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TESTING REFERENCE DEPENDENCE, LOSS AVERSION AND DIMINISHING SENSITIVITY IN SPANISH TOURISM

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Based on Tversky and Kahneman's Prospect Theory, we test the existence of reference dependence, loss aversion and diminishing sensitivity in Spanish tourism. To do this, we incorporate the reference-dependent model into a Multinomial Logit Model with Random Parameters -which controls for heterogeneity- and apply it to a sample of vacation choices made by Spaniards. We find that the difference between reference price and actual price is considered to make decisions, confirming that reference dependence exists; that people react more strongly to price increases than to price decreases relative to their reference price, which represents evidence in favor of the loss aversion phenomenon; and that there is diminishing sensitivity for losses only, showing convexity for these negative values.

Keywords: Prospect theory, tourism prices.

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1. Introduction

Experimental investigations of small-scale trading decisions, as well as monetary risk taking, indicate that preferences are reference-dependent, i.e. people compare economic outcomes to relevant reference points - not only evaluate them according to absolute measures- (Heidhues and Köszegi, 2005). Based on this idea, and derived from Prospect Theory (Kahneman and Tversky, 1979), the most noticeable manifestations of such reference-dependent preferences are loss aversion and diminishing sensitivity.

Loss aversion implies that changes from reference points may be valued differently depending on whether they are gains or losses; in particular, people are more sensitive to losses relative to their reference point than

to gains. In this regard, this theory predicts that the absolute level of the change in demand due to a loss is greater than the corresponding impact of an equal gain. Schmidt and Zank (2002) note that loss aversion is an important psychological concept which receives increasing attention in economic analysis as anomalies in traditional choice theory, such as the endowment effect of Thaler (1980), the status quo bias of Samuelson and Zeckhauser (1988), or the equity premium puzzle proposed by Benartzi and Thaler (1995) are explained by the notion of loss aversion. For instance, according to the neoclassical economic view, an individual should be willing to sell a product for one euro and buy it for an identical price. However, empirical research reveals that the minimum price one is willing to accept when selling a good is commonly greater than the maximum amount s/he is willing to spend for buying the same good. That is, people might value a product to be worth one euro and are willing to pay this price for it; however, when they are selling the same product they demand more money, say one and a half euros. Such behavior is against presumptions underlying the concept of economic rationality. Prospect theory explains this anomaly by a trade-off between gains and losses of such transaction, since the prospect of the monetary gain in selling weighs less than the aversion to lose the product. In practical terms, this "loss aversion" property has important implications in markets in which individuals manifest to be loss averse: given that their final choice is greatly influenced by it, organizations can develop actions based on this phenomenon (e.g. to implement activities to modify their reference points).

Diminishing sensitivity derives from the fact that the marginal impact of a gain or a loss is contingent upon the distance from the reference point. To be precise, this characteristic produces outcomes that have smaller marginal effects when they are more distant from the reference point: a gain (loss) from 120 to 140 has a smaller effect on the final outcome than a gain (loss) from 20 to 40. Intuitively, the first sip of beer tastes the best, and the first euro lost hurts the most. In this respect, the notion that changes in a variable have less impact the farther the variable is from a reference point is pervasive in both economics and psychology (Hardie *et al.,* 1993; Hill and Neilson, 2007), as it brings about the properties of diminishing marginal rates of substitution in consumer theory, diminishing returns in producer theory, discounting in intertemporal choice, or the pattern of risk aversion over gains and risk seeking over losses in behavior toward risk. In the context of neoclassical economics, this example is valid for gains as each new euro

brings less extra utility than the one before (concave utility); however, for losses, it implies a different pattern since the closer to the reference point the higher -rather than the lower- impact on the outcome (convex utility). Köbberling et al. (2007) suggest that this difference in predictions exists on account of the fact that both theories focus on distinct aspects of utility: the economic prediction deals with the goodness of money (money enhances the purchasing power and well being of an individual), depends on final wealth and is rational; and prospect theory concerns the general perception of quantity and depends on changes from a perceived reference point.

Therefore, it is widely recognized that these characteristics -loss aversion and diminishing sensitivity- may have important economic consequences, and researchers have studied these ideas in economic situations (e.g. Benartzi and Thaler, 1995; Barberis *et al.,* 2001; Genesove and Mayer, 2001; Köbberling *et al.,* 2007), shaping an increasing body of evidence toward the thought that the carriers of utility are generally not states but rather changes relative to a reference point (Novemsky and Kahneman, 2005).

A challenging area, in which this statement derived from Prospect Theory applies and has important implications, is pricing research (Bell and Latin, 2000). In this context, Mazumdar *et al.* (2005) identify two streams of research: a) one that takes a behavioral perspective and uses experimental approaches to assess the effects of external stimuli on consumers' reference price; and b) another stream of research that models alternative reference price formulations and tests their effects through the statistical fit of models.

