

Applying a Hedonic Model to the Analysis of Campsite Pricing in Spain

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ABSTRACT: In Spain, camping accommodation accounted for 6.32% of total tourism accommodation and 8.2% of overnight stays in 2007. There were 1,152 registered campsites which provided lodging for almost 6.4 million users. Although these figures are higher than those of rural accommodation, few studies have analyzed the main attributes of this sector and their contribution to the development of Spanish tourism. The main aim of this work is to provide information on pricing based on the attributes of camping establishments. Given the heterogeneity of supply in this sector, a hedonic model is applied using data from different sources. The results show that the variables with the greatest influence on pricing are a coastal location, the quality of the facilities, having a quality distinction or being an ecological establishment. The effect of the latter variable reinforces the strategy initiated by the private sector and public administrations of investing in sustainable tourism.

Key words: Nature Tourism, Environment, Campsites, Hedonic prices, Regional analysis, Spain

INTRODUCTION

One of the main attributes of tourism is the intensive use it makes of land, public goods and infrastructures (Bull, 1994). Therefore, any tourism activity has a sizeable environmental impact (Vargas *et al.*, 2009), if we take into account the growing importance of the tourism industry throughout the world. This fact forces authorities to maximize control over the externalities that this activity generates. The requirement to conduct an environmental assessment of activities likely to have a negative impact on the environment is a requirement in Spanish legislation (RD 1302/1986, 28 June and Act 9/2006, 28 April) (Sánchez-Ollero and López, 2006).

These evaluations are the basis for what is known as sustainable tourism development. In fact, as pointed out by Sánchez and Pulido (2008) and the WTO (2004), thanks to advances in our understanding of sustainability new approaches were implemented to find a balance between the environmental, sociocultural and economic aspects of tourism such that its long-term sustainability could be guaranteed. According to Ivars (2003), sustainability should be interpreted as an ongoing process of improvement in the tourism, socioeconomic and environmental domains, and which requires strict follow-up using a comprehensive sys-

tem of indicators. An interesting proposal for measuring tourism sustainability using a synthetic index of indicators can be found in Sánchez & Pulido (2008). In the tourism sector, accommodation companies have a significant impact on the environment and cultural resources available (Fernández *et al.*, 2007). The use of natural areas for recreational purposes, such as free campsites, can also lead to increased environmental degradation of the environment (Baena *et al.*, 2008). However, within the tourism industry, regulated and registered campsites are among the types of accommodation that most respect the environment. This is the case because not only do they restrict or even eliminate free camping, their offer is based on rigorously integrating their services into the natural setting. Although camping was originally a military activity, its recreational and civilian aspects began with the industrial revolution as an inexpensive way to lodge workers. Its application to tourism started later to answer the need of trekkers and cyclists' associations for alternative accommodation, mainly in Southern France and Catalonia, Spain. The Camping Club of Catalonia was created in 1923, and the first official campsite in Spain was founded in 1954. For comprehensive and interesting historical references see Izquierdo (2002). As the tourism industry spread rapidly along the Spanish Mediterranean coast—mainly

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due to international visitors—the campsite industry started to grow. It incorporated new types of accommodation such as caravans and bungalows, and provided better infrastructures. The first inland campsites in Spain did not open until the mid-1980s, when the category of “natural space” began to be applied to some high mountain areas.

Currently, campsites are considered a modality of tourism accommodation and as one of the three main types of extra-hotel accommodation: tourism apartments, rural houses, and campsites. According to the Spanish National Statistics Institute (INE), “Tourism campsites, also called “Campsites” are understood as a group of predefined pitches equipped with suitable facilities aimed at providing people with a place to live outdoors for a limited period while on vacation or for tourism using mobile shelters, caravans, tents, or other similar and easily portable items as a residence, and in exchange for suitable payment” (INE, 2008a). These establishments are classified in Spain in the following categories: luxury, and 1st, 2nd and 3rd category, depending on their facilities and services. They have to be registered with the regional or local tourism Board. In December 2007, the total number of campsites in Spain was 1,152 (239, luxury and 1st category; 674, 2nd category; and 239, 3rd category), and which provided accommodation to 6,457,106 users, 67% of whom were residents in Spain. Campsite users in Spain account for 6.32% of the total tourism accommodation in this country (ie, hotels, campsites, tourism apartments and rural accommodation) and account for 8.2% of total overnight stays (Table 1 in the Appendix).

Despite their relative importance, there are few studies on this accommodation subsector. In Spain, some studies were conducted in the 1960s that described the incipient camping movement and others that included campsites as part of tourism accommodation—see for example, the contributions of Barke

and France (1986) or more recently García and Sancho (2008). Nevertheless, the sector has been mainly studied from a regional standpoint, such as the work by González (1992) or Izquierdo (2002). The only exception to this is the work of Feo (2003) who studied the sector at the national level and included an exclusive analysis of the camping industry. The regional administration of Andalusia has recently published a descriptive study of regional demand in the sector (Junta de Andalucía, 2009). Literature on this issue is also scarce at the international level, and, as in the case of Spain, most studies deal with data by region or state or even at more local levels (see Murphy 1979, Stephens et al. 1989, and Niskee 1990). More recently, concerns over environmental issues and the impact of camping tourism has motivated the works of Wight (1997), Reid and Marion (2004) and Park et al. (2009).

