DOCUMENTOS DE ECONOMIA Y FINANZAS INTERNACIONALES

Return to Tourist Destination. Is it Reputation, After All?

Francisco J. Ledesma
Manuel Navarro
Jorge V. Pérez-Rodríguez

April 2003

DEFI 03/01

FEDEA
Fundación de Estudios de Economía Aplicada

Asociación Española de Economía y Finanzas Internacionales

http://www.fedea.es/hojas/publicaciones.html

ISSN 1696-6376

RETURN TO TOURIST DESTINATION. IS IT REPUTATION, AFTER ALL?

FRANCISCO J. LEDESMA[†], MANUEL NAVARRO[†] AND JORGE V. PÉREZ-RODRÍGUEZ[‡]

ABSTRACT: In this paper we study the hypothesis that the repeated purchases in the tourism markets could be considered as a consequence of asymmetrical information problems. We analyze this hypothesis with the case study of the Island of Tenerife by the estimation of a count data model. We obtain that the length of the stay and the information obtained from previous visits and/or relatives and friends might increase the return to a destination suggesting the presence of a reputation mechanism as proposed by Shapiro (1983). We also estimate the determinants of the willingness to return confirming the main results.

Keywords: reputation, tourism, count data, logit
JEL: F14

1. INTRODUCTION

In this paper we study some new factors explaining why tourists return to a destination in the short-haul travel markets. In particular, we propose that these repeated purchases could be considered as a consequence of asymmetrical information problems in the tourism markets. We analyze this hypothesis with the case study of the Island of Tenerife. This phenomenon is quite important in Tenerife, as the tourist repetition rate for this island became 50% in 1999. Moreover, this island represents almost 20% of the lodging offered in Europe during the winter season, which makes it one of the main destinations in the sun-and-beach tourism market (Ledesma et al., 2001).

The intangibility of tourism services could be generating the typical information problems associated with experience goods. Moral hazard can be coming from the asymmetrical information in favour of sellers; in this way, suppliers have incentives to a *fly-by-night* strategy by cutting the quality in order to maximize their profits. Sunk costs could serve as a signal of quality. In spite of this, we focus on reputation as a mechanism assuring quality when repeated purchases are possible (Shapiro, 1983).

In tourism markets with a potential moral hazard, it is possible to investigate if the repetition can be explained by way of variables related to a reputation model. If that is the case, we will be able to say that reputation can overcome the problems caused by moral hazard.

[†] Departamento de Análisis Económico, Universidad de La Laguna, 38071 La Laguna, Tenerife-SPAIN. Phone: +34 922 317111, Fax: +34 922 317204, E-mail: fledesma@ull.es; mnavarro@ull.es.
[‡] Departamento de Métodos Cuantitativos en Economía y Gestión, Universidad de Las Palmas, Las Palmas de Gran Canaria-SPAIN, Phone: +34 928 458222, E-mail: jorge@empresariales.ulpgc.es.

In the next section, we analyze a reputation model providing variables which can describe the observed repetition. The third section examines the case of Tenerife in order to test how relevant reputation is to tourist repetition. In section 4 we analyze the sensitivity of the results. The last section points out some concluding remarks.

2. A Reputation Model

In this section we describe a simplified version of a reputation model based on Shapiro (1983)[1]. We have two levels of quality in the tourism markets, q=0 (low quality) and q=1 (high quality). The quality of the product is known by the monopolist who supplies it but unknown to the consumers[2]. In this way there exists asymmetrical information in favour of suppliers. The average cost of the high quality product (c_1) is greater than for low quality one (c_0). In this model, the consumer decides whether or not to buy a unit of the product, while the monopolist can vary price and quality in each period by an infinite horizon.

The length τ of each period reflects the lag between successive sales. If "κ" is the instantaneous interest rate, $r = e^{\kappa\tau} - 1$ denotes the one-period interest rate.

Consumer preferences

Consumers are characterized for identical preferences:

$$\begin{aligned} U &= \varphi q - p \quad \text{if consumer buys product} \\ U &= 0 \quad \text{otherwise} \end{aligned} \qquad (1)$$

where p denotes the price of the product and parameter φ represents the taste for quality.

Information structure

We consider three scenarios in which consumers form their expectations. In all cases, we consider that tourism involves experience goods, as the more direct way to know the product's quality is by consumption. These cases provide a group of variables that influence the presence of a reputation mechanism in the market.

First scenario: reputation is public information. When a consumer buys the product, the aditional information is available directy to the population. However, reputation formation involves a lag of size k periods, due to both, the reduced ability of consumers to observe quality after purchase and the delay required for this information to be available to other potential buyers. The adjustment equation is given by:

---

[1] Klein and Leffler (1981) is the seminal work studying the repeat-purchase mechanism of contract enforcement. More complex reputation models can be found in Tadelis (1999) and Mailath and Samuelson (2001).

[2] Hörner (2002) indicates the need of competition in order to get a discipline effect on firms in a more complete framework. In this paper we consider a monopolist version for a reason of simplicity.

$$R_t = q_{t-k} \qquad (2)$$

where R_t denotes reputation (expected quality) in period t, and k indicates the adjustment lag in reputation when a purchase has taken place.

Second scenario: there exists an average reputation due to the presence of individuals with a faster degree of adjustment and consumers with a longer lag in detection of quality. In this case, we are assuming that some tourists are less able to know and assimilate the real attributes inmediately after the consumption[3]. This reputation mechanism is given by[4]:

$$R_t = \alpha q_{t-k} + (1-\alpha) q_{t-1} \qquad (3)$$

with α being the proportion of consumers who have a slower process of quality detection.

