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Pricing the time and location of a stay at a hotel or apartment

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This paper presents a comparative study of the price component of the physical characteristics and the location of apartments and hotels in order to compare their effect on the final price of both types of accommodation. In addition, the authors carry out a comparative study of the price component of the point in time at which the stay was offered. For the price component of the actual place, substantial variability can be observed in the case of hotels, whereas little variability can be observed in the case of apartments. When seasonality is compared, slightly lower seasonality can be observed for hotels in relation to apartments throughout the period under study, and higher seasonality observed in the case of Spanish resorts (particularly the Balearic Islands) in comparison with French ones.

Keywords: hedonic price method; accommodation prices; seasonality; hotels; apartments

JEL classification: C21; D12

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The recent emergence of new forms of accommodation, like the condo hotel or the holiday-serviced apartment, has highlighted a symbiotic strategy between two types of accommodation (hotels and tourist apartments) that have a certain degree of substitutability. This substitutability between hotels and apartments can be broken down by comparing the price component of shared characteristics (the category, amenities, location, time when a stay is made, etc). In particular, knowing the price component that corresponds to the tourist area where the hotel or apartment is located is particularly important when choosing a specific holiday destination, because it can be interpreted as an approximation of perceptions of destination quality. Another important component that is implicit in the price of a stay is the moment in time when it occurs. Pricing this component provides information on the effect of seasonality on the tourist accommodation supply, which is a crucial field of study in tourism. Thus, understanding that place and time are two crucial aspects that determine tourism accommodation demand at a specific destination, this paper sets out to price them using the hedonic price method, distinguishing between two basic forms of accommodation: hotels and apartments.

Methodologically, the hedonic price model is used to explain the price of heterogeneous products made up of different characteristics, because the implicit marginal price of these characteristics can be ascertained by estimating a model that explains the price of a product based on its characteristics. Evidently, all forms of accommodation have a price that can be broken down into its characteristics and so a hedonic price model can be used to price these components.

This paper uses the hedonic price method to go further than pricing the classic attributes of a single form of accommodation by studying the substitution effect between two forms of accommodation (something that hitherto has not been done), focusing the analysis on two fundamental aspects: the place and time associated with the price of a stay.

To illustrate what the paper proposes, a hedonic price analysis will be conducted of the prices of hotels (rooms) and apartments (units) in certain coastal sun and sand resorts in the Pyrenean-Mediterranean and coastal Mediterranean Euroregion, chosen depending on their relevance as resorts. Their physical characteristics and the actual location of the apartments and hotels will be priced in order to compare the effect of the same characteristic on price for both types of accommodation. Likewise, a comparative study of the price component of the moment in time that the holiday is offered will enable us to discover the effect of seasonality on the prices of hotels in relation to apartments.

The study is organized as follows. First, we present a review of the literature on hedonic prices (the methodology on which our analysis is based), placing special emphasis on its application in the field of tourism. We then describe the database used for the study, specifying the selection criteria for the sample, how the data are filtered and defining the variables adopted. Next, we outline the main results obtained, comparing apartments and hotels, and the price component of their physical characteristics, location and moment in time. Finally, we offer our main conclusions.

Literature review

Economic literature on hedonic prices emerged in the context of the automobile industry. This was the framework for the classic study by Griliches (1971), who popularized these models. In his study, the price of automobiles was estimated once the vehicle characteristics that influenced their price had been controlled, such as their power or fuel consumption. It must be stressed, however, that it was not Griliches who 'invented' this kind of model and neither was he the person who coined the term 'hedonic' for the first time. This was Andrew Court, in a work from the early 1940s (Court, 1941). Both studies are quite topical even now, since questions are being raised on the functional form of the said models.[1]

Once the technique had been popularized in the 1950s (Tinbergen, 1951), it was just over a decade before it was given a theoretical basis. In this case, the classic work was by Rosen (1974).[2] The latter shows how heterogeneous products are made up of different characteristics and how the implicit marginal price of these characteristics can be ascertained by estimating a model (a hedonic price model) that explains the price of a product based on its characteristics.

Some outstanding work in the literature on hedonic prices applied to the housing market includes articles by Mendelsohn (1984), Palmquist (1984), Bartik (1987), Mills and Simenauer (1996), Bover and Velilla (2001), Ekeland *et al* (2002 and 2004), Bin (2005) and Garcia *et al* (2006).

In the field of tourism, most studies that use hedonic price models focus on the determinants of the prices of tourist packages (Sinclair *et al*, 1990; Taylor, 1995; Aguilo *et al*, 2001, 2003; Papatheodorou, 2002). The studies coincide in establishing the choice of tour operator, hotel star rating and hotel facilities as determinants of the price of packages. Thrane (2005) takes into account the simultaneity of hotel attributes and the number of stars, estimating them through instrumental variables.

Focusing on hotels, using data for different tourist destinations in Spain provided by different tour operators, Coenders *et al* (2003) estimated a hedonic price model to price key attributes of hotels at these destinations. Using a historic series for hotels on the southern Costa Brava during the period 1991–1998, Espinet (2003) used dynamic hedonic models with panel data to estimate the effect on price of different hotel attributes and the correlation between the price and the size of a hotel. Thanks to the data's variability across time, the effect on price of cycles and seasonality could be assessed. Rigall (2004) obtained price indicators by seasons and indexes of characteristics. Lastly, he extended traditional models to include the market power and endogeneity of prices, estimated using instrumental variables.