The aim of our work is to add to the literature, using hedonic pricing methodology to analyze how the characteristics of this type of tourism affects final prices in the Spanish market. To this end, we identified the attributes with a stronger effect on pricing in this type of accommodation and quantified the effect to assess their relative importance on pricing. In section 2, we define the structural framework of campsites in Spain and the hedonic methodology used in this work. Section 3 provides details on the data used and describes the selection criteria for the variables included in the model variables. Section 4 presents the empirical model and the results obtained from it. We finally draw some conclusions based on the results.

MATERIALS & METHODS

The descriptive analysis of the sector using the available data aids in characterizing the camping industry activity in Spain from a supply and demand point of view. According to data from 2001 to 2007 (see Table 3), activity has undergone a 6.6% increase per

Table 1. Travellers using tourist accommodation in Spain and number of overnight stays. 2007 data

| | Travellers (n) | Travellers (%) | Overnight stays (n) | Overnight stays (%) |
|---------------------|----------------|----------------|---------------------|---------------------|
| Hotels | 84,423,433 | 82.66 | 271,689,481 | 71.19 |
| Campsites | 6,457,106 | 6.32 | 31,334,732 | 8.21 |
| Apartments | 8,611,541 | 8.43 | 70,667,472 | 18.52 |
| Rural accommodation | 2,645,237 | 2.59 | 7,938,623 | 2.08 |
| National Total | 102,137,317 | 100 | 381,630,308 | 100 |

Source: Tourism Campsite Occupation Survey 2007 and Hotel Occupation Survey 2007 (Spanish National Institute of Statistics, 2008b, and 2008c). Apartments Occupation Survey 2007 (Spanish National Institute of Statistics, 2008d). Rural Accommodation Occupation Survey 2007 (Spanish National Institute of Statistics 2008e). Own data

total number of users and 2.4% per number of overnight stays with a cumulative annual growth rate of 0.91% and 0.34%, respectively. 2003 could be considered the “launch” year for Spanish residents: compared to 2002, the increase in users was over one million (20%), of whom 800,000 were Spanish; in the same period, the increase in overnight stays in hotels by Spanish residents was only 5.13%. The source of this hotel accommodation data is the *Encuesta de ocupación en alojamientos turísticos (alojamientos hoteleros)* (Survey of tourism accommodation occupation). Out of the total number of campsite users, two-thirds were Spanish residents, while the remaining third were international users (the figures for hotel accommodation were 58% and 42%, respectively). The growth rate was higher for international users (8%) than for Spanish residents (5.9%) for the entire period under study, with a cumulative annual growth rate of 1.1% and 0.82%, respectively.

Table 2 shows the number of campsite users and overnight stays per Spanish regions and their place of

residence. The importance of this type of accommodation in Catalonia is striking since it forms 45% of total overnight stays. On the other hand, the camping industry is negligible in the Balearic and Canary Islands, representing only 1% of total visitors to the islands. This is even more remarkable if we bear in mind that both archipelagos, especially the Canary Islands, are major international tourism destinations, with genuinely attractive natural spaces for this type of tourism. The proportion of hotel accommodation in tourism packages and the differentiated tourism strategies of the islands might explain this apparent contradiction.

The average stay (Table 4 in the Appendix) is around 5 nights per visitor; this breaks down to less than 4 for Spanish residents and almost 7 for international clients. The average stay in campsites is longer than in hotel accommodation (2.4 overnight stays for Spanish clients and 4.3 for international clients).

Although Spanish national tourists predominate, international tourists surpass national tourists in terms of overnight stays, (66% of overnight stays in Murcia

Table 2. Number of users and overnight stays per Autonomous Community and place of residence. 2007 data