These applications in pricing research have unraveled substantive findings, especially related to reference dependence and loss aversion. In general terms, there is considerable evidence from both marketing and economics supporting the notion that, from the consumer's perspective, price is a complex construct that is multidimiensional in nature and not composed of only retail price (Winer, 1986). Thaler (1985) was the first to suggest the existence of reference standards in a pricing context, and since then, many researchers have investigated the effect of reference price in the context of consumer choice, obtaining that reference prices have a consistent and statistically significant impact on consumer demand (Erdem *et al.,* 2001). That is, when faced with a price, the consumer evaluates that price by comparing it with some form of comparison standard, i.e. the reference price; and this com-

parison leads consumers to perceive a gain if the actual price is less that the reference price or a loss if the actual price is in excess of the reference price.

Regarding the impact of loss aversion, i.e. the proposal that the effect of the difference between *reference price* and *observed price* in demand is asymmetric depending on whether it is positive (gain) or negative (loss), is theoretically and experimentally supported, but the empirical results about the relative size of loss aversion are not consistent (Klapper *et al.,* 2005). For instance, Hardie *et al.* (1993) find evidence of loss aversion while Kalyanaram and Little (1994) find no significant loss aversion in their respective applications. Some authors argue that this inconsistency can be the result of not adequately accounting for consumers' heterogeneity in their response, as applications that do not incorporate heterogeneity into their modeling may provide an upward biased estimate for loss aversion. This fact has been empirically demonstrated by Bell and Latin (2000) and Klapper *et al.* (2005).

At this point, it is also important to stress that reference prices not only are quantities generally unavailable from conventional data sources, but they are difficult to measure (Winer, 1986). In fact, Hardie *et al.* (1993) indicate that the identification of the reference point for each consumer is a significant challenge in this modeling context. In broad terms, two comparison standards have been widely established: a) internal reference price, through which consumers evaluate a price by comparing it with price information that is based upon past information. In the terminology of Briesch *et al.* (1997), consumers are said to use an internal memory-based price standard; and b) external reference price, in which the comparison standard is a price -or the current distribution of prices- observed in the shopping environment. In this case, consumers are said to utilize a stimulus-based reference price (Briesch *et al.,* 1997).

In general terms, in the review carried out by Kalyanaram and Winer (1995) it is concluded that many empirical studies have assumed and found that past prices are important components of the reference price formation process, thus building convincing empirical evidence that past prices are considered when consumers form reference prices. In this line, Briesch *et al.* (1994) compare models with current prices (external) and with past prices (internal), obtaining that the best-fitting model was based on the latter. However, based on the price recall data presented by Dickson and Sawyer (1990) in their application

to a supermarket context, Kalyanaram and Winer (1995) also indicate that consumers are not very likely to clearly remember past prices paid given the number of products purchased in supermarkets. In addition, consumers may also use current context-dependent information when building a reference price, such as the current price of the last product purchased (Klapper et al, 2005). The current price of the last product purchased has been suggested by Bell and Latin (2000) based on the argument that it is easier for the consumer to remember the product bought at the last purchase occasion than remember the last price paid. Hence, considering this pitfall that appears when operating with reference prices, it is important to propose and try several reference prices -both external and internal-.

Within the stream of research -identified by Mazumdar et al. (2005)- that models alternative reference price formulations and tests their effects through the statistical fit of models, we investigate reference dependence, loss aversion and diminishing sensitivity in Spanish tourism in a sample of vacation choices made by Spaniards. Tourism is one of the highest income-generating industries in Spain -its contribution to the GDP stands at 11.5% and to employment at 12% (Cinco Días, 2007)-, where prices play an important role as a decision criterion. However, in this field, the three phenomena of reference dependence, loss aversion and diminishing sensitivity are under-developed (as indicated in the next section, only two studies have analyzed -partially only- some of these aspects in rather limited contexts).

In order to fulfill this objective, the remainder of the paper is arranged as follows: The second section shows the role price plays in tourism and how the characteristics of this type of product have an influence on the effect of prices. The third section covers the description of the modeling approach used to test the three properties of Prospect Theory. The fourth section shows the data, sample and variables used, and the fifth presents the results obtained and their discussion. Finally, the sixth section summarizes the conclusions.

2. Tourism prices

The analysis of the prices of tourism products is an especially relevant issue in tourism economics: their particular characteristics and the psychological component inherent in their consumption make the price play a crucial role for firms to shape the product and for people to make their choices.