With environmental policies as his aim, Hamilton (2007) studied the effects of some coastal characteristics on the pull factor of certain destinations in Schleswig-Holstein in Germany. The results show the unsuitability of dyke construction.

Lastly, Uriel and Ferri (2004) apply different hedonic price methods (direct, indirect, with a fixed base or a chained one, and weighted or unweighted) to break down the prices of Spanish hotels during the period 1993–2002 into changes in quality and 'pure' price variations. The aim was to consider the use of hedonic price methods in drawing up hotel price indexes. The data, which

were aggregate, were taken from the directory of hotels of the 'Instituto de Estudios Turísticos'.

Saló (2005) applied the hedonic price method to tourist apartments, estimating a hedonic price model with data for tourist apartments on the Costa Brava (from January to October) in order to ascertain which attributes had the most influence on the final rental price, thus highlighting demand preferences. Ropero (2006) took a step forward, testing a price-fixing model by tourist businesses in the Canaries and Balearic Islands, where for each accommodation establishment, its own occupancy level and that of rivals was taken into account when fixing prices. For the empirical analysis, information was gathered weekly during previous months on variations in hotel and apartment rates for a specific week. For estimation purposes, a multinomial model was used (depending on whether prices had gone up, down or stayed the same) in which, as well as the variables from the theoretical model (the market share, pressure of prices and competition), the characteristics of the supply and its location were controlled for as explanatory variables. Finally, a Tobit model was estimated to determine the effects of the previous explanatory variables on the extent of rises or falls in prices.

Data

The data are taken from hotel and apartment prices in the Euroregion municipalities of the Pyreneean-Mediterranean and Mediterranean coast.[3] The chosen municipalities are: Lloret de Mar and Alt Maresme (Catalonia), Dénia and Calp (Alicante), Calvià and Alcúdia (Balearic Islands) and Argelès-sur-Mer and Collioure (Languedoc-Rousillon). They have been chosen because all of them are on the coast and they can be considered homogeneous from the point of view of the tourism specialization index,[4] which is higher than 1 in all cases, indicating substantial residential tourism.

Once the municipalities had been selected, a search was made in tour operators' paper travel brochures and exhaustive data were compiled from their websites. The database contained the prices and characteristics of tourist apartments and hotel rooms from May to October 2007. As an initial filter, when the observations were tabulated, the following aspects were taken into account. Firstly, given that each tour operator started and finished the week on different days, the prices for each week consisted of the weighted average of each of the prices of coinciding holidays. Secondly, with regard to hotels, all different cases of possible prices were taken into account, depending on the type of board and room, ensuring a richer database than in other previous studies.

Empirical model

To price the characteristics and location and obtain a quality-adjusted seasonal price index (in our case, direct and with a fixed base) for both hotels (rooms) and apartments (units), the following equation was estimated:

$$Price_{it} = \beta_0 + \sum_{k=1}^{k=K} \beta_k X_{ik} + \sum_{l=1}^{l=L} \alpha_l D_l + \sum_{t=1}^{t=T} \delta_t D_t + u_{it}$$

Table 1. Explanatory variables.

Dependent variable: price (the price per night (€) of a room in the case of hotels and of an entire unit in the case of apartments).

Explanatory variable	Description
Resort:	
Alt Maresme	Dummy variable that takes a value of 1 if the hotel is located in Alt Maresme and 0 if not
Lloret de Mar	Dummy variable that takes a value of 1 if the hotel is located in Lloret de Mar and 0 if not
Calp	Dummy variable that takes a value of 1 if the hotel is located in Calp and 0 if not
Dénia	Dummy variable that takes a value of 1 if the hotel is located in Dénia and 0 if not
Alcúdia	Dummy variable that takes a value of 1 if the hotel is located in Alcúdia and 0 if not
Calvià	Dummy variable that takes a value of 1 if the hotel is located in Calvià and 0 if not
Argelès-sur-mer	Dummy variable that takes a value of 1 if the hotel is located in Argelès-sur-mer and 0 if not
Collioure	Dummy variable that takes a value of 1 if the hotel is located in Collioure and 0 if not
Category:	
1 star	Dummy variable that takes a value of 1 if the hotel/apartment is one-star and 0 if not
2 star	Dummy variable that takes a value of 1 if the hotel/apartment is two-star and 0 if not
3 star	Dummy variable that takes a value of 1 if the hotel/apartment is three-star and 0 if not
4 star	Dummy variable that takes a value of 1 if the hotel/apartment is four-star and 0 if not
5 star[a]	Dummy variable that takes a value of 1 if the hotel/apartment is five-star and 0 if not
Type of board (hotels only):	
Accommodation only	Dummy variable that takes a value of 1 if the type of board is accommodation only and 0 otherwise
Bed and breakfast	Dummy variable that takes a value of 1 if the type of board is bed and breakfast and 0 otherwise
Half board	Dummy variable that takes a value of 1 if the type of board is half board and 0 otherwise
Full board	Dummy variable that takes a value of 1 if the type of board is full board and 0 otherwise
All inclusive	Dummy variable that takes a value of 1 if the type of board is all inclusive and 0 otherwise
Type of room (hotels only):	
Single	Dummy variable that takes a value of 1 if the room is single and 0 otherwise
Double	Dummy variable that takes a value of 1 if the room is double and 0 otherwise
Junior suite	Dummy variable that takes a value of 1 if the room is a junior suite and 0 otherwise
Rooms	Number of hotel/apartment rooms
Swimming pool	Dummy variable that takes a value of 1 if the hotel/apartment has a swimming pool and 0 otherwise
Car park	Dummy variable that takes a value of 1 if the hotel/apartment has a car park and 0 otherwise
Garden/terrace	Dummy variable that takes a value of 1 if the hotel/apartment has a garden/terrace and 0 otherwise
Weeks	Dummy variable dummy that takes a value of 1 if the price observation was gathered in week X (from 1 to 24) and 0 otherwise

Note: [a]There were no five-star apartments in the sample.