| Regions | Number of users | | | Number of overnight stays | | |
|--------------------------|-----------------|-------------------|-----------------|---------------------------|-------------------|-----------------|
| | Total | Resident in Spain | No-resident (%) | Total | Resident in Spain | No-resident (%) |
| TOTAL | 6.457.106 | 67,31 | 32.69 | 31.334.732 | 53.74 | 46.26 |
| Andalusia | 997.255 | 68.84 | 31.16 | 3.904.203 | 62.06 | 37.94 |
| Aragón | 292.725 | 67.86 | 32.14 | 936.976 | 68.95 | 31.05 |
| Principality of Asturias | 179.829 | 80.29 | 19.71 | 719.386 | 87.11 | 12.89 |
| Balearic Islands | 28.381 | 61.39 | 38.61 | 178.976 | 47.44 | 52.56 |
| Canary Islands | 16.596 | 88.23 | 11.77 | 103.351 | 52.7 | 47.3 |
| Cantabria | 250.745 | 76.23 | 23.77 | 1.028.350 | 82.89 | 17.11 |
| Castilla and León | 275.953 | 65.93 | 34.07 | 688.545 | 76.83 | 23.17 |
| Castilla - La Mancha | 87.885 | 76.16 | 23.84 | 227.615 | 82.61 | 17.39 |
| Catalonia | 2.668.816 | 60.94 | 39.06 | 14.093.794 | 46.45 | 53.55 |
| Valencian Community | 630.761 | 70.69 | 29.31 | 5.306.656 | 41.17 | 58.83 |
| Extremadura | 104.986 | 88.02 | 11.98 | 282.756 | 87.76 | 12.24 |
| Galicia | 221.907 | 74.64 | 25.36 | 814.039 | 83.18 | 16.82 |
| Madrid Region | 208.571 | 85.56 | 14.44 | 649.802 | 86.03 | 13.97 |
| Murcia Region | 136.930 | 70.47 | 29.53 | 1.361.895 | 34.17 | 65.83 |
| Navarra | 111.758 | 73.07 | 26.93 | 327.809 | 76.33 | 23.67 |
| Basque Country | 150.806 | 49.71 | 50.29 | 414.100 | 55.13 | 44.87 |
| La Rioja | 93.201 | 88.87 | 11.13 | 296.478 | 93.27 | 6.73 |

Source: Tourism Campsite Occupation Survey 2007. Spanish National Institute of Statistics (INE, 2004). Own data

Table 3. Travellers using camping accommodation and number of overnight stays in Spain. Total and distribution percentage per category and year: 2007 data

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| TOTAL TRAVELERS | 6,058,349 | 6,020,078 | 7,032,588 | 6,673,924 | 6,556,150 | 6,619,748 | 6,457,106 |
| SPANISH | 4,104,445 | 3,857,891 | 4,669,808 | 4,513,264 | 4,491,350 | 4,499,374 | 4,346,149 |
| Luxury and First (%) | 32.46 | 32.18 | 32.84 | 33.64 | 31.32 | 33.29 | 34.83 |
| Second (%) | 57.68 | 57.37 | 57.40 | 56.68 | 57.67 | 56.59 | 55.33 |
| Third (%) | 9.86 | 10.45 | 9.76 | 9.69 | 11.01 | 10.12 | 9.84 |
| FOREIGNERS | 1,953,904 | 2,162,187 | 2,362,780 | 2,160,660 | 2,064,800 | 2,120,373 | 2,110,957 |
| Luxury and First(%) | 47.15 | 47.95 | 50.01 | 49.12 | 44.67 | 46.87 | 48.12 |
| Second (%) | 47.46 | 46.74 | 44.63 | 45.60 | 49.59 | 47.51 | 46.32 |
| Third (%) | 5.39 | 5.32 | 5.35 | 5.29 | 5.74 | 5.63 | 5.57 |
| TOTAL OVERNIGHT STAYS | 30,600,742 | 31,272,685 | 31,115,203 | 30,418,990 | 31,182,401 | 31,922,173 | 31,334,732 |
| SPANISH | 16,881,229 | 16,277,082 | 16,852,264 | 16,685,367 | 17,055,156 | 17,478,871 | 16,840,814 |
| Luxury and First(%) | 35.55 | 35.85 | 34.28 | 34.92 | 34.09 | 33.16 | 35.68 |
| Second (%) | 54.77 | 54.13 | 56.20 | 55.70 | 56.67 | 57.56 | 55.42 |
| Third (%) | 9.68 | 10.01 | 9.53 | 9.38 | 9.24 | 9.28 | 8.90 |
| FOREIGNERS | 13,719,513 | 14,995,603 | 14,262,939 | 13,733,623 | 14,127,245 | 14,443,301 | 14,493,917 |
| Luxury and First(%) | 51.07 | 51.27 | 50.41 | 49.86 | 48.96 | 50.11 | 51.96 |
| Second (%) | 45.48 | 45.42 | 46.52 | 47.54 | 48.25 | 46.69 | 44.93 |
| Third (%) | 3.45 | 3.31 | 3.06 | 2.59 | 2.79 | 3.20 | 3.11 |

Source: Tourism Campsite Occupation Survey 2007. Spanish National Institute of Statistics 2008b. Own data

and 60% in Valencia) in the Eastern Mediterranean regions. International users stay for longer, with an average of 22 nights per visitor in Murcia and almost 17 in Valencia. However, the average number of overnight stays per international visitor was greater in the Canary Islands, with 25.3 overnight stays per visitor in 2007.