As tourism products are perishable, inseparable, intangible and heterogeneous (Witt and Moutinho, 1995) firms have to bear these basic aspects in mind when they establish pricing strategies:

1) Perishability means that an unsold unit for a scheduled date is revenue lost as it cannot be stored for future use. Plainly said, if no one is sitting in a plane seat when a flight departs from an airport at a specific time, the chance to sell that seat is gone forever. Therefore, for each and every scheduled time, organizations must price their products so profits are maximized. Even though a firm could be willing to sell a number of units inferior to the available units in order to maximize its profits (say, the case of a monopoly or an oligopoly), the fact that a tourism service (one night in a hotel or a plane seat) cannot be stored to be sold the next time (next night or next flight), together with the large proportion of fixed costs incurred by tourism firms, make them consider pricing a particularly complex task and be strongly revenue-dependent. It implies that high revenue levels are normally required to survive and generate adequate profit returns; in fact, Rushmore and Goldhoff (1997) and Toh (2007) indicate that this industry is affected by a singular burden of huge fixed costs and, consequently, a follow-up assessment of break-even levels is fundamental for decision-makers to implement informed decisions which ensure survival, optimize profit returns and limit risk. Along this line, Graham and Harris (1999) point out that this industry frequently experiences disproportionate profit variations during periods of fluctuating demand. This leads to a strong profit instability the sector has to face with. Hence, in this context, prices and pricing strategies that maximize profits at each scheduled time are critical (suffice it to say that the technique *revenue* or *yield management* was originated in the airline industry in order to deal with this particular circumstance).

2) Inseparability implies that production and consumption take place at the same time. It means that tourists have to go to the place where the product is located, not the reverse like other types of products that

people buy in a store near home and use at their own home. As a consequence, it is the individual -his/her own person- who has to move to reach the product, hence increasing his/her involvement in consumption. That is why in the context of tourism consumption people tend to reduce the uncertainty associated with both the displacement and the stay away from home; as explain later, prices can be used for this purpose.

3) Intangibility means that tourist cannot see or try what they are really purchasing, having important implications for the ease with which they can evaluate tourism services. In actual fact, tourism is an experience good and tourists base their assessment in terms of expected results and experiences. However, not knowing a priori what they will eventually obtain when getting to the destination is risky.

4) And heterogeneity reflects the potential for high variability in tourism service delivery, not making it possible to produce two identical products. There is always a difference in what a tourist experiences even though the destination chosen is the same as on the previous occasion. It raises again this uncertainty derived from not really knowing what an individual will find during his/her stay.

Therefore, in order to reduce uncertainty derived from perishability, inseparability, intangibility and heterogeneity, an individual may rely on prices. As prices are sometimes considered to be an indication of quality, attitudes to prices can also be related to the amount of risk the buyer feels is involved in the purchase decision: a person may be willing to pay a higher price to feel safer and make sure of what s/he will obtain. Note that prior to the consumption, for the case of experience goods, the individual forms expectations about the forthcoming experience using a number of intrinsic and extrinsic cues that give indication about the likely performance standards (Gould-Williams, 1999). In this regard, information asymmetries are particularly important for these goods because their attributes are difficult to grasp in advance, as they are not observed prior to service encounter. In this line, Bharadwaj and Menon (1994) point out that the image that the market has of a company and its perception of the good it offers affect the company's performance even more than the very product/service it offers. Outstanding among experience goods is tourism, where information asymmetries play a crucial role for the individual to make his/her decisions (it is important to remind that it is the individual -his/her own person- who has to move to reach the product). Actually,

apart from the usual asymmetry between the information that circulates among companies and that held by the consumers with regard to the quality of the products and services that are offered on the market, the uncertainty inherent in the purchase and consumption of tourism services makes the strategies developed to reduce information asymmetries critical; note that, in order to reduce the uncertainty derived from the characteristics of this experience good, an individual may rely on prices. In fact, according to Assael (1995), the individual's interest and level of involvement in a product determine the extent s/he meaningfully absorbs the information on prices and, clearly, this statement strongly applies to the tourism consumption in which the individual is actively involved.

Also, another psychological aspect of tourist prices is related to the fact that they may be a symbol of status as well as value. In this respect, although literature holds that demand for tourism products and tourist activities is that of *ordinary goods,* in such a way that price increments diminish consumption (Smith, 1995), price does not always have a deterrent effect on destination choice. Morrison (1996) indicates that the underlying hedonistic character often found in the consumption of tourism products implies that high prices do not always act against demand; rather that the concept of value for money, which compares the amount spent with the quality of installations and service, takes over.

Note that, as has been suggested previously, an individual meaningfully absorbs the information on prices depending on his/her level of involvement in a product. Then, once people have obtained this information, they put it into an encoding process in which they interpret and assign a meaning to a specific price. However, even though they all receive the same external stimulus -the price-, perceptions of it are changed in the encoding process as individuals adapt it to fit an existing set of beliefs (Jacoby and Olson, 1977; Schoell and Guiltinan, 1995). That is, when people observe the price to visit a destination, information acquired in the past makes it likely that some will interpret the price as being expensive while others will consider it to be inexpensive. This process of adapting the price to fit an existing set of beliefs leads to different psychological evaluations of it, the central construct in them being the reference price (Assael, 1995;Kim and Crompton, 2002), since it establishes a reference point for the evalua-

tion: it is the internally held standard that people use to evaluate new price information.