Table 2. Descriptive statistics for hotels.

Variable (hotels)	Mean (%)	Variable (apartments)	Mean (%)
Price (€)	59.85	Price (€)	73.66
Category:		*Category:*	
1 star	0.45	1 star	6.11
2 star	6.67	2 star	38.23
3 star	57.02	3 star	50.93
4 star	33.23	4 star	4.74
5 star	2.63	*Resort:*	
Resort:		Alt Maresme	3.74
Alt Maresme	33.29	Lloret de Mar	8.43
Lloret de Mar	27.07	Calp	21.51
Calp	4.68	Dénia	26.36
Dénia	10.62	Alcúdia	6.74
Alcúdia	8.49	Calvià	11.64
Calvià	7.13	Argelès-sur-Mer	8.63
Argelès-sur-Mer	4.36	Collioure	12.96
Collioure	4.36	*Characteristics:*	
Board:		Garden	72.96
Accommodation only	3.11	Pool	74.20
Bed and breakfast	21.71	Car park	48.83
Half board	36.72	Number of rooms	1.75
Full board	28.22		
All inclusive	10.24	*Observations*	*4,441*
Characteristics:			
Garden	47.96		
Pool	91.09		
Car park	54.28		
Number of rooms	207.11		
Room:			
Double	95.34		
Single	1.54		
Junior suite	3.12		
Observations	*11,781*		

where the aim was to explain the price of an apartment or hotel room ($Price_{it}$) based on its characteristics (X_{ik}), the municipality in which it was located (D_l) and the week (D_t), in order to know the seasonality. Finally β_k, α_l and δ_t are the effect the characteristics have on price, the municipality where the accommodation is located and the week, while β_0 is the constant (which can be interpreted as the mean price of the apartment or room in question) and u_{it} is the disturbance term, which follows the usual assumptions.

From the literature discussed above (Espinet, 2003, Rigall, 2004, and Thrane, 2005, for hotel data; and Saló, 2005, for tourist apartment data), the explanatory variables specified in the model are set out in Table 1. Table 2 shows the mean values of the variables in the sample, for hotels and apartments respectively.

Table 3. Explanatory price model (log) for coastal hotels (controlling for each of the weeks).

Variable	Coefficient	*t*
Category:		
1 star	–	–
2 star	0.3587	7.83
3 star	0.5095	11.21
4 star	0.8089	17.69
5 star	0.5867	11.99
Resort:		
Alt Maresme	–	–
Lloret de Mar	0.0235	3.34
Calp	0.6531	48.32
Dénia	1.1152	75.97
Alcúdia	0.8396	75.74
Calvià	0.8456	72.95
Argelès-sur-Mer	0.9229	53.56
Collioure	1.0793	56.11
Board:		
Accommodation only	–0.4215	–17.54
Bed and breakfast	–0.1724	–14.35
Half board	–0.1369	–14.70
Full board	–0.0244	–2.52
All inclusive	–	–
Characteristics:		
Garden	0.0280	4.87
Pool	0.0083	0.57
Car park	0.0714	11.34
Number of rooms	–0.0002	–13.92
Type of room:		
Double	–	–
Single	–0.2303	–9.82
Junior suite	0.3750	23.35
Constant	2.7620	57.33
Control: weeks	Coefficients shown in Figure 1	
R^2	0.78	
Observations	10,644	

Results

Hotels

Table 3 shows the separate hotel price regression (in logarithms)[5] for the resort and each week in the sample. We must remember that when the dependent variable is in logarithms, the effect of the explanatory variable on the dependent one is the exponential of its coefficient. Remember too that the exponential of the constant gives us information about the mean price of a room with the reference characteristics. That is, in our case, the mean price of a double room in the first week of May at an all-inclusive one-star hotel in Alt Maresme without a garden, car park or swimming pool is €15.83.

As for the category of hotel, the fact that a hotel is two-, three-, four- or five-star increases the price of the room in comparison with a one-star hotel by 43.45%, 66.45%, 124.52% and 79.80%, respectively. Logically, as the category goes up, the effect on price is higher. In the case of five-star hotels, the fact that there are very few of them (2.63% of the sample) and that they are concentrated in three resorts might explain why their coefficient is lower than that of four-star hotels.

As for the type of board, with regard to the reference category (all inclusive), full board decreases the price of the room by 2.44%, half board by 14.67%, bed and breakfast by 18.82% and accommodation only by 52.42%.

The type of room affects its price as follows. A single room has a price 25.88% lower than a double one, while a junior suite pushes up the price of a double room by 45.50%.