The number of establishments operating in Spain is fairly stable. However, the activity of campsites, especially on the coast, seems to be strongly conditioned by the weather and summer seasonality (see Table 5 in the Appendix for basic data; to analyze the methodology used to create this, see INE, 2008a). In 2007, an average of 710 campsites were operating in Spain, offering over 480,000 places divided over 145,000 pitches. The mean size of the establishments underwent little change, with an average of about 670 places per campsite, divided over 200 pitches with space for 3-4 people per pitch. Each establishment provides employment for 7-8 workers. The high seasonality leads to a significantly low mean occupation level per pitch: less

than 38%. This contrasts with the mean hotel occupation rate for 2007 of 56%.

The use of new technologies for marketing the campsite industry is shown in Table 6. In 2003, barely half the campsites had a website, but 4 years later 80% of them had their own, and 76% had publicity on the Internet. These figures are significantly higher than those reported for hotel accommodation (67% and 62%, respectively). Nevertheless, the use of the Internet as a booking channel remained quite low — just 26.4% — which was 10 points below that of hotel accommodation (36.4%) in 2007.

The data used in our study was taken from the 2007 Guide published by the Spanish Federation of Campsite Clubs (Federación Española de Clubes Campistas, FECC). This guide includes information gathered from a total of 1,201 Spanish campsites, including all registered campsites (1,152) and 49 unregistered sites. Incomplete or inconsistent records were eliminated after data analysis. The final sample included data on 1048 tourism campsites.

Table 4. Mean number of campsite users according to nationality and category of the establishment. 2007 data

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| TOTAL | 5.05 | 5.19 | 4.42 | 4.56 | 4.76 | 4.82 | 4.85 |
| SPANISH | 4.11 | 4.22 | 3.61 | 3.70 | 3.80 | 3.88 | 3.87 |
| Luxury and First (%) | 4.50 | 4.70 | 3.77 | 3.84 | 4.13 | 3.87 | 3.97 |
| Second (%) | 3.91 | 3.98 | 3.53 | 3.63 | 3.73 | 3.95 | 3.88 |
| Third (%) | 4.04 | 4.04 | 3.52 | 3.58 | 3.19 | 3.56 | 3.50 |
| FOREIGNERS | 7.02 | 6.94 | 6.04 | 6.36 | 6.84 | 6.81 | 6.87 |
| Luxury and First (%) | 7.61 | 7.42 | 6.08 | 6.45 | 7.50 | 7.28 | 7.41 |
| Second (%) | 6.73 | 6.74 | 6.29 | 6.63 | 6.66 | 6.69 | 6.66 |
| Third (%) | 4.49 | 4.31 | 3.45 | 3.12 | 3.33 | 3.88 | 3.84 |

Source: Tourism Campsite Occupation Survey 2007. Spanish National Institute of Statistics 2008b. Own data

Table 5. Mean yearly supply, mean weighted occupation and employees. 2007 data

| Year | Open Campsites ¹ | Estimated spaces ¹ | Estimated pitches ¹ | Estimated occupied pitches ¹ | Pitches occupied % ² | Weekend occupation % ² | Employees ¹ |
|------|-----------------------------|-------------------------------|--------------------------------|---|---------------------------------|-----------------------------------|------------------------|
| 2001 | 805 | 466,775 | 144,106 | - | 32.36 | - | 5.007 |
| 2002 | 735 | 485,867 | 148,329 | 19,107,164 | 35.07 | - | 5.220 |
| 2003 | 713 | 475,361 | 143,041 | 18,168,976 | 34.66 | 38.60 | 5.117 |
| 2004 | 727 | 487,824 | 146,087 | 19,390,553 | 36.16 | 39.17 | 5.291 |
| 2005 | 731 | 490,176 | 146,682 | 19,747,310 | 36.72 | 39.57 | 5.398 |
| 2006 | 717 | 482,163 | 144,480 | 20,005,229 | 37.79 | 40.80 | 5.444 |
| 2007 | 710 | 480,066 | 145,088 | 20,081,126 | 37.79 | 40.55 | 5.579 |

Notes: ¹: Yearly average; ²: Mean weighted occupation per pitch

Source: Tourism Campsite Occupation Survey 2007. Spanish National Institute of Statistics 2008b. Own data

Table 6. Use of new technologies for marketing campsite establishments. 2007 data

| Year | Operated campsites ¹ | With website % | With online booking % | With online publicity % |
|--|---------------------------------|----------------|-----------------------|-------------------------|
| 2001 | 805 | <i>na</i> | <i>na</i> | <i>na</i> |
| 2002 | 735 | <i>na</i> | <i>na</i> | <i>na</i> |
| 2003 | 713 | 46.98 | <i>na</i> | <i>na</i> |
| 2004 | 727 | 52.69 | <i>na</i> | <i>na</i> |
| 2005 | 731 | 67.39 | 20.93 | 62.86 |
| 2006 | 717 | 72.78 | 22.90 | 68.63 |
| 2007 | 710 | 80.23 | 26.40 | 75.85 |
| Notes: Annual Mean; na, data not available | | | | |

Source: Tourism Campsite Occupation Survey 2007. Spanish National Institute of Statistics 2008b. Own data

The database included information on 119 observable features in each establishment, thus providing an extremely comprehensive description of tourism campsites in Spain.