In the tourism context, characterized by a high involvement consumption with important psychological connotations, it may be valuable to investigate the notion of reference price as it could shed some light on the tourist responses to prices. More broadly, we investigate Prospect Theory in Spanish tourism. To the best of the author's knowledge, only two articles have so far addressed the "reference point" topic in tourism prices, both of them in rather limited contexts: the study of Oh (2003) in the context of room prices of a specific upscale hotel operating in a US city and the study of Kim and Crompton (2002) in the context of admission fees to Texas state park. Oh (2003) estimates the 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 like the sample hotel (also estimated by the sample individuals). This author does not evidence that asymmetric effects of price deviations exist in individual's judgments of price perceptions. Kim and Crompton (2002), on the other hand, even though basing their study on reference prices, do not estimate them. They operationalize the perceptions of the admission price to 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 recoding them on a five-point Likert scale. They use this measure as the dependent variable in a regression model so as to find out those independent variables that have an influence on it. Their main result is that economic factors are better explanatory variables for perceptions of admission price than behavioral factors.

Based on Tversky and Kahneman's Prospect Theory, the objective of this article is to test the existence of reference dependence, loss aversion and diminishing sensitivity in Spanish tourism, in the context of price responsiveness. In order to test these characteristics, we assume that the value function for a certain tourism product is determined by weighted gains and losses defined relative to a reference point. That is, people compare the relevant attributes of the alternatives to one reference point. Focusing on the attribute *prices,* they are compared to their benchmarks, that is, the reference prices, and therefore the gains and losses are obtained from the difference between reference price and observed price. A positive disparity -a gain- increases tourists' *happiness* because they find the product priced lower than expected; and

a negative discrepancy -a loss- augments tourists' *disappointment* as they find the product priced higher than expected. The questions to investigate are: a) whether the difference between reference price and observed price -gains and losses- explains the outcomes in greater extent than the observed price only (testing for reference dependence); b) whether gains and losses -increases in *happiness* and *disappointment*- bring about different effects on the final decision (testing for loss aversion); and c) whether the marginal effect of gains and losses depends on the distance from the reference point (testing for diminishing sensitivity).

3. The model

For the analysis of the reference dependence, loss aversion and diminishing sensitivity properties in Spanish tourism, we base our modeling on Kahneman and Tversky (1979) and Tversky and Kahneman (1991). Kahneman and Tversky (1979) replace the notion of *utility function* with *value function* $v(x)$ for an attribute x. The value function is: 1) defined in terms of gains and losses, which represent deviations from a reference point. That is, the value function depends on gains and losses relative to a reference point or status quo and not on final wealth positions as in expected utility theory; 2) is steeper for losses than for gains $[v(x) < -v(-x), x > 0]$, i.e. the aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount (Tversky and Kahneman, 1991). It implies the existence of loss aversion; and 3) is concave for gains $[v''(x) < 0, x > 0]$ and convex for losses $[v''(x) > 0, x < 0]$, the value function depicting its typical S-shape. It brings about diminishing sensitivity, in such a way that the marginal value of both gains and losses decreases with their magnitude.

Therefore, in order to incorporate these characteristics into our modeling, and according to Tversky and Kahneman (1991), given an alternative i, an attribute x, an attribute utility u_i, and a reference point r, there exists a reference function $R(x)$ that represents a GAIN or a LOSS, such that

$$\begin{aligned} R_i(x) &= u_i(x) - u_i(r) && \text{if } x_i \geq r_i \\ R_i(x) &= \lambda\left[u_i(x) - u_i(r)\right] && \text{if } x_i < r_i. \end{aligned}$$

The utility of alternative i, evaluated from reference point r is captured by this reference function. If $\lambda > 1$ then the individual is loss averse.

Note that Tversky and Kahneman presented prospect theory as an explanation of a body of pre-existing evidence and, as an alternative to expected utility theory, the sole aim of prospect theory is to describe behavior, not to characterize optimal behavior. Thus, in order to implement the theory 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 Bell and Lating (2000) and Klapper *et al.* (2005) we operationalize prospect theory so that the utility function U_{int} for alternative i and individual n on occasion t is expressed as[1]

$$U_{int} = \alpha_i + \beta_n \left(GAIN_{int} + \lambda_n LOSS_{int}\right) + \varepsilon_{int}$$

Rearranging and specifying $\gamma_n = \beta_n \lambda_n$

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

crusidiring that, 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. $LOSS_{int} = (RP_{nt} - PRICE_{it})D_2$, 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, $\alpha_i, \gamma_n, \beta_n, \lambda_n$ are coefficients to be estimated and ε_{int} is a random term.