Lastly, as for the hotel's remaining characteristics, the effect of the number of hotel rooms can be seen to be negative, albeit to a very limited extent. When a hotel has one additional room, the price drops by 0.02%, capturing the scale effect or market power of the hotel. The fact that a hotel has a car park raises the price of the room by 7.39%, having a garden increases it by 2.80%, and the availability of a swimming pool does not affect the price at all. Because all the hotels are close to the sea and over 91% of them have a pool, this explains the lack of significance of this variable.

In continuation, we will comment on the effect of hotels being located in either one resort or another from the sample. The exponential of the coefficient for the resort in the regression in Table 3 shows the effect on price of the same room being located in a hotel in Lloret, Calp, Dénia, Alcúdia, Calvià, Argelès-sur-mer or Collioure in comparison with it being in Alt Maresme. If the hotel is in Lloret de Mar, this increases the price of the room by 2.32%, with corresponding figures for the other resorts being 92.13% (Calp), 205.02% (Dénia), 131.52% (Alcúdia), 132.94% (Calvià), 151.63% (Argelès-sur-mer) and 194.25% (Collioure). The low relative mean price of hotel rooms from the sample in Catalan resorts (about one-third of the price of those of Dénia and Collioure) is due to the high concentration of three-star hotels at very low prices. That is, this result can be interpreted as an indicator of the quality of the accommodation supply at a destination, given that we can use the hedonic price method for this purpose because we obtain the price of a similar room (same category, type of board, amenities, moment in time) but which differs only in its location.

Finally, the effect of seasonality was estimated by commenting on the coefficients that affected the week when the price information was gathered. Remember that these weeks run from the first week of May through to the second week of October. Thus, a weekly price index of hotel rooms in these resorts can be estimated, taking 100 as a base for the price of a room in the first week of May. The results of this index, shown in Figure 1, can be understood to constitute a quality-adjusted seasonal price index because it shows how the price of the same hotel room changes in the same resort depending on the week when the information was gathered. More specifically, it is a direct price index with a fixed unweighted base[6] (Uriel and Ferri, 2004). This figure shows the seasonality of the tourist product clearly, because the index, with a base of 100 for the first week of May, rises as the weeks go by to reach a

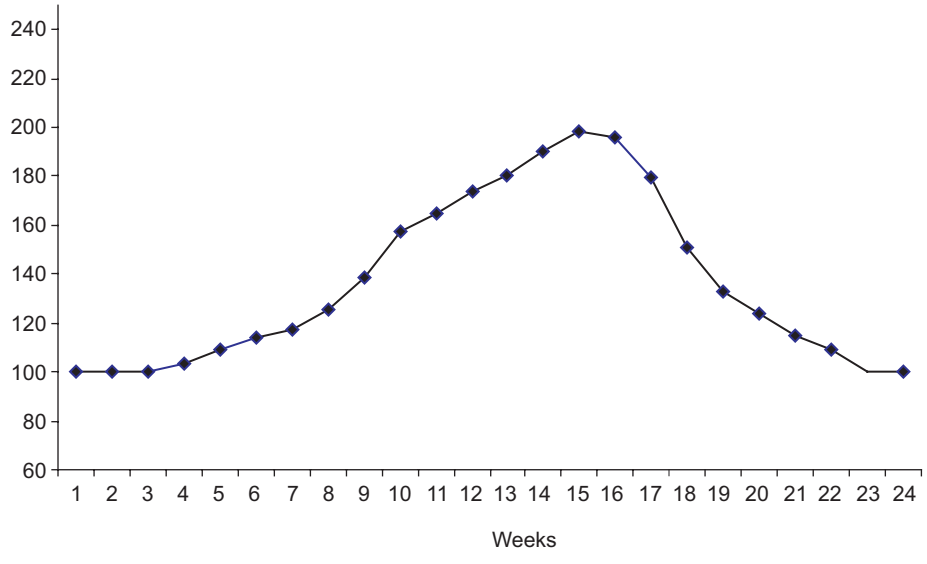

Figure 1. Quality-adjusted price index (hotels).