Third scenario: there exists two types of consumers, one type (a proportion $1-\beta$) that are informed due to previous experience or through relatives and friends[5], and another type that has no such information, who believe that reputation is going to be unaltered between periods (Keane, 1996). The expression involving the dynamics of this reputation is:

$$R_t = \beta R_{t-1} + (1-\beta) q_{t-1} \qquad (4)$$

The reputation premium

The monopolist chooses the quality in each period in order to maximise the present value of profits. In all scenarios, the reputation mechanism works as a discipline tool only if the monopolist's benefits from a strategy of supply quality q=1 are no less than those from a milking strategy in which low quatity (q=0) is offered and the price p_1 for the quality q=1 is obtained.

In the first scenario, in which the reputation adjustment is modelled by equation (2), the condition for monopolist not deviating from the production of high quality is given by:

[3] The lag in detection of quality is very common in durable goods (see Shapiro, 1983). In the case of tourism services it could mean that either some tourists did not consume them in the past or tourists visiting with a short stay need more time to process and assimilate the information about the attributes of the services consumed.

[4] Caserta and Russo (2001) follows a similar approach but making the lag in detection of quality and the period of time between purchases coincide.

[5] Stiglitz (1989) follows a similar approach but assumes that a fraction of consumers is not loyal to the seller in each period. In this sense, he obtains that the less loyalty there is among consumers, the higher the price must be to induce firms not to cheat.

$$\left(p_1 - c_1\right)\left[\frac{1+r}{r}\right] \geq \left(p_1 - c_0\right)\left[\frac{1 - \frac{1}{(1+r)^k}}{1 - \frac{1}{(1+r)}}\right] \qquad (5)$$

where the term on the left side is the present value of profits from the strategy of q=1 and the term on the right represents the present value of profits when a monopolist cheats consumers by suplying q=0 during k periods. After some algebra, expression (5) can be presented in an interesting way:

$$p_1 - c_1 \geq \left[(1+r)^k - 1\right](c_1 - c_0) \qquad (6)$$

where c_1-c_0 is the cost of establishing a reputation for quality q=1 and the complete term on the right side represents the reputation premium, i.e. the margins required for the monopolist to not cut quality. The premium of reputation is increasing in the consumer lag in detection in quality k. Moreover, it is increasing in r, and so in the size of period between purchases (i.e. a lower frequency of purchases). In this way, the reputation mechanism works especially well if individuals obtain more complete information when purchasing the products and if sales are very frequent.

The second scenario considers two types of tourists with different lag size in the knowledge of the true quality. In this case, the reputation is a discipline tool if:

$$\left(p_1 - c_1\right)\left[\frac{1+r}{r}\right] \geq \alpha\left(p_1 - c_0\right)\left[\frac{1 - \frac{1}{(1+r)^k}}{1 - \frac{1}{(1+r)}}\right] + (1-\alpha)\left(p_1 - c_0\right) \qquad (7)$$

where the first right hand term indicates the profits by deceiving individuals with higher lags in detecting quality and the second one the profits associated with tourists that adjust quickly to quality expectations. The expression indicating the required premium for reputation is given by:

$$\left(p_1 - c_1\right) \geq \left[\frac{(1+r)^k}{\alpha + (1-\alpha)(1+r)^{k-1}}\right](c_1 - c_0) \qquad (8)$$

where frequent sales (small τ and thus r), a greater proportion of individuals with more information immediately due consumption, and consumers obtaining more information by the consumption activity (shorter lag in detection of characteristics) facilitate the investment in reputation.

In the third scenario, a proportion 1-β of the population is informed due to previous visits to a destination or via relatives and friends, while it is assumed that reputation is going to be unaltered between periods for rest of the population. Equation (4) can be interpreted as an adaptive expectation mechanism in which 1-β measures the adjustment of reputation towards the true value between time t-1 and time t. The reputation works if:

$$\left(p_1 - c_1\right)\left[\frac{1+r}{r}\right] \geq \left(p_1 - c_0\right)\left[1 + \frac{1}{1+r} + \ldots\ldots\ldots\ldots + \frac{1}{(1+r)^{(1/1-\beta)-1}}\right] \tag{9}$$

where 1/1-*β* indicates the number of periods before reputation effects disappear. By solving the partial sum of this geometric progression, we obtain:

$$p_1 - c_1 \geq \left[(1+r)^{1/1-\beta} - 1\right]\left(c_1 - c_0\right) \tag{10}$$

Following Shapiro, for small values of the interest rate per period *r*, the last equation can be expressed as:

$$p_1 - c_1 \geq \frac{r}{1-\beta}\left(c_1 - c_0\right) \tag{11}$$

where the required premium of reputation is decreasing as 1-*β*, i.e., the proportion of population being informed through previous experience or via relatives and friends.

We can summarize the determinants of the reputation premium pointing out that its size is decreasing with the proportion of population that has previously visited the destination or is informed through the previous experience of relatives and friends, and with the proportion of individuals with more information obtained immediately by consumption. It is increasing with the consumer lag k in detection of quality and with the period τ between purchases.

In this way, in tourism markets the presence of reputation is facilitated if:

a) there exists a high degree of repetition (small τ). In this case tourists are better informed and it can reduce the presence of milking strategies.
b) a great part of tourists have a greater ability to detect the characteristics of the destination (small *α* and *k*). This can be due to a longer stay in the destination or to better information based on previous visits.
c) a higher proportion of tourists are informed via previous experience or through relatives and friends (small *β*)

3. Explaining Repeated Visits

In this section we explore the presence of a reputation mechanism in tourism markets. In particular, we look for some evidence in the case study of the Island of Tenerife. Tenerife is one of the most important destinations for European sun and beach tourism. A relevant characteristic of tourism in Tenerife is the high degree of repetition of those who visit the island; 50.5% of Tenerife's visitors have been there at least once before. In the case of the U.K., 70.6% of the tourists are returning visitors.