Beside the official category awarded to the establishment, as mentioned above, the FECC adds their own category (called “tents”), which is based on the quality of the amenities, cleaning facilities, cleanliness, and the service and care of campers. Thus, campsites are ranked from 1 to 5 “tents”, according to the reports on the establishment as a whole provided by the users.

The attributes described in the database are classified into groups (the number of attributes in each group is given in parentheses), which serve as the basis for the set of variables of the model: Location (10); Land (4); Woodland (5); Facilities and services (32); Sports (14); Rental (3); Accommodation (30) and Price (21).

From these potential variables, the empirical models finally included 14 independent variables (for information on the descriptive statistics and the definition of variables, see Table A7 in the Appendix). The choice of variables was based on their economic significance and on expectations regarding their effect on the price of the service, as well as on econometric criteria related to their statistical significance within the selected empirical models. To this end, an exploratory analysis of available variables was previously conducted by obtaining the condition number and creating a correlation matrix to detect multicollinearity. The information obtained with these techniques revealed evidence of severe multicollinearity, and so those variables with clear signs of this were eliminated from the model providing their removal did not involve losing the structural meaning of the model. Solution contributed by Novales (1993) who suggests that this

procedure might be the most appropriate. Thus, the problem of multicollinearity in the explanatory variables was largely solved.

The geographical area analyzed was peninsular Spanish, and the establishments were grouped into 4 locations: Andalusia; the Centre (including Extremadura, Castilla La Mancha, Madrid and Castilla León); the East (including Murcia, the Valencian Community and Catalonia); and the North (Aragón, Navarra, La Rioja, Basque Country, Cantabria, Asturias and Galicia). These areas served to create 4 dummy variables included in the model.

Regarding the dependent variable, and to standardize the information on each establishment, a mean daily price for the stay was estimated. This price includes the use of one pitch with electricity, occupied by 2 adults and 2 children, with 1 car and a caravan in the high season.

RESULTS & DISCUSSION

Since the database available provides information on the price of camping services and their attributes, we have applied hedonic methodology to this analysis. The hedonic model has its roots in work from the 1920s (Haas (1922), Wallace (1926) or Waught (1928)) and the pioneering study by Court (1939). In the 1950s, Houthakker (1952) and Tinbergen (1956) provided the first theoretical formulations of the model, but it was not until the mid-1960s, following the innovations of Griliches (1961), that Lancaster (1966, 1971 and 1979), developed the theory of consumer behaviour regarding the demand of different goods with identifiable and objectively evaluable attributes. This can be considered the first basic step in the literature to understand the pricing of a given good’s attributes. A complete analysis of the evolution of this model can found in García-Pozo (2007). However, it was not until the

Table 7. Descriptive statistics and definition of the model variables

| Variables | Mean | SD |
|-----------------------|--------|--------|
| PRECIO | 32.714 | 9.947 |
| CALIFICAC | 2.551 | 0.757 |
| Q_O_ECOL | 0.022 | 0.147 |
| WIFI | 0.105 | 0.307 |
| BUNGALOWS | 0.591 | 0.492 |
| AC_DIR_MAR | 0.167 | 0.373 |
| DE_COSTA | 0.508 | 0.500 |
| WC | 25.479 | 26.163 |
| SERV_GENER | 5.827 | 1.866 |
| SERVICIOS_OCIO_Y_REST | 4.243 | 1.318 |
| NUM_PISCINAS | 1.146 | 0.957 |
| EXTENSION_HA | 3.843 | 7.488 |
| CENTRO | 0.159 | 0.366 |
| ANDALUCIA | 0.129 | 0.335 |
| NORTE | 0.286 | 0.452 |
| ESTE | 0.426 | 0.495 |

Source: Federación Española de Clubes Campistas (2007) and own data

Notes: PRECIO: price for the stay defined in this paper (€); CALIFICAC: Number of “tents” (1 to 5). Quantitative variable; Q_O_ECOL: Distinction of quality or ecological establishment. Dummy variable.

