	3.718	94.85
4	0.064	8.860	15.889	91.14
3	0.180	24.749	29.041	75.25
2	0.391	53.790	46.210	46.21
1	0.727	100	0	0

*Intra-group variance.

Table 3. Segment characterization through loss aversion degree

Segment	Average Loss aversion	Number of tourists	Percentage
Reverse loss aversion	-0.114	61	28%
Very Little loss aversion	0.006	29	13.4%
Little loss aversion	0.054	21	9.7%
Loss aversion	0.106	98	45.2%
High loss aversion	0.290	8	3.7%

Table 4. Segment characterization by demographics, tourist behavior and motivations

	Reverse LA	Very Little LA	Little LA	Normal LA	High LA	Global	χ^{2*}
Segment characterization by tourist demographics							
<i>Income 1</i>	13%	23%	6%	12%	0%	13%	
<i>Income 2</i>	43%	27%	47%	47%	60%	44%	
<i>Income 3</i>	35%	50%	35%	35%	40%	37%	8.91
<i>Income 4</i>	9%	0%	12%	6%	0%	7%	
<i>Income 5</i>	0%	0%	0%	0%	0%	0%	
<i>Age</i>	41.56	41.55	44.52	34.21	49.63	38.82	4.72 ^a
<i>Age 1: less than 25</i>	21%	21%	19%	29%	13%	24%	
<i>Age 2: between 26 and 45</i>	34%	45%	38%	52%	13%	43%	30.45 ^a
<i>Age 3: between 46 and 65</i>	33%	24%	19%	16%	75%	24%	
<i>Age 4: Over 65</i>	11%	10%	24%	3%	0%	8%	
<i>Household size</i>	3.51	3.28	3.05	3.87	3	3.58	2.72 ^b
<i>Single</i>	33%	31%	29%	45%	25%	37%	19.07 ^c
Segment characterization by tourist behavior							
<i>Own organization</i>	83%	83%	94%	83%	80%	85%	1.40
<i>Length of stay (days)</i>	12.95	10	10.83	11.18	11.63	11.62	0.123
<i>Accommodation type 1</i>							
Hotel	28%	41%	29%	40%	40%	34%	
<i>Accommodation type 2</i>							
Camping site	7%	14%	6%	11%	-	9%	
<i>Accommodation type 3</i>							
Own apartment	33%	5%	29%	11%	20%	22%	19.50
<i>Accommodation type 4</i>							
Rented apartment	2%	14%	-	6%	-	4%	
<i>Accommodation type 5</i>							
Friends and relatives	29%	27%	35%	29%	40%	30%	
<i>Tourist expenditures €</i>	2365.40	506.59	325.75	675.24	168.28	1114.28	5.63 ^a
Segment characterization by tourist motivations							
Resting	52%	55%	62%	56%	25%	54%	3.481
Climate	43%	45%	52%	41%	63%	44%	2.166
Cultural interest	20%	17%	0%	10%	13%	13%	6.720
Interest in new places	33%	41%	24%	43%	25%	37%	4.182
Doing sports	3%	17%	10%	3%	13%	6%	9.875 ^b
VFR	34%	21%	14%	22%	50%	26%	7.242

*Test statistics for continuous variables rely on F-test (ANOVA) whereas for all the other categorical variables χ^2 -test applies.