3.1. Variables

We have used the survey carried out continuously by *Cabildo Insular de Tenerife* of the tourists visiting the island. In particular, we consider data corresponding to the years from 1996 up to 1999. This survey is a questionnaire answered by tourists in the airports just before they return to their countries and includes socio-economic characteristics of the tourists, the organization of their trips, the origin of the previous information about the destination, the number of previous visits, and their degree of satisfaction[6].

The dependent variable is the number of visits to Tenerife from the past to the moment the surveys is taken; $y_i = 1,2,...,N$, where N is the number of counts and i=1,2,…,n is the number of people surveyed.

Let us now describe the explanatory variables and their expected influence on the endogenous variable, i.e. the number of visits. With respect to *number of previous visits* PV_i (which varies between 0 and 100) and *length of stay* LS_i (which goes from 0 to 75 in 1996, from 1 to 87 in 1997, from 2 to 90 in 1998, and 1 to 180 in 1999), we expect a positive effect on the reputation mechanism. Individuals that have previously visited destination and with a longer stay get more complete information about the characteristics of services and so the required premium for reputation is reduced. In the case of PV_i this reduction can occur *via* a greater frequency of sales (lesser τ and greater r in equations 6, 8, and 10) while in the case of LS_i it can be due to a smaller lag k in detecting characteristics or a greater proportion 1-α of individuals with more ability to detect the characteristics of a destination (equations 6 and 8). The third variable more directly related to the reputation model described above is a dummy RF_i with value 1 for tourists informed via previous experience or via relatives and friends and zero otherwise. A greater proportion 1-β of these individuals makes the mechanism works better as can be seen in equation 11.

The descriptive statistics are shown in Table 1. As can be observed, the average value of the number of previous times that a tourist has visited Tenerife goes from 1.1 in 1997 to 2.8 in 1999. The average tourist has stayed around ten days and 20% of them declares their willingness to return. From 50% to 71% have received the relevant information about the destination through previous visits and/or relatives and friends. Furthermore, from 35% to 45% of the visitors purchased only the flight and lodging at their origin, and half of them belong to the group of the high income segment.

We consider two satisfaction indices as declared by tourists (from 1 to 10) that recognize the nature of *experience good* of tourism, since under perfect information tourists would assign the maximum value to them (indicating a full satisfaction of their expectations). These satisfaction indices correspond to *sun* S_i and *beach* B_i. Furthermore, we construct a dummy variable FL_i with value one for tourists purchasing at their origin only *flight and lodging* and zero otherwise. In this sense we expect that individuals who purchase more services than flight and lodging before the trip have less information about the destination. In other words, tourists with a good knowledge of the destination prefer to purchase the additional services at the destination.

[6] The survey eliminates individuals with more than a hundred previous visits. Moreover, we does not consider visitors with more than thirty previous visits with lodging other than private apartment, given that the motive of the visit is very likely to be business rather leisure.

Table 1. Descriptive Statistics.

	1996	1997	1998	1999
PV_i	2.0021	1.1890	2.6107	2.8435
	(4.94)	(4.28)	(5.30)	(6.28)
WR_i	0.2115	0.1906	0.2580	0.2663
	(0.41)	(0.39)	(0.44)	(0.44)
LS_i	10.9173	9.5843	10.8831	10.6234
	(5.70)	(5.35)	(5.68)	(10.3)
B_i	5.5699	5.4846	6.2494	6.3179
	(2.46)	(2.51)	(2.45)	(2.41)
S_i	8.3607	7.9068	8.9837	8.1172
	(1.99)	(2.24)	(1.63)	(2.08)
RF_i	0.6795	0.5633	0.7152	0.7064
	(0.47)	(0.49)	(0.45)	(0.45)
FL_i	0.4390	0.3527	0.4491	0.4347
	(0.49)	(0.47)	(0.49)	(0.49)
I_i^m	0.2774	0.3032	0.2980	0.2941
	(0.45)	(0.46)	(0.45)	(0.45)
I_i^h	0.4541	0.5703	0.5897	0.5877
	(0.49)	(0.49)	(0.49)	(0.49)
TA_i	0.3415	0.2816	0.2490	0.2683
	(0.47)	(0.45)	(0.43)	(0.44)
PA_i	0.0931	0.0614	0.1204	0.1068
	(0.29)	(0.24)	(0.32)	(0.31)
H_i	0.4789	0.4464	0.3695	0.3860
	(0.49)	(0.50)	(0.48)	(0.48)

Note: The standard deviation is in parenthesis.

Finally, we introduce some variables capturing the influence of lodging type and the income levels of the consumers. TA_i, PA_i and H_i denote three dummy variables with value one (and zero otherwise) for *rental apartments*, *private houses or apartments*, and *hotels*, respectively[7]. I_i^h and I_i^m with value one (and zero otherwise) indicate individuals that belong to high and medium income segment, respectively[8].

3.2. Count data regression

We have applied a truncated count data regression model in order to look for some evidence of the presence of reputation. Using this count data model we analyse the influence of the variables presented in Table 1 on the number of visits to the destination.

[7] Following Shapiro (1983) we expect a reputation premium to increase with the quality of goods. In this sense we could expect a positive influence of touristic apartments opposite to hotels. The influence of reputation is more difficult to characterize for high quality offerings.

[8] The medium revenue segment is defined by an interval from 2 millions to 4 millions of pesetas and the high revenue segment includes individuals with a revenue greater than 4 millions.

This type of regression model can be employed when we want to represent the number of events that occurs over a fixed time interval. In fact, they have become popular in empirical studies of economic behaviour in various areas of economics[9].