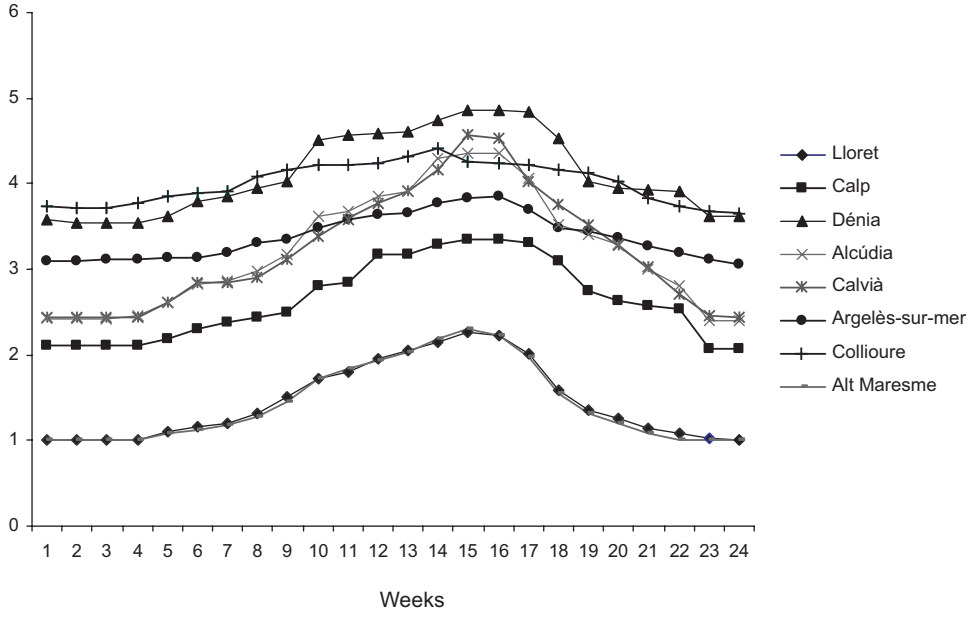

Figure 2. Price index adjusted for resorts (hotels).

maximum (week 15, the first full week of August) where the price of the same hotel room in the same resort is now double (198.57). From then on, the price of the room starts to fall, until a value of 100 is reached for the first two weeks of October.

Figure 2 shows the results of the seasonality analysis by resorts. Thus, from the estimations of Table 4,[7] where interactions by each of the dummy variables

Table 4. Explanatory price model (log) for coastal hotels (controlling for interaction of weeks and resort).

Variable	Coefficient	*t*
Category:		
1 star	–	–
2 star	0.3370	7.11
3 star	0.4931	10.48
4 star	0.7905	16.70
5 star	0.5897	11.66
Board:		
Accommodation only	–0.4220	–17.58
Bed and breakfast	–0.1625	–13.26
Half board	–0.1260	–13.28
Full board	–0.0185	–1.87
All inclusive	–	–
Characteristics:		
Garden	0.0262	4.47
Pool	0.0077	0.52
Car park	0.0693	10.79
Number of rooms	–0.0002	–13.83
Room:		
Double	–	–
Single	–0.2266	–9.47
Junior suite	0.3697	22.41
Constant	2.7520	51.04
Control: interaction of week and resort	Coefficients shown in Figure 2	
R^2	0.80	
Observations	10,644	

for the resort and week were incorporated, the quality-adjusted seasonal price index was calculated for each of the resorts from the sample. It should be noted that if the only difference among the resorts was their price, then Figure 2 would take the shape of eight parallel parabolas. As we can see, the effect of seasonality differs among the resorts, with a very similar shape being maintained for resorts in the same area. Generally, it can be observed that the effect of seasonality is more important in Spanish resorts, especially those in the Balearic Islands (Alcúdia and Calvià), and not so acute in French resorts (Argelès-sur-mer and Collioure).

Apartments

Table 5 shows the price regression for apartments (in logarithms).

As for the category, the fact that an apartment has two, three or four stars increases its price in relation to a one-star apartment by 13.96%, 28.04% and 82.90%, respectively. Logically, as the category goes up, the effect on price is higher, with a significant quantitative leap when the apartment is a four-star one.

Table 5. Explanatory price model (log) for coastal apartments.

Variable	Coefficient	*t*
Category:		
1 star	–	–
2 star	0.1307	7.94
3 star	0.2471	14.75
4 star	0.6038	24.95
Resort:		
Alt Maresme	–	–
Lloret de Mar	0.0913	4.18
Calp	–0.1300	–7.00
Dénia	–0.1100	–5.72
Alcúdia	0.0876	4.00
Calvià	0.2487	11.47
Argelès-sur-Mer	–0.2845	–12.20
Collioure	–0.2149	–10.69
Characteristics:		
Garden	0.0246	2.69
Pool	0.1289	11.81
Car park	0.0569	6.79
Number of rooms	0.1870	32.45
Constant	3.2740	110.76
Control: weeks	Coefficients shown in Figure 3	
R^2	0.6612	
Observations	4,141	

As for the remaining apartment characteristics, the effect of the number of rooms in an apartment is positive: an additional room in an apartment increases the price by 20.56%.[8] Having a car park raises the price of an apartment by 5.85%, while having a garden increases it by 2.49%. Likewise, the availability of a swimming pool raises the price by 13.76%.

In continuation, we will comment on the effect of an apartment being situated in either one resort or another from the sample. The exponential of the coefficient for the resort in the regression in Table 5 shows the effect on price of the same apartment if it is situated in Lloret, Calp, Dénia, Alcúdia, Calvià, Argelès-sur-mer or Collioure, as opposed to Alt Maresme. We can see that if the apartment is in Lloret de Mar, this increases the price by 9.56%, with a price rise of 9.15% if it is in Alcúdia and 28.24% if it is in Calvià. In contrast, in the remaining resorts, the price of an apartment drops in relation to Alt Maresme by 12.19% (Calp), 10.41% (Dénia), 24.76% (Argelès-sur-Mer) and 19.33% (Collioure). The results show that a bigger price dispersion can be detected for the location of hotels as opposed to apartments. This can even be observed from the descriptive statistic, because the price of an apartment in Argelès-sur-Mer is half the price of one in Calvià.