Reference dependence will be observed if this model explains the outcome better than the baseline model (a model with the variable $PRICE_{it}$ only) and some of the parameters associated to $GAIN_{int}$ and $LOSS_{int}$ are significant. Loss aversion will be detected if $\lambda_n > 1$ or if $\gamma_n/\beta_n > 1$; i.e. if the parameter associated with losses is greater than the parameter related to gains. And diminishing sensitivity will be evidenced

[1] A priori, this way of operationalizing the model could resemble the way neoclassical economics operate. However, note that the prospect theory model does not incorporate either the price itself or the reference price, but the difference between them. Even if the differences between the reference price and the actual price were considered as attributes to be incorporated into the utility function of expected utility theory the final result would still be different. That is, if one were to optimize as it is done in the theory of consumer choice, the outcome would differ from the prospect theory's proposal. This is shown by Putler (1992, p. 291).

if one of the squares of $GAIN_{int}$ and $LOSS_{int}$ has significant parameters (expectedly, a negative parameter for $GAIN^2_{int}$ to produce a concave function above the reference point and a positive parameter for $LOSS^2_{int}$ to result in a convex function below it).

We assume that ε_{int} is a random term that is iid extreme value which allows us to use the Random Parameter Logit Model (RPL). As Bell and Latin (2000) evidence that a model without heterogeneity may provide an upward biased estimate for some parameters (in particular, for the loss aversion parameter), we estimate the RPL Model because it explicitly models the price response heterogeneity and, in line with Klapper *et al.* (2005), allows us to account for heterogeneity in the fullest possible extent. As it 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:

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

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.

4. Data

To reach the objective, we have used 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[2]. This is due to the following reasons: a) 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 *costal-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

[2]The items in the questionnaire appear in www.cis.es/cis/opencms/ES/index.html

development of tourism policies by public bodies and for the implementation of strategies in the tourism industry. And b) 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 accurate 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 information was collected through personal, at home, interviews with a structured questionnaire. The original sample is of 3,781 individuals, but only 2,127 take holidays. Given that we need information on past vacation experiences, 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 final sample size is of 410 individuals. In spite of this considerable sample reduction, the properties of the new sample are still quite comparable (for instance, in the original sample, 61.9% of people going on holiday chose a coastal destination and 38.1% an inland destination; in the new sample, these proportions are 59.2% and 40.8% respectively).

4.1 Variables

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

— *Dependent variable.* To represent the set of alternatives (destination types) available to the individual, we use the following three dummy variables: 1) coastal, which takes a value of 1 when this type of destination is chosen and 0 if not; 2) inland, where a value of 1 shows that this kind of destination has been selected and 0 if not; 3) not going on holiday (at the last vacation occasion), which takes a value of 1 when chosen and 0 if not. In the questionnaire, individuals are asked to choose the place where they stayed during their holidays from the following options: coastal village, coastal city, inland village, inland city or none. In order to assure a minimum number of choices per alternative, we code this five-option answer into a three-option response: 168 individuals opt for alternative *coastal,* 116 choose alternative "inland" and 126 do not go on holiday.

— *Independent Variables.* 1) *Prices.* Since the alternatives are *types of destinations* (coastal and inland) we have to build up a price index for each type. In particular, we measure prices of destination types

using the specific cost index for each type of destination and each individual proposed by Eymann & Ronning (1997). The procedure used to form this index has sometimes been called *quasi-hedonic* regression technique due to the 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 to follow a two stage procedure (Eymann and Ronning, 1997): a) 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 the individual n on occasion t (household size, marriage status, education and income); and b) 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 $QHP_{int} = \widehat{\delta}_{i1} + \widehat{\delta}_{i2} \overline{X}_{it}^{(1)} + \widehat{\delta}_{i3} X_{nt}^{(2)}$ where $\overline{X}_{it}^{(1)}$ represents the average consumption of variable $X_{it}^{(1)}$ in destination i in period t.

The description of the variables used in the estimation of the quasi-hedonic prices QHP_{int} is as follows: *Tourist expenditures* (E_{int}). The variable relative to tourist expenditures is found by a quantitative variable which represents costs incurred during the holiday. In the questionnaire, individuals were suggested to indicate how much they had approximately spent during their holidays as a whole on vacation products such as travel cost, accommodation, tickets, etc. The mean value stands at 675.17 euros and its standard deviation at 888.16.