The main focus in count data regression is the effect of covariates on the frequency of an event, measured by non-negative and integer-value counts. In this sense, the standard Gaussian linear regression model ignores the restricted support of the dependent count. To estimate the parameters there are several models, one being the standard Poisson maximum likelihood specification. The leading motivation for considering parametric distributions other than the Poisson specification is that they have the potential to accommodate features in the data that are inconsistent with the Poisson assumption. There are some common departures from the standard Poisson regression as the failure of the mean equals variance restriction, truncation and censoring, the excess of zeros or zero inflation problem, multimodality, trends, simultaneity and sample selection or the failure of the conditional independence assumption [see Cameron and Trivedi (1998), p.97].

Since we have truncated counts we employ models for truncation. The models allowing for truncation are required if observations for dependent and exogenous variables in some range are totally lost and the distribution of observed counts is restricted. Truncated count models are discrete counterparts of truncated and censored models for continuous variables. The most common form of truncation in count models is left-truncation at zero [see Gurmu (1991), Gurmu and Trivedi (1992), Cameron and Trivedi (1998)].

Our truncated variable, y_i, is the number of trips to Tenerife from the past to the present in surveys taken on tourism in Tenerife; $y_i = 1,2,...,N$, where *N* is the number of counts. The model is represented as:

$$y_i = f\left(SS_i, B_i, S_i, RF_i, FL_i, I_i^m, I_i^h, TA_i, PA_i, H_i\right) + u_i,$$

where u_i is an error term and $f(.)$ is a linear model including a constant term. The variable $y_i = 1,2,...,N$, is an example of left-truncation or truncation from below at zero. As in the untruncated count models, the most important restriction in this model is the equality of the conditional mean and variance. This assumption is often violated in empirical applications, however, which causes the model would to be misspecified. When the conditional variance of the data exceeds the conditional mean overdispersion is present. One common alternative to the Poisson model is to estimate the parameters of the model using maximum likelihood of a Negative Binomial specification which is often used when there is overdispersion in the data. The most commonly used explanation for overdispersion is that unobserved heterogeneity is present (i.e.: omitted variables in the mean function, measurement errors in explanatory variables or structural parameters being random). In this sense, to deal with unobserved

[9] For a complete survey of these models, see Cameron and Trivedi (1998). Many examples of the use of count data models exist, with the most important one being its application to the fields of health economics (modelling the visits to doctors) [Cameron and Trivedi (1986)], labour economics (workers' absenteeism and labor mobility), financial economics (loan default) [Schwartz and Torous (1986)], patent studies [Hausman, Hall and Griliches (1984)]. See also Gurmu and Trivedi (1994).

heterogeneity and overdispersion one may allow for random variation in the conditional mean by introducing a multiplicative error term.

Our truncated counts are the special case of Poisson (P) and Negative Binomial (NB2, in terms of Cameron and Trivedi, 1998) without zeros. Following Gurmu and Trivedi (1992), let $P(Y_i \leq y_i) = H(y_i;\theta_i)$ denote the cumulative distribution function of the discrete random variable with probability density function $h(y_i;\theta_i)$, when $\theta_i = \exp(-x_i'\beta)$ where x_i' is a row vector of exogenous variable values for each individual and β is a parameter vector. If realizations of Y less than a positive integer r are omitted, the distribution is called left-truncated. We consider two left-truncated distributions, one of them being the left-truncated Poisson (LTP), which is given by:

$$f(y_i;\theta_i / y_i \geq s) = h(y_i;\theta_i) / [1 - H(s-1;\theta_i)], \quad y_i = s, s+1, \ldots$$

where $h(y_i;\theta_i)$ is the untruncated Poisson distribution. The second left-truncated distribution is negative Binomial (LTNB2). This is given by:

$$f(y_i;\theta_i,\gamma / y_i \geq s) = h(y_i;\theta_i,\gamma) / [1 - H(s-1;\theta_i,\gamma)], \quad y_i = s, s+1, \ldots$$

where $h(y_i;\theta_i,\gamma)$ is the negative Binomial.

Also, we consider that our problem is without zeros, $s = 1$ because the number of visits includes the present one. The maximum likelihood estimation of left-truncation Poisson uses a logarithm of likelihood as $L(\theta) = \sum_{i=1}^{n} \ln f(y_i,\theta_i / y_i > 0)$, where n is the number of individuals and θ is the vector of parameters. In the case of left truncation NB2 is $L(\theta,\gamma) = \sum_{i=1}^{n} \ln f(y_i,\theta_i,\gamma / y_i > 0)$. These models are quite nonlinear and require iterative procedures for estimating the parameters. We use the BFGS nonlinear optimization procedure.

The mean and variance in the untruncated Poisson is θ_i, but in the NB2 it is θ_i and $\theta_i + \gamma\theta_i^2$, respectively. When $\gamma = 0$ there is equidispersion because the mean and variance are equal. But, when $\gamma > 0$ there is overdispersion. Tests for overdispersion are tests of the variance-mean equality imposed by the Poisson against the alternative that the variance exceeds the mean. The null hypothesis of equidispersion, $H_0 : \gamma = 0$, is tested against the alternative hypothesis of overdispersion, $H_a : \gamma > 0$.

In the case of truncated Poisson and NB2, mean (μ_i) and variance (σ_i^2) are quite different from the untruncated case, because it's necessary include a correction factor (δ_i). For LTP, the mean and variance are $\mu_i = \theta_i + \delta_i$ and $\sigma_i^2 = \theta_i - \delta_i(\mu_i - s)$, and the correction factor is $\delta_i = \theta_i\lambda(s-1,\theta_i)$. For the LTNB2 the mean and variance are $\mu_i^* = \theta_i + \delta_i^*$ and $\sigma_i^{*2} = \theta_i + \gamma\theta_i^2 - \delta_i^*(\mu_i^* - s)$, and the correction factor is $\delta_i^* = (\theta_i + \gamma(s-1)\theta_i)\lambda(s-1,\theta_i,\gamma)$. With these results, the mean of the left-truncated random variable exceeds the corresponding mean of the untruncated variable, whereas the variance of the truncated variable is smaller.