Similarly, as happened in the case of hotels, the effect of seasonality could be analysed through the coefficients that affected the week for which price information was gathered. Thus, an index of direct seasonal prices can be

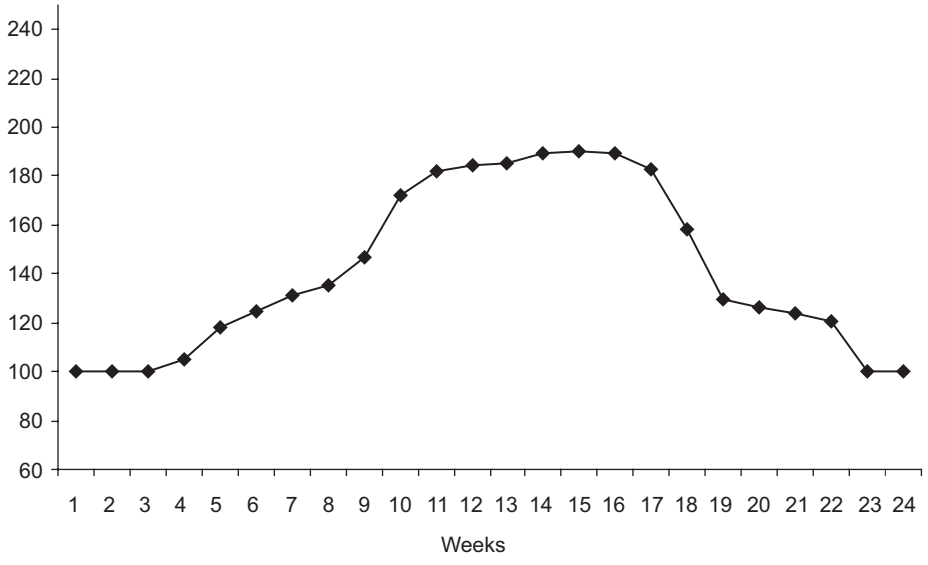

Figure 3. Quality-adjusted price index (apartments).

estimated, with a fixed unweighted base, for the price of an apartment in these resorts, with a base of 100 for the price of a room in the first week of May. The result of this index, which can be seen in Figure 3, shows clearly the seasonality of this tourist product, because the index rises across the weeks until it reaches a peak (week 15, the first full week of August), when the price of the same apartment in the same place is almost double (190.34). From then on, the price of the same room begins to fall until it reaches 100 in the two weeks of October.

Lastly, following the same procedure as that used for hotels, Figure 4 shows the results of the seasonality study by resort. From the estimations of Table 6,[9] where interactions by each of the dummies for the resort and week were incorporated, a quality-adjusted seasonal price index was estimated for each of the resorts in the sample. Once again, we can observe a greater seasonality in Spanish resorts, particularly in resorts in the Balearic Islands (Alcúdia and Calvià), in relation to French ones. In this sense, in the specific case of Argelès-sur-Mer, there is even a different seasonal pattern, reaching a peak beforehand (week 10, the first week of July).

A comparison of results for hotels and tourist apartments

Table 7 shows a comparison of the pricing of characteristics common to both hotels and apartments, showing in each case where they have a greater influence on price and the difference in percentage points. Thus, we can see that the fact that a hotel has two or three stars as opposed to just one has a much higher effect on price (22 percentage points). In fact, for both forms of accommodation,

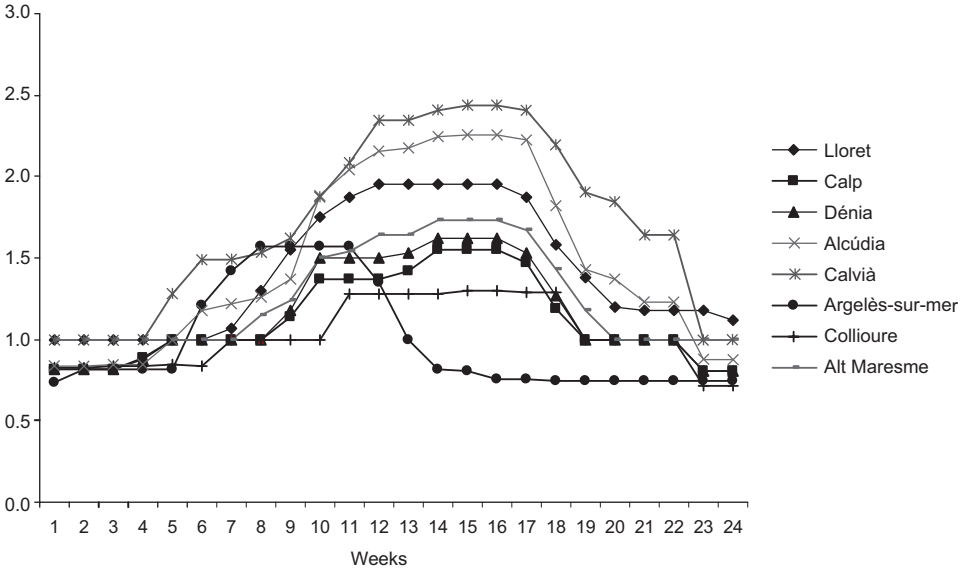

Figure 4. Price index adjusted for resorts (apartments).

Table 6. Explanatory price model (log) for coastal apartments (controlling for interaction of weeks and resort).