Based on the literature review (Alegre & Pou, 2006; Caswell & McConnell, 1980; Eymann & Ronning, 1992; 1997; Riera, 2000) the explanatory variables ($X_{int}^{(1)}$ and $X_{nt}^{(2)}$) of tourist expenditures are: a) *duration of stay* ($X_{int}^{(1)}$) [Individuals were asked to say their length of stay by a quantitative variable of the number of days that they spent outside the usual place of residence, showing an average duration of 17.95 days with a standard deviation of 13.94]; b) *household size* ($X_{nt}^{(2)}$) [This variable was measured by the number of people living in the house, with a mean value of 3.42 and a standard deviation

of 1.47]; c) *marital status* ($X_{nt}^{(2)}$) [This dimension is measured by a dummy variable which married=1 and single=0, with a proportion of 58.53% married people]; d) *education* ($X_{nt}^{(2)}$) [three educational levels through three categorical variables are defined: *Education 1,* Basic Education (34.8%); *Education 2,* Secondary education (33.33%); and *Education 3,* University Education (30.39%). Category *Education 1* is taken as a base reference (originally, in the questionnaire there were up to fourteen options so that old and new Spanish official names of levels of education and certificates were available)]; and e) *income* ($X_{nt}^{(2)}$) [monthly income levels are placed into the following categories: Income 1, up to 600 € per month (14.96%); *Income 2,* between 600 and 1200 € (39.45%); *Income 3,* between 1200 and 2400 € (37.75%); *Income 4,* between 2400 and 4500 € (7.48%); and *Income 5,* more than 4500 € (0.34%). Income 1 is taken as the base reference (again, originally there were ten categories, from less of 300 euros to more than 6000 euros; for the sake of parsimony in the estimation, we reduced them to five)].

— *Reference prices.* As stated before, in the pricing literature, two types of comparison standards have been proposed, *internal reference price* (or memory-based price standard) -through which consumers evaluate a price by comparing it with price information that is based upon past information-, and *external reference price* (or stimulus-based reference price) -in which the comparison standard is a price, or the current distribution of prices, observed in the shopping environment. Given the lack of consensus in the estimation of the reference price (as discussed previously, the identification of the reference point for each consumer is a significant challenge in this modeling context), in our investigation we develop alternative internal and external reference price concepts. In particular, we formulate one internal reference price and two external reference prices. Then, we will empirically determine which reference price model, internal (memory-based) or external (stimulus-based), is best.

We define the one internal memory-based reference price as the price a consumer paid at the last purchase incidence. As stated before, this measure is common in the literature and several studies support the use of this internal reference price, such as Putler (1989), Kalwani *et al.* (1990), Mayhew and Winer (1992), Raman and Bass (2002), Klapper *et al.* (2005) and Mazumdar *et al.* (2005). On the other hand, we determine the two stimulus-based reference prices as: a) 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 remember the last price paid; and b) the average of the current prices of the available alternatives (Rajendran and Tellis, 1994; Mazumdar and Papatla, 1995; Moon *et al.,* 2006), as individuals may observe to what extend a price stands out in comparison with other product prices.

Regarding their measurement, the reference prices for the destination types coastal and inland are, just as in the case of prices, measured using the quasi-hedonic prices of Eymann & 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 $RP_{nt} = \overline{QHP}_{nt}$.

5. Results and discussion

In order to empirically test the best reference price alternative, we estimate -with each of them- the two models with reference-price-based variables: Model 1 with the effects of gain and loss and Model 2 with their square magnitudes. Table 1 shows that the internal reference price measured by the price paid at the last purchase incidence presents the best fit in both models. This result is in accordance with the wide evidence that the last price paid takes part in the formation of the reference price (Briesch *et al.,* 1994; Kalyanaram and Winer, 1995; Mazumdar *et al.,* 2005). What's more, in the literature, the main criticism to this internal reference price derives from the poor memory consumers have to recall the prices of the many products they have put in their baskets when buying in a supermarket (Dickson and Sawyer, 1990). However, in purchasing tourism products this situation does not apply in the same way, as it is easier for people to recall the total price of their holidays than the price of a tin of tuna. On the one hand, the magnitude of money is considerably different and people usually tend to remember -to a greater extent, at least- how much a

product for which they have paid a big amount of money costs, even more so considering the high involvement with the product (Helgeson and Beatty, 1987; Mazumdar and Monroe, 1990); and also the inertial behavior inherent in the purchase of some frequently bought products that leads individuals not to pay much attention to their prices (Monroe and Lee, 1999), does not apply in buying a vacation product -at least, it does not apply in such a general way because a holiday product is not such a frequently bought product like a tin of tuna-. Therefore, the amount of money and the degree of involvement implied in the consumption of tourism products as well as the fact that people seem to pay greater attention to the prices of holidays, are factors that help individuals to have better recall of them.

At any rate, having empirically determined that, in this application, the internal memory-based reference price is best, we use it in order to estimate the models.