Overdispersion is present when $\gamma > 0$, so $\sigma_i^{*2} > \sigma_i^2$. Therefore, the LTNB2 model's departures from the LTP model may be formulated in terms of testing the null hypothesis of equidispersion ($H_0 : \gamma = 0$) against the alternative hypothesis of overdispersion is $H_a : \gamma > 0$. In the case of truncated Poisson models against the alternative of truncated negative binomial distribution, Gurmu and Trivedi (1992) consider overdispersion tests by using adjusted score tests for these models. Henceforth, for data left-truncated at *s*, they adjusted LM test for LTP against LTNB1 and LTNB2. Concretely, in the case of LTP against LTNB2 and following Cameron and Trivedi (1998), this test is:

$$T_{LM} = \left[\hat{I}^{\alpha\alpha}\right]^{-0.5} \sum_{i=1}^{n} \frac{1}{2} \hat{\mu}_i^{-2} \hat{\mu}_i^2 \left[(y_i - \hat{\mu}_i)^2 - y_i + (2y_i - \hat{\mu}_i + s - 1)\lambda(s-1;\hat{\mu}_i)\right] \overset{a}{\sim} N(0,1)$$

where $\left[\hat{I}^{\alpha\alpha}\right]$ is the scalar subcomponent for α of the inverse of the information matrix and $\lambda(s-1;\hat{\theta}_i) = f(y_i;\hat{\theta}_i) / \left[1 - F(y_i;\hat{\theta}_i)\right]$ where $f(.)$ and $F(.)$ are the untruncated Poisson density and cumulative distribution functions.

3.3. Results

The results for the count data approach are presented in Table 2[10]. From the results we find that the length of the stay could be increasing the return to a destination. This result seems to indicate that a more informed tourist is more willingness to return, suggesting the presence of a reputation mechanism.The number of visits is increasing with the degree of satisfaction of consumers as it was to be expected. This repetition is especially relevant in the case of tourists obtaining the information from previous visits and/or relatives and friends, as in the reputation model associated to the third type of expectations; for instance, the conditional mean of the dependent variable is 2.45 $(\exp(0.8982))$ times larger in 1998 when RF_i variable takes the value of one rather than zero.

Furthermore, there is a robust influence from the variable introduced for individuals who purchases only flight and lodging at their origin. Again, there are significant problems with the medium-income variable, but we observe a clear effect of individuals belonging to the high-income segment. Finally, we confirm a positive influence from private houses or apartments on the number of times, since it increases the conditional mean of the dependent variable between 1.7 and 2.6 times. The use of owned (rather than rented) lodging, or lodging owned by relatives and friends can be interpretated as a clear indication of the presence of reputation, making individuals decision's be in favour of the destination in the long run. The model of Shapiro predicts

[10] Logically, we ommitted PV_i, as the endogenous variable is the number of visits (including the current one). The introduction of PV_i as an explanatory variable in the Poisson regression is not appropriate: its coefficient tends to one due to the quasi-perfect correlation between the endogenous variable y_i and the explanatory variable PV_i; the rest of coefficients, which corresponding to the rest of explanatory variables would be zero. We have also used the LTNB2 model for estimation, but the algorithms used did not converge, showing an abnormal exit from the iterations.

a positive influence of quality on the size of reputation premium and so a greater difficult for the reputation mechanism to work. This is consistent with our finding of a negative effect of the H_i variable on repetition that could be interpretated as a reduction in the conditional mean of the dependent variable.

Table 2. Left-truncated Poisson (LTP) estimation in $s < 1$ visits.

	1996	1997	1998	1999
Constant	-0.6717 (-8.085)	-0.9305 (-11.141)	-0.5512 (-11.720)	-02146 (-2.806)
LS_i	0.0305 (27.978)	0.0268 (34.440)	0.0142 (41.102)	0.0061 (11.206)
B_i	0.0587 (11.569)	0.0637 (9.870)	0.0499 (13.669)	0.0358 (7.290)
S_i	0.0172 (2.403)	0.0609 (7.068)	0.0643 (13.559)	
RF_i	0.7633 (20.106)		0.8982 (31.786)	0.8776 (22.317)
FL_i	0.1981 (5.875)	0.4211 (8.323)	0.0533[a] (2.079)	0.2986 (10.227)
I_i^m	0.0657 (1.574)			0.1982 (4.472)
I_i^h	0.2729 (7.107)	0.3055 (6.472)	0.1025 (3.895)	0.4332 (10.627)
TA_i	-0.3227 (-9.360)	-0.3646 (-6.372)	-0.3214 (-10.197)	-0.2656 (-8.065)
PA_i	0.5912 (17.279)	0.9730 (17.405)	0.5545 (20.140)	0.6541 (21.406)
H_i	-0.1473 (-3.683)	-0.1379 (-2.631)	-0.4561 (-14.373)	-0.1356 (-3.793)
R_p^2	0.4372	0.4364	0.3253	0.4395
R_d^2	0.2718	0.1986	0.2324	0.2608
Number of individuals	2908	3620	4835	2407

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.
a: FL_i includes breakfast for 1998.

4. CONSISTENCY OF RESULTS

In this section we study the robustness of the results in relation to the season –in winter, tourists have fewer sun-and-beach alternatives destinations-. The influence of the explanatory variables could be modified due to the different degree of competition which characterizes each season. Furthermore, we estimate the model for two specific origins of tourists: the United Kingdom and Spain. They represent the greatest and the smallest degree of repetition of the visitors, respectively. Finally, we modify the dependent variable in order to know the determinants of the willingness to return using a logit approach and so we study the sensitivity or the determinants obtained in the previous section.