WIFI: wireless Internet in the establishment. Dummy variable; BUNGALOWS: Bungalows available in the establishment. Dummy variable; AC_DIR_MAR: Direct access to the beach from campsite. Dummy variable; DE_COSTA: Establishment located on the coast. Dummy variable; WC: Number of working toilets in the campsite. Dummy variable; SERV_GENER¹: Number of general services offered by the establishment, including: supermarket, bus services, day-care center, public telephone, credit cards accepted, cash points, children’s park, health care, automatic wash for vehicles, and safes (from 1 to 7). Quantitative variable; SERVICIOS_OCIO_Y_REST: Number of leisure and restaurant services offered by the establishment, including: bar, restaurant, social and meeting rooms, discotheque, barbecues, pub and recreational activities (1 to 10). Quantitative variable; NUM_PISCINAS: Number of swimming pools offered by the establishment. Quantitative variable; EXTENSION_HA: Size of campsite (hectares). Quantitative variable; CENTRO: Establishment located in one of the autonomous communities included in this group. Dummy variable; ANDALUCIA: Establishment located in Andalusia. Dummy variable; NORTE: Establishment located in one of the autonomous communities included in this group. Dummy variable; ESTE: Establishment located in one of the autonomous communities included in this group. Dummy variable.

³An approach similar to the one used for this variable and the following one can be found in Mangion et al. (2005).

publication of the study by Rosen (1974) that hedonic methodology was provided with a microeconomic foundation that enabled it to formalize empirical contributions. From that time onwards, Rosen’s model was accepted as the paradigm of the hedonic approach.

The versatility of the hedonic pricing model and the attributes of tourism products has encouraged its use, although as Mangion et al. (2005) pointed out, this is not very widespread in scientific studies of the tourism sector, especially in those focusing on how pricing is fixed. The hedonic model has been used to analyze price competition between tourism operators (Espinete *et al.*, 2001), to measure the effect of quality on companies (Campos and Sánchez, 2002) and tourism destinations (Mangion *et al.*, 2005),

and to analyze the price of tourism packages in Spain (Sinclair *et al.*, 1990) and Norway (Thrane, 2005). Numerous studies have used this model for the hotel industry. For example, Jaime (1999) and Espinete *et al.* (2003), (2003) analyzed hotel pricing in Spain; Papatheodorou (2002) and Hamilton (2007), studied the demand for accommodation in Mediterranean and coast hotels; and Monty and Skidmore (2003) conducted hedonic measurement of some particular aspects of the hotel sector.

However, few studies have applied hedonic methodology to the camping sector to elucidate the effect of certain attributes on pricing. Some works have included campsites as an explanatory dummy variable to analyze the demand for certain recreational activi-

ties and have used hedonic methodology or the hedonic travel cost variation (Yeh *et al.*, 2004; Holmes *et al.*, 1995; Landry *et al.*, 2007). Brox (1995) also made estimates of campsite demand using this methodology.

Having defined the potential variables for the model, the next step was to choose the functional form of the equations.

Using the simple hedonic estimate, the most suitable functional form was chosen from the four most widely used—linear, semilog, double log and inverse—by calculating their goodness-of-fit and taking the one with a higher value. The criteria applied to choose the best adjustment were as follows: the greatest number of explanatory variables with statistical and economic significance (the former was measured using the T-statistic and the latter using the coefficient's value and associated sign); the value of adjusted R²; and the Schwarz criterion to evaluate the estimated models.

Double log functional and inverse forms did not provide statistically acceptable results, and were discarded. Applying the criteria yielded contradictory results for the following linear form

$$p = \beta_0 + \sum_{k=1}^K \beta_k z_k + u_k \quad \text{and} \quad \text{semilog}$$

$$\ln p = \beta_0 + \sum_{k=1}^K \beta_k z_k + u_k \quad \text{form. For this reason,}$$

both functional forms of the model are presented.

On the other hand, and due to the heteroskedasticity of the error term in the regressions (shown by the results of White's test), we applied White's methods (1980) to all the regressions presented. Using the Ordinary Least Square estimation method, with a robust variance and covariance matrix regarding heteroskedasticity, we obtained some estimates of the attributes that were not affected by heteroskedasticity. This means that the estimators are robust because they are nonbiased for any sample size and their variance tends to zero as the size of the sample increases.

The linear model estimates were as follows, with the dummy variable representing the ESTE (East) area as the reference category:

$$\begin{aligned} \text{Precio} = & \beta_0 + \beta_1 \text{CALIFICAC} + \beta_2 \text{Q}_O \text{ECOL} + \beta_3 \text{WIFI} \\ & + \beta_4 \text{BUNGALOWS} + \beta_5 \text{AC DIR MAR} + \beta_6 \text{DE COSTA} \\ & + \beta_7 \text{WC} + \beta_8 \text{SERV GENER} + \\ & \beta_9 \text{SERVICIOS OCIO Y REST} + \beta_{10} \text{NUM PISCINAS} \\ & + \beta_{11} \text{EXTENSION HA} + \beta_{12} \text{CENTRO} + \\ & \beta_{13} \text{ANDALUCIA} + \beta_{14} \text{NORTE} \end{aligned}$$

In the semilog estimate, the first term of the previous expression changes to "lnprecio".

Table A8 shows the results from the estimations according to the established criteria. The linear regression presents a greater number of explanatory variables with statistical and economic significance (14 vs 11 variables) and adjusted R² is higher (54.3% vs. 51.6%). However, the Schwarz criterion for the semilog regression shows a value closer to zero (-0.247 versus 6.734 in the linear regression). This justifies the inclusion of both functional forms in this paper.