TABLE 1
Fit of alternative reference prices

		Model 1	Model 2
Internal Reference Price:	Price paid at the last purchase incidence	-408.54	-367.59
External Reference Prices:	Current price of the last product purchased	-413.13	-405.36
	Average of current prices of the available alternatives	-418.52	-390.83

Table 2 presents the parameter estimates for three models: a) the reference-dependent model 1 derived from Prospect Theory and designed explicitly to examine the effects of gain and loss on individual decisions; b) the reference-dependent model 2 with square variables for gains and losses; and c) a baseline model with the variable price only (as reference prices are unobserved, their effect are typically examined by comparing the fit of the models with reference price terms with a model that contains no reference price).

The models that incorporate gains and losses (Models 1 and 2) show better fits than the baseline model 3. According to the maximum likelihood function and the Aikaike and Schwarz information criteria[3], models 1 and 2 outperform the baseline model. It implies that

[3]The Akaike and Schwarz Information Criteria are defined as AIC=$\log(L_{ML}) - k$ and SIC=$\log(L_{ML}) - (k/2)\log(M)$ respectively, in which L_{ML} represents the likelihood function, M is the number of observations and k the number of parameters in the model. These measures, apart from considering the likelihood function, take the parsimony of the model into account by adjusting for the number of parameters, which are considered as a penalty.

the reference-price-based variables are explaining something about the tourist choice that the price variable by itself is not doing. In particular, it evidences that tourists tend to use reference prices and therefore, the magnitude of the difference between reference price and actual price, to make their decisions. Hence, this result supports reference dependence.

TABLE 2
Effects of gains and losses on tourism decisions

	Model 1		Model 2		Baseline model	
Independent Variables	*B*	SD of β	B	SD of β	*b*	SD of β
Price					-0.009[a]	0.013[a]
					(0.002)	(0.002)
Gain	0.002	0.027[c]	-0.004	0.018[c]		
	(0.004)	(0.011)	(0.004)	(0.008)		
Gain^2			0.00001	0.00003[c]		
			(0.00001)	(0.00001)		
Loss	0.021[a]	0.028[a]	0.026[a]	0.006[c]		
	(0.006)	(0.006)	(0.004)	(0.002)		
Loss^2			0.00005[a]	-0.000005		
			(0.00001)	(0.000004)		
Coastal Constant	1.205[a]		1.220[a]		1.777[a]	
	(0.263)		(0.222)		(0.344)	
Inland Constant	0.955[a]		1.150[a]		1.487[a]	
	(0.265)		(0.233)		(0.364)	
ML	-408.54		-367.59		-416.11	
Akaike Information Criterion	-412.54		-373.59		-419.11	
Schwartz Information Criterion	-413.76		-375.42		-420.03	

a=prob<0.1%; b=prob<1%; c=prob<5%.

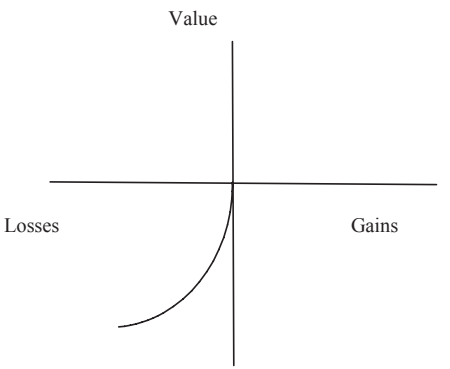
Focusing on the first two models, we observe that both models arrive at the same results regarding gains and losses: the parameter associated with gains is not significantly different from zero and the parameter related to losses is significantly positive. The fact that the loss parameter is greater than the gain parameter supports the idea 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. In real terms, it means that, when individuals encounter actual prices above their reference prices, they opt for another cheaper alternative. Note that according to the way the loss variable is defined $[(RP_{nt} - PRICE_{it})$ in such a way that $RP_{nt} - PRICE_{it} < 0]$, it has a negative sign for alternative i. Given that its parameter associated is positive, the effect on the choice of alternative i is negative,

reducing its value and therefore, increasing the probability of another alternative j with lower price being chosen.

With regard to the gain parameter, it is not significant. It means that the positive difference $(RP_{nt} - PRICE_{it})$ does not have any influence on the selection of alternative i. One possible explanation for this result could be that, although some individuals can save money when actual prices are below reference prices, some others can opt for another more expensive alternative whose price approaches to their reference price. Therefore, as $PRICE_{it}$ brings near to RP_{nt} the difference $(RP_{nt} - PRICE_{it})$ tends to zero, and its impact on the choice of alternative i becomes null.

Concerning the square variables, $gain^2$ and $loss^2$, we find that the parameter associated with the former is not significantly different from zero and the parameter related to the latter is significantly positive. It means that there exists diminishing sensitivity for losses, showing convexity for these negative values. Visually, and comparing with the traditional S-shape line of Prospect Theory, in this context a half-S-shape line is obtained (see Figure 1).