4.1. Seasons

The survey used in this paper permits the distinction between the summer and the winter seasons. The former is the period going from April to September while the latter goes from January to March and from October to December. In winter, the degree of competition in the sun-and-beach tourism market is much less than in summer, due to the lack of good alternatives for tourists in this segment of demand (as well as to their repetition). We estimate the count data model described in section 3 for each season, and the results are presented in Tables 3 and 4. LTNB2 regression appears for the winter season of 1996 and 1999, because the null hypothesis of equidispersion is rejected.

Table 3. Left-truncated Poisson (LTP) estimation in $s < 1$ visits. All countries and summer season

	1996	1997	1998	1999
Constant	-1.0831 (-7.465)	-2.2967 (-14.526)	-0.5214 (-7.775)	-1.6195 (-10.175)
LS_i	0.0309 (13.554)	0.0381 (17.751)	0.0131 (22.641)	0.0034 (3.087)
B_i	0.0340 (4.135)	0.1087 (9.899)	0.0467 (8.901)	0.0436 (5.386)
S_i	0.0534 (4.071)	0.1527 (9.572)	0.0528 (8.349)	0.1520 (10.216)
RF_i	1.0834 (14.061)		1.0111 (22.888)	0.7037 (12.254)
FL_i	0.4388 (7.421)	0.6277 (7.003)	0.1489 (3.715)	0.3493 (7.048)
I_i^m	-0.2129 (-3.561)		-0.3131 (-6.318)	0.0887 (1.312)
I_i^h	-0.1633 (-2.978)	0.2517 (3.010)	0.0439 (1.139)	0.4005 (6.561)
TA_i	-0.7222 (-11.827)	-0.6191 (-6.276)	-0.3708 (-7.811)	-0.1733 (-3.214)
PA_i	0.5745 (11.600)	0.4870 (5.118)	0.3767 (8.983)	0.7022 (14.187)
H_i	-0.3263 (-4.496)	-0.6700 (-6.733)	-0.4921 (-10.372)	
R_p^2	0.6218	0.5175	0.2715	0.4684
R_d^2	0.3180	0.2243	0.2001	0.2606
Number of individuals	1457	1867	2497	1111

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.

Table 4. Left-truncated Poisson (LTP) and Negative Binomial (LTNB2) estimation in $s < 1$ visits. All countries and winter season

	1996[b]	1997	1998	1999[b]
Constant	-3.5096 (-5.699)	0.0288 (0.278)	-0.5995 (-8.705)	-2.6989 (-6.499)
LS_i	0.0899 (8.266)	0.0250 (27.616)	0.0145 (32.773)	0.0569 (6.588)
B_i	0.0958 (4.397)	0.0473 (5.768)	0.0489 (9.507)	0.0916 (3.847)
S_i			0.0790 (10.860)	
RF_i	0.8680 (8.790)		0.8150 (22.112)	1.3447 (12.228)
FL_i	0.2153[a] (1.930)	0.2873 (4.729)		0.4330 (3.901)
I_i^m	0.4851 (2.966)		0.2062 (4.855)	0.3239 (2.091)
I_i^h	0.8028 (5.230)	0.2432 (4.167)	0.1623 (4.434)	0.3624 (2.534)
TA_i	-0.1736 (-1.256)	-0.2521 (-3.553)	-0.2546 (-6.049)	-0.4141 (-2.880)
PA_i	1.1203 (5.557)	1.1924 (16.919)	0.7049 (19.175)	0.8866 (4.724)
H_i		0.1611 (2.552)	-0.4100 (-9.326)	-0.1984 (-1.516)
R_p^2	0.3564	0.4461	0.3961	0.4504
R_d^2	0.2684	0.2156	0.2744	0.2817
Number of individuals	1451	1753	2338	1296

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.
a: FL_i includes breakfast for 1996.
b: LTNB2 regression appears for 1996 and 1999, because T_{LM} indicates a rejection of the null hypothesis of equidispersion.

As can be observed, in both seasons LS_i and RF_i are significant, pointing to the relevance of the length of the stay and the information obtained (and conveyed) from previous visits. We confirm that individuals with high incomes who stay in private houses or apartments, and who purchase a reduced number of services at their origin are the most likely to return. The significant problems of the S_i variable in winter seem to indicate a less importance to the sun as the reason why they return during this season. The similitude of the results suggests the estimates presented in the previous section are not sensitive to the different degrees of competition in both seasons.

4.2. Countries

The two main origins of tourists visiting Tenerife are the United Kingdom and mainland Spain. British visitors present the highest degree of repetition while Spanish visitors practically never return. The results of the estimation of the determinants of repetition for these two countries are presented in Tables 5 and 6. LTNB2 regression appears for the United Kingdom in 1996 and 1999, because the null hypothesis of equidispersion is rejected.

Table 5. Left-truncated Poisson (LTP) and Negative Binomial (LTNB2) estimation in $s < 1$ visits. United Kingdom for all seasons

	1996[a]	1997	1998	1999[a]
Constant	-0.9218 (-2.136)	0.2594 (1.918)	-0.6275 (-3.117)	-0.2485 (-0.752)
LS_i	0.0337 (3.104)	0.0140 (3.945)	0.0208 (3.434)	0.0227 (2.960)
B_i	0.0972 (4.224)	0.0818 (8.411)	0.0584 (4.090)	0.0428 (1.913)
S_i			0.0313 (1.749)	
RF_i	0.7158 (5.520)		0.8395 (9.767)	0.9702 (7.800)
FL_i		0.1503 (2.021)		0.2569 (2.113)
I_i^m		-0.1501 (-1.641)		
I_i^h		0.2665 (3.685)		
TA_i	-0.5394 (-4.141)	-0.2318 (-2.854)	-0.3576 (-2.651)	-0.2020 (-1.638)
PA_i	0.7306 (4.717)	0.8165 (10.697)	0.6074 (4.067)	0.8712 (6.372)
H_i		-0.1316 (-1.467)	-0.2006 (-1.337)	
R_p^2	0.3916	0.3274	0.1743	0.3851
R_d^2	0.2244	0.0990	0.1297	0.1921
Number of individuals	1040	1027	1771	888

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.
a: LTNB2 regression appears for 1996 and 1999, because T_{LM} indicates a rejection of the null hypothesis of equidispersion.