Together with the coefficients and statistics, Table 7 shows the standardized coefficients of each explanatory variable in both models. The standardized regression coefficients were calculated using

$$\beta_i^{est.} = \beta_i \cdot \left(\frac{S_i}{S_{var.dep.}} \right). \quad \text{Where } \beta_i^{est.} \text{ represents}$$

the standardized coefficient of variable i , β_i the nonstandardized coefficient, S_i the standard deviation of variable i , and $S_{var.dep.}$ the standard deviation of the dependent variable. These estimations make it possible to assess the relative importance of each variable in the regression, since they eliminate the effect of the units of measure for each variable. Thus, the variable representing the category of the establishment, and those referring to location, have a high relative importance in both models. This is also the case for the variable number of general services offered by the establishment.

Table 9 shows the implicit hedonic prices estimated for the statistically significant variables in the two functional forms. First, it should be pointed out that these implicit prices represent the marginal value of each attribute according to both providers and users, whereas the remaining attributes stay the same. Secondly, between lower and higher values of the confidence intervals built for the implicit prices are included estimated values for the respective variables regardless of the econometric specification used, when those were statistically significant. For this reason, it can be stated that both specifications yield statistically similar results for most of the attribute estimates.

On the other hand, higher values in the linear regression are assigned in absolute terms to establishments located in areas other than the reference location (the East). In fact, when a campsite is located in the Central area, the market reduces the value assigned by more than 6€, with a 3.513€ and 4.647€ reduction when located in Andalusia or in the Northern area, respectively.

The high marginal value estimated for ecological campsites is noteworthy and for those with quality distinctional "tent". In other words, the value differ-

Table 8. Linear and semilog regression estimates

| | Linear | | | Semilog | | |
|-------------------------------|--------------|-------------|---------------------------|--------------|-------------|---------------------------|
| | Coefficients | t-statistic | Standardized coefficients | Coefficients | t-statistic | Standardized coefficients |
| β_0 | 18.637 | (17.357) | | 3.015 | (91.680) | |
| β_0 | 2.075 | (5.025) | 0.158 | 0.067 | (5.944) | 0.173 |
| CALIFICAC | 4.361* | (1.962) | 0.064 | - | - | 0.019 |
| Q_O_ECOL | 1.824* | (2.253) | 0.056 | - | - | 0.029 |
| WIFI | 1.138 | (2.647) | 0.056 | 0.038 | (2.644) | 0.063 |
| BUNGALOWS | 1.968 | (2.875) | 0.074 | 0.054 | (2.928) | 0.069 |
| AC_DIR_MAR | 2.395 | (4.070) | 0.120 | 0.081 | (4.855) | 0.138 |
| DE_COSTA | 0.064 | (3.144) | 0.168 | 0.001 | (3.140) | 0.088 |
| WC | 0.825 | (4.819) | 0.155 | 0.030 | (5.761) | 0.190 |
| SERV_GENER | 0.372* | (1.973) | 0.049 | - | - | 0.038 |
| SERVICIOS_OCI O_Y_REST | 0.820 | (3.255) | 0.079 | 0.028 | (3.428) | 0.090 |
| NUM_PISCINAS | 0.049* | (2.128) | 0.037 | 0.002 | (2.904) | 0.040 |
| EXTENSION_HA | -6.751 | (-11.118) | -0.249 | -0.227 | (-10.410) | -0.284 |
| CENTRO | -3.513 | (-5.354) | -0.118 | -0.105 | (-4.856) | -0.120 |
| ANDALUCIA | -4.647 | (-8.732) | -0.211 | -0.134 | (-8.022) | -0.207 |
| <i>Adjusted R²</i> | | 0.543 | | | 0.516 | |
| <i>F Statistic</i> | | 89.946 | | | 78.720 | |
| <i>Sum-squared residue</i> | | 46686.876 | | | 43.404 | |
| <i>Schwarz Criterion</i> | | 6.734 | | | -0.247 | |
| <i>Number of Observations</i> | | 1048 | | | 1048 | |

Note: All values are statistically significant at 1%, except for those marked with asterisks which are significant at 5%.

Source: Federación Española De Clubes Campistas (2007) and own data.

ence between an establishment in the lowest category (1 “tent”) and another in the highest category (5 “tents”) is around 8.3€. The remaining quantitative variables have a lower marginal value, around 0.049€ per each additional hectare of land, and up to 0.825 € per every extra general service provided.

CONCLUSION

This paper analyzes the camping market using hedonic methodology. The aim is to increase the amount of literature on this type of sustainable and natural accommodation, and to analyze the marginal influence of the different components on the final pricing of the service.