Variable	Coefficient	*t*
Category:		
1 star	–	–
2 star	0.1311	8.57
3 star	0.2451	15.69
4 star	0.5962	26.25
Characteristics:		
Garden	0.0276	3.21
Pool	0.1276	12.60
Car park	0.0550	7.02
Number of rooms	0.1850	34.39
Constant	3.3721	57.25
Control: interaction of week and resort	Coefficients shown in Figure 4	
R^2	0.7312	
Observations	4,141	

the difference between one and two stars is priced the same. When a comparison is made between four stars and one star, the price component is slightly higher in the case of apartments. The availability of a car park and garden are also characteristics that have a slightly higher effect on price in the case of hotels (about one percentage point). In contrast, the availability of a swimming pool

Table 7. Comparison of the effect of characteristics on price.

Variable	Pricing
2 star	Hotel (22)
3 star	Hotel (22)
4 star	Apartment (1)
Car park	Hotel (1)
Pool	Apartment (14)
Garden	Hotel (less than 1)

Table 8. Comparison of the effect of location on price.

Variable	Effect on price of hotels	Effect on price of apartments
Alt Maresme	100	100
Lloret	102.32	109.56
Alcúdia	231.52	109.15
Calvià	232.94	128.24
Collioure	294.25	80.67
Argelès-sur-mer	251.63	75.24
Dénia	305.02	89.59
Calp	192.13	87.81

is a characteristic that has a much higher price influence in the case of an apartment than in that of a hotel (14 percentage points). This can be explained by the variables' greater variability in the case of the sample group of apartments because, in this case, 25.08% of the apartments do not have a pool.

Table 8 shows a comparison of the price component of the location of hotels and apartments. Firstly, the location indexes display a much lower dispersion when the location of the same apartment is priced as opposed to the location of the same hotel room. Thus, there was a difference of over 200% between the price component of a location that contributed the most to an increase in the price of a hotel room (in Dénia and Collioure) and the price component with the least effect (in Alt Maresme and Lloret), while in the case of apartments, this difference was little more than 50%. In the second place, in the case of hotels, the price component for Alt Maresme and Lloret, as locations, is much lower than the price component for other resorts, thus demonstrating a policy based heavily on prices aimed at tourists of a low socio-economic level who base decisions on this variable alone. In the case of apartments, the price policy for these resorts does not seem so visibly aggressive. In fact, it was in Catalan resorts where the price of apartments rose the most, together with those in the Balearic Islands.

Figure 5 shows, in the same figure, the quality-adjusted seasonal price indexes (QAPI) for hotels and apartments. Despite the similar, strongly seasonal

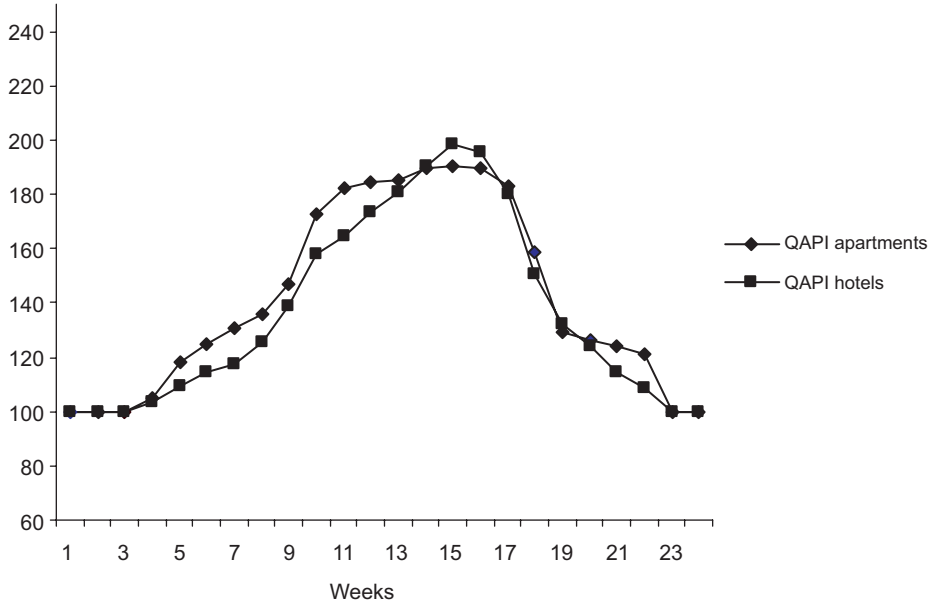

Figure 5. Comparison of QAPI of hotels and apartments.

evolution of both indexes, small differences can be observed. A slightly lower degree of seasonality can be seen in hotels for most of the period, especially between weeks 5 and 12. On the other hand, with the exception of this generic behaviour, it is in weeks 15 and 16 when the highest value can be found in both cases. In this case, the quality-adjusted price index for hotels is higher than the index for apartments.

Conclusions

Taking into consideration the characteristics that make up a certain type of accommodation and the determinants that lead to a demand for it and contribute to the formation of its price, this study was directed at estimating the value of some of these characteristics as price components. With this is mind, one of the objectives of this study was to price certain physical characteristics of the demand and, even more interesting, to price the location of the accommodation and the time of the demand. In particular, knowing the location-related price component of accommodation is especially important when choosing a holiday destination because it can be interpreted as an approximation of the perception of the destination's quality. Also implicit in the price of a stay is the time of year when a holiday is taken, and so estimating this component offers information on the effect of seasonality in each of the tourist resorts; a crucial subject of tourism studies.