In three of the four years of this study we confirm the results obtained for length of the stay variable and the variable of the information through relatives and friends, which seems to indicate that if reputation is present the mechanism does not differ between countries. Although in the case of United Kingdom the income variables present significant problems, in general we observe a greater degree of repetition for tourists belonging to the high income segment. For its part, the secondary home phenomenon[11] is more frequent in the case of British visitors. The underlying explanation of why repetition occurs does not seem to change when we consider the different origins.

[11] For a discussion of the economic effects of second homes and time-sharing, see Navarro-Ibáñez and Becerra-Domínguez (1995).

Table 6. Left-truncated Poisson (LTP) estimation in $s < 1$ visits. Spain for all seasons

	1996	1997	1998	1999
Constant	-2.2126 (-7.265)	-1.4578 (-5.841)	-1.7513 (-10.362)	-1.5097 (-4.545)
LS_i	-0.0229 (-3.407)	0.0300 (5.905)	0.0529 (11.117)	0.0071 (3.844)
B_i		0.1088 (4.568)	0.0316 (2.136)	0.0418 (1.949)
S_i	0.1921 (7.366)	0.0628 (2.329)	0.1276 (7.875)	0.1256 (4.728)
RF_i	0.9120 (6.126)	-0.6034 (-4.943)	0.8340 (7.342)	0.5526 (3.628)
FL_i	0.4821 (2.735)	0.8219 (3.160)		
I_i^m	0.5889 (4.326)			0.6347 (4.152)
I_i^h	0.8933 (6.445)	0.4762 (2.455)	0.7084 (7.126)	0.8926 (5.634)
TA_i	-0.3911 (-2.304)		-0.8753 (-5.596)	-1.0615 (-4.956)
PA_i	1.5143 (6.104)			
H_i	-0.6862 (-4.300)	-0.5893 (-3.247)	-0.7560 (-7.366)	-0.5586 (-3.467)
R_p^2	0.7020	0.1951	0.4410	0.2814
R_d^2	0.3531	0.0730	0.2488	0.2274
Number of individuals	596	877	883	394

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.

4.3. A Logit Estimation

In this subsection, we construct a binary variable WR_i, that equals 1 when the tourist states his willingness to return to Tenerife during his next holiday and zero otherwise[12]. Our objective is to study if the results obtained are modified when we change the dependent variable from an *ex-post* to an *ex-ante* return variable. We have estimated a binomial logit based on the following expression:

$$P_i = P(WR_i = 1) = \Phi(z_i'\omega) = \frac{e^{z_i'\omega}}{1+e^{z_i'\omega}}; \qquad (12)$$

where P_i is the probability for an individual to return in his next holiday, z_i' is a row vector of explanatory variables, ω is a colum vector of unknown parameters, $\Phi(\cdot)$ is the standard cumulative normal distribution function (so that $\Phi(\lambda)$ is the probability that normally distributed random variable with zero mean and unit variance does not exceed λ), and $P(WR_i = 0) = 1 - P_i$. The parameters in (12) are estimated maximising the logarithm of the likelihood function with respect to individual observations:

[12] Note that we create this variable conditional to the questionnaire of the survey. We would have liked to ask visitors about their total willingness to return and not only in the next holidays. In this sense, we may very well undervaluing the real willingness to repeat the destination.

$$LnL = \sum_{i=1}^{n} WR_i \ln F(z_i'\omega) + \sum_{i=1}^{n} (1 - WR_i) \ln[1 - F(z_i'\omega)] \qquad (13)$$

This alternative approach allows us to consider a new explanatory variable: the number of previous visits PV_i. It permits the study of the influence of this variable (as a proxy of the period between purchases τ) something which underlies the three types of expectations presented in section 2.

The results of the logit estimation for the four years are presented in Table 7. As can be observed, the number of previous visits has a positive and significant parameter with a value between 0.14 y 0.20. Similarly, although the estimated parameter is smaller than the one for the previous visits, the length of the stay increases the probability of return in all cases.

Table 7. Binomial logit estimation results

	1996	1997	1998	1999
	-4.0925	-3.5223	-4.1678	-3.6773
Constant	(-13.028)	(-8.907)	(-9.696)	(-10.498)
	0.2095	0.2040	0.1442	0.1477
PV_i	(14.114)	(7.957)	(11.272)	(11.093)
	0.0293	0.0243	0.0373	0.0450
LS_i	(3.495)	(2.191)	(3.582)	(4.933)
	0.5630	0.1089	0.1276	0.0864
B_i	(2.835)	(4.061)	(5.734)	(3.712)
	0.1089	0.0998	0.1356	0.0777
S_i	(3.823)	(3.029)	(3.359)	(2.734)
	0.3994		0.4050	0.4748
RF_i	(3.510)		(3.208)	(3.616)
			0.2494[a]	0.2145
FL_i			(1.964)	(1.593)
	0.2541	0.4453		
I_i^m	(1.957)	(1.994)		
	0.1723		-0.3651	
I_i^h	(1.454)		(-2.218)	
	0.2520			
TA_i	(1.939)			
	0.5684	0.3716	0.1771	0.4757
PA_i	(3.278)	(1.358)	(1.065)	(2.591)
	0.2022	-0.2046		
H_i	(1.354)	(-1.121)		
% correct predictions:				
0	97.30%	98.93%	96.44%	97.62%
1	26.96%	16.95%	29.07%	31.97%
Number of individuals	3385	1857	2574	2359

Note: The t-Student for null hypothesis that parameter is zero is in parenthesis.
a: FL_i includes breakfast for 1998.