We started by analysing the structural framework of camping tourism. This sector accounts for 6.32% of total accommodation in the Spanish tourism sector, well behind hotel and apartment accommodation, but

significantly higher than rural accommodation. Almost 6.5 million users stayed in Spanish campsites in 2007, two-thirds of whom were Spanish residents. Camping is especially important on the entire Spanish Mediterranean coast, and in Catalonia — an area which pioneered camping in Spain — with over 41% of total users and 45% of total overnight stays.

Despite its relative importance, studies in this field are very scarce, especially regarding price analysis using hedonic methods. The available literature normally focuses on regions or even on small communities, but is practically nonexistent at the national level. The attributes and theoretical conditions of the subsector make it suited to hedonic methodology. On the other hand, the database available permits us to obtain implicit marginal prices for each attribute using Ordinary Least Square estimates.

Table 1. Estimated implicit hedonic prices of attributes for the linear and semilog functional forms

| | Linear ¹ | | | Semilog ² | | |
|-----------------------|------------------------|------------|--------------------|----------------------|------------|--------------------|
| | Lower ^a (€) | Higher (€) | Implicit price (€) | Lower (€) | Higher (€) | Implicit price (€) |
| CALIFICAC | 1.266 | 2.885 | 2.075 | 1.467 | 2.910 | 2.188 |
| Q_O_ECOL | 0.004 | 8.718 | 4.361 | - | - | - |
| WIFI | 0.237 | 3.412 | 1.824 | - | - | - |
| BUNGALOWS | 0.295 | 1.981 | 1.138 | 0.337 | 2.181 | 1.259 |
| AC_DIR_MAR | 0.626 | 3.310 | 1.968 | 0.624 | 3.019 | 1.821 |
| DE_COSTA | 1.242 | 3.549 | 2.395 | 1.682 | 3.840 | 2.761 |
| WC | 0.024 | 0.103 | 0.064 | 0.012 | 0.052 | 0.032 |
| SERV_GENER | 0.489 | 1.160 | 0.825 | 0.644 | 1.309 | 0.977 |
| SERVICIOS_OCIO_Y_REST | 0.002 | 0.742 | 0.372 | - | - | - |
| NUM_PISCINAS | 0.326 | 1.314 | 0.820 | 0.386 | 1.418 | 0.902 |
| EXTENSION_HA | 0.004 | 0.095 | 0.049 | 0.016 | 0.085 | 0.051 |
| CENTRO | -7.941 | -5.561 | -6.751 | -8.068 | -5.236 | -6.652 |
| ANDALUCIA | -4.798 | -2.227 | -3.513 | -4.642 | -1.852 | -3.247 |
| NORTE | -5.690 | -3.604 | -4.647 | -5.178 | -3.020 | -4.099 |

^aThe lower and higher values of the implicit price of the variables are based on a 95% confidence interval for the estimated implicit prices.

1. In this functional form, the estimated coefficients for each variable represent the implicit prices of the attribute, since the implicit price = $\frac{\partial p}{\partial x_k} = \beta_k$, therefore, the regression coefficients β_k ($k = 1, \dots, K$) indicate the marginal change in price with respect to a unitary change in the k -th attribute, when the variable is quantitative. If variable x is a dummy variable, the marginal change in price occurs when the condition expressed by such a variable is fulfilled.

2. In this case, the regression coefficients β_k will measure the percentual variations of the dependent variable in relation to unitary changes in the quantitative explanatory variables. The dummy variables measure the same increase in percentage when the condition that justifies the variable is fulfilled, providing that we use Halvorsen and Palmquist's criterion (1980) to calculate the relative effect on the dependent variable due to variations in a dummy variable. This effect, which we can call g_k , is calculated by the expression $g_k = e^{\beta_k} - 1$, where β_k represents the coefficient of the dummy variable under consideration. On the other hand, the implicit hedonic prices of the attributes are determined by:

$$\frac{\partial p}{\partial x_k} = \beta_k \cdot p \quad \text{and} \quad \frac{\partial p}{\partial x_k} = g_k \cdot p \quad \text{respectively, where } p \text{ is the mean value for the variable price (see Table A6 in the}$$

Appendix).

This work presents the coefficient estimates of two hedonic regressions that served to obtain the implicit prices of the attributes under consideration. The study reveals that the variables with more weight in the model were those referring to geographical location, category of the establishment (2.075€ per category), general services at the campsite, proximity to the coast (2.395€), and access to the beach (1.968€). On the other hand, the implicit price shows marginal values that indicate the importance in the market of access to wireless Internet (1.824€).

However, the attributes with the highest marginal value in this market are having the distinction of quality or being classified as an ecological establishment (4.361€), ie, more than 13% of the mean reference price.

This fact clearly shows the importance of both these aspects to users.

The data confirm that environmental awareness among camping companies is essential to their image and offer, together with the improved facilities witnessed in recent years. Similarly the data should encourage public administrations involved in tourism to include campsites in sustainable tourism development policies as an alternative accommodation which is environmentally friendly and is widely accepted by tourists.

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