FIGURE 1
Convexity for losses



Also, it is important to remark that the significance of the standard deviations $SD(\beta)$ of gains and losses shows that the effect of them are different for each individual, which reflects the existence of heterogeneity in price responsiveness to the positive and negative difference between reference and actual prices.

Finally, even though we have found evidence toward the prospect theory models, it is important to note that other explanations are possible for the results obtained. Not only that they can be partially explained

by other theories such as the Adaptation-Level Theory (which states that people judge a stimulus relative to the level to which they have become adapted) and the Assimilation-Contrast Theory (which hypothesizes a price range of acceptable prices in such a way that if a price falls into the latitude of acceptance is assimilated into the range and will be accepted, and if it falls outside the range is contrasted to the acceptable range and will be rejected), but also that other factors can have an influence on these patterns, e.g. experience with a product. Precisely, List (2004) has recently pitted prospect theory against neoclassical theory and found that the former properly represents behavior among inexperienced consumers, but the way that consumers with intense market experience behave is largely in agreement with the latter. In fact, as indicated in the previous paragraph, there exists heterogeneity in the way people behave.

6. Conclusions

This article has examined the existence of reference dependence, loss aversion and diminishing sensitivity in Spanish tourism. By incorporating the reference-dependent model into a Multinomial Logit Model with Random Parameters -which controls for heterogeneity-, the empirical application carried out in Spain shows 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 has also obtained 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 implies that, when individuals encounter actual prices above their reference prices, they opt for another cheaper alternative. Conversely, the opposite situation -actual prices below reference prices- does not seem to have any effects on their choice. It is important to note, however, that this absence of effect is not general for all individuals as we find significant heterogeneity parameters. Regarding the diminishing sensitivity property, we show that it exists for losses only, showing convexity for these negative values.

These findings have relevant practical implications, since in markets in which people manifest to be loss averse, the existence of loss aversion implies that destinations and firms have to consider it when developing price strategies: a) excessive price reductions could lower reference prices, and consequently the region of loss aversion would be widened;

and b) price increases could provoke strong negative reactions in demand. In this regard, firms could force people to adapt to new higher reference prices by augmenting prices through small increments, in such a way that these increments are not fully noticed by individuals (Kalyanaram and Winer, 1995). It makes even more sense if we take into account that, according to Kalyanaram and Little (1994), there exists a region of price insensitivity around the reference price. Consequently, given that tourists' final choice is greatly influenced by loss aversion, destinations and organizations can develop actions based on this phenomenon (e.g. to implement activities to modify their reference points). Also, having shown that decisions are determined by asymmetric price response effects, and that those decisions determine market shares, it is important to note that the inclusion of loss aversion in competition models could shed some light on the analysis of competitor's actions and reactions.

An important limitation of this study comes from the use of secondary information sources, as it does not allow us to work with dimensions tailored to our investigation. In particular, this limitation prevents us from testing a bigger number of alternative reference price proposals. As Lattin and Bucklin (1989) suggest, consumer reference points are difficult if not impossible to measure directly, and researchers have to try several alternatives to capture these constructs indirectly. Although in our study we have tested three alternative reference prices -one internal and two external-, we cannot use either subjective measures suggested by the individual him/herself such as the *fair price* or some stimuli-based reference prices such as those appearing in brochures or advertising because they were not available to us.

Further research is necessary to identify the aspects that characterize the tourist loss aversion: because heterogeneity in price responsiveness to the positive and negative difference between reference and actual price has been evidenced, it suggests that there are personal factors that determine a specific level of loss aversion; uncovering these factors would permit a more accurate explanation for the formation of loss aversion. The same applies to diminishing sensitivity. Also, our analysis focuses on types of destinations: even though this way of working allows us to find the influence of prices and reference prices in a general manner, we are not able to get knowledge of the impact of them on a particular destination. In this regard, future research

could be oriented to analyze specific destinations in order to observe the asymmetric effects of price response, in such a way that rivalry analyses could be carried out destination-by-destination.

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Resumen

A partir de la Teoría de los Prospectos de Tversky y Kahneman, contrastamos la existencia de dependencia de las referencias, aversión a las pérdidas y sensibilidad decreciente en el contexto de las respuestas a los precios turísticos en España. Para ello, se incorpora el modelo de dependencia de las referencias en el Modelo Logit Multinomial con Coeficientes Aleatorios -que permite controlar la heterogeneidad-. Mostramos que la diferencia entre el precio de referencia y el precio actual es tenida en cuenta a la hora de tomar decisiones turísticas, lo que confirma la existencia de dependencia de las referencias, que los individuos reaccionan con relación a un punto de referencia en mayor medida ante los incrementos en los precios que ante reducciones en los mismos (evidencia de aversión a las pérdidas) y que existe sensibilidad decreciente únicamente para las pérdidas, mostrando una curca convexa para estos valores negativos.

Palabras clave: Teoría de los prospectos, precios turísticos.

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