The parameters for the satisfaction indices are positive as it was to be expected. Except for 1997, individuals obtaining information about a destination from previous visits and/or relative and friends are more likely to return. We only obtain evidence in favour of willingness to return of individuals who only purchase flight and lodging at their origin, indicating better informed consumers in the last two years. For its part, the income variables have significant problems and we cannot extract clear conclusions about them. Finally, the lodging type variables indicate that private houses or apartments increase the probability of repetition, while hotels have the smallest influence.

In this way, the consideration of a dependent variable which is constructed in terms of willingness to return confirms that the relevant variables are the same ones already suggested from the reputation models: number of previous visits, lenght of the stay and the information obtained through previous experience and/or relatives and friends.

5. Concluding Remarks

In this paper we examined the hypothesis that the repeated purchases (visits to Tenerife) can be considered as a consequence of asymmetrical information in the tourism markets. Specifically, we focused on reputation as a mechanism assuring the quality of the tourist services. Thus, we described a reputation model based on Shapiro (1983), introducing three possible types of expectations to analyze the determinants of the reputation premium. In particular, we studied the presence of a reputation mechanism in the case of tourism in Tenerife.

To that end we use data of tourists who have visited Tenerife in the years 1996 to 1999. We estimated a count data model for the number of visits of tourists. We obtain that the length of the stay might increase the return to a destination. This result seems to indicate that a more informed tourist increases the repetition, suggesting the presence of a reputation mechanism. Moreover, the number of visits is increasing with the degree of satisfaction of consumers, as was expected. This repetition is especially relevant in the case of tourists obtaining the information from previous visits and/or relatives and friends, as in the reputation model. These results suggest the presence of reputation as a factor explaining the return to the destination. Furthermore, they are not sensitive to the different degree of competition that characterizes the seasons nor to the countries of origin of the visitors.

We also estimated the determinants of the willingness to return through a logit model. It permitted to verify the results obtained from the count data model now for an *ex-post* variable. Moreover, we detected the relevance of the previous visits in order to ease the work of the reputation mechanism.

REFERENCES

Cameron, A. and Trivedi, P. (1986). Econometric Models Based on Count Data: Comparisons and Applications of Some Estimators and Tests. *Journal of Applied Econometrics* 1: 29-53.

Cameron, A. and Trivedi, P. (1998). *Regression Analysis of Count Data. Econometric Society Monograph*. Cambridge University Press.

Caserta, S. and A.P. Russo (2001). Spatial Displacement and Sustainable Heritage Tourism. Tinbergen Institute Discussion Paper TI 2001-035/2.

Cox, D. and Oakes, D. (1984). *Analysis of Survival Data*. London: Chapman and Hall.

Gurmu, S. (1991). Test for Detecting Overdispersion in the Positive Poisson Regression Model. *Journal of Business and Economics Statistics* 9: 215-222.

Gurmu, S. and Trivedi, P. (1992). Overdispersion Tests for Truncation Poisson Regression Models. *Journal of Econometrics* 54: 347-370.

Hausman, J., Hall, B. and Griliches, Z. (1984). Econometric Models for Count Data with Applications to the Parents-R&D Relationship. *Econometrica* 52: 909-938.

Hörner, J. (2002). Reputation and Competition. *American Economic Review* 92(3): 644-663.

Kalbfleisch, J. and Prentice, R. (1980). *The Statistical Analysis of Failure Time Data*. New York: Wiley.

Keane, M.J. (1996). Sustaining quality in tourism destinations: an economic model with an application. *Applied Economics* 28: 1545-1553.

Klein, B. and K.B. Leffler (1981). The Role of Market Forces in Assuring Contractual Performance. *Journal of Political Economy* 89(4): 615-645.

Lancaster, T. (1997). The Econometric Analysis od Transition Data. Econometric Society Monographs, Nº.17. Cambridge University Press.

Lancaster, T. and Imbens, G. (1986). *Log-linear Transition Intensities*. Hull University.

Ledesma, F.J., Navarro, M. and J.V. Pérez-Rodríguez (2001). Panel data and tourism: a case study of Tenerife, *Tourism Economics* 7(1): 75-88.

Maddala, G. (1983). Limited-Dependent and Qualitative Variables in Econometrics. Econometric Society monographs.

Mailath, G.J. and L. Samuelson (2001). Who Wants a Good Reputation? *Review of Economic Studies* 68: 415-441.

Meyer, B. (1986). Semi-parametric Estimation of Hazard Models. Department of Economics, MIT.

Navarro-Ibáñez, M. and M. Becerra-Domínguez (1995). The Growth of Second Homes and Time Sharing in Small Islands. Occasional Papers on Islands and Small States Nº 7, Islands and Small States Institute, University of Malta.

Schwartz, E. and Torous, W. (1993). Mortgage Prepayments and Default Decisions: A Poisson Regression Approach. AREUEA-*Journal: Journal of the American Real Estate Association* 21: 431-449.

Shapiro, C. (1983). Premiums for high quality products as returns to reputations. *Quaterly Journal of Economics* 98: 659-679.

Stiglitz, J.E. (1989). Imperfect information in the product market. In R. Schmalensee and R.D. Willig (eds.) *Handbook of Industrial Organization*. Elsevier Science Publishers, 769-847.

Tadelis, S. (1999). What's in a Name? Reputation as a Tradeable Asset. *American Economic Review* 89(3): 548-563.