The hedonic price method, used to explain the price of heterogeneous products composed of different characteristics, has demonstrated that it meets the objectives of this study, making it possible to price physical components

of accommodation, together with the time and place of a stay. Lastly, because the prices of hotels and apartments in the same resort were estimated separately, the price of these components could be compared.

To sum up, the main finding of this paper was to price the location of the accommodation and the time of the demand for hotels and apartments. First of all, pricing location provides indirect evidence of a destination's quality. We have observed much lower dispersion when the location of the same apartment is priced as opposed to the location of the same hotel room. We can conclude, therefore, greater differences in the quality of these destinations as perceived by tourists staying in hotels in relation to the differences in the quality of these destinations as perceived by tourists staying in apartments. In the case of hotels, the price component for Alt Maresme and Lloret, as locations, is much lower than the price component for other resorts. This lower quality of the destination as perceived by the tourist to these resorts is the result of a policy based heavily on prices aimed at tourists of a low socio-economic level who base decisions on this variable alone. In the case of apartments, the price policy for these resorts does not seem so visibly aggressive. Pricing the time of a stay offers information on the effect of seasonality in each of the tourist resorts. Results suggest similar, strongly seasonal evolution for both types of accommodation, although small differences can be observed. In particular, a slightly lower degree of seasonality can be seen in hotels for most of the period. Finally, we have observed a greater seasonality in Spanish resorts, particularly in resorts in the Balearic Islands, in relation to French resorts.

Knowing the estimated price components of accommodation characteristics is important in assessing the competitiveness of a destination, and this, in turn, is a key factor in the development of destination management strategies. Knowing these values provides essential information for use in decision making and the establishment of priorities in the development of a resort's hotels and other features relating to the resort, particularly when the aim is to reposition the destination to meet new demands. In this sense, pricing locations provides indirect evidence of the quality of a destination as perceived by tourists, and this, in market conditions where there might be a surplus supply of hotels and thus a reduction in business profits, is especially vital. This is the case of most tourist resorts in this study.

Lastly, what is important in a strategy aimed at improving competitiveness is to preserve and reinforce the background setting and appeal of a tourist resort, while working on a balanced combination of types of accommodation that ensure sustainable positioning and the design of new tourist areas and products with complementary services that can boost the destination's competitiveness and added value and attract and ensure the loyalty of a wider demand.

As for future research, firstly the number of characteristics included in the analysis must be extended, particularly those that can be compared for both types of accommodation (like different services). During a second stage, with a database with observations for different years, the temporal evolution of the effect on price of physical characteristics and place and time could be observed. An attempt could be made to explain this temporal and spatial variability in the price component of different resorts and moments in time, depending on the evolution of different aspects of the tourist supply at these destinations.

Endnotes

1. For a detailed analysis of the work by Andrew Court and the reasons why the technique was forgotten for over two decades, see Goodman (1988).
2. The hedonic technique is based on modern consumer choice theory, according to which consumers obtain utility not directly from a good but from its characteristics, see Lancaster (1966).
3. The Pyrenees-Mediterranean Euroregion is a joint initiative by the Governments of Aragon, Catalonia, the Balearic Islands and Regional Councils of Languedoc-Roussillon and Midi-Pyrénées, which subscribed to the founder declaration of the Euroregion in October 2004.
4. Second homes per first home, which measures the concentration of this residential phenomenon. In all cases, the value of the tourism specialization index is higher than 1.
5. Findings regarding the non-linearity of the hedonic price function are well known and well documented in the economic literature (Halvorsen and Pollakovsky, 1981; Anglin and Gençay, 1996; and Gençay and Yang, 1996, among others). In our case, a regression was performed previously where price was specified in the Box–Cox formal function, achieving a value of $\lambda = -0.010$ with which, at a 5% significance level, the null hypothesis that $\lambda = 0$ cannot be rejected; that is the suitability of the logarithmic functional form for the dependent variable. Given the presence of heteroskedasticity, the model has been used robustly, using the White estimator.
6. The index of indirect prices and/or chained index make sense when the observations correspond to different years and so the assumption that the characteristics remain constant over the period cannot be accepted. In our case, because we have observations for five months, it can be assumed that the quality does not change. At the same time, weighted indexes correct the assumption that all the observations (hotel rooms) have the same importance (Silver, 2002). Models were estimated with the same specification as the model in Table 2, but using weighted least squares where each observation was weighted by the degree of occupancy of the resort to which it belonged during the period (if it is considered to be a tourist resort by the National Statistics Office, otherwise the tourist area to which it belongs is used). The results are qualitatively similar, although they change with regard to the impact of the coefficients. The estimations of this model are available on request.
7. In fact, the model in Table 2 (constrained model) is a nested model of the one in Table 3 (unconstrainted model). The value of the constraint test F-statistic is 11.17, rejecting the hypothesis that both models are equal at the 1% significance level. That is, the belief that seasonality's effect on price is the same for all the resorts.
8. A similar effect can be observed if the regression incorporates the maximum number of people that can rent the accommodation, where the correlation between both variables is almost 67%.
9. In this case, the value of the constraint test F-statistic is 7.83, rejecting the null hypothesis of equality between the estimations of Model 1 and Model 2 at a 1% significance level.

References

Aguilo, P.M., Alegre, J., and Riera, A. (2001), 'Determinants of the price of German tourist packages on the Island of Mallorca', *Tourism Economics*, Vol 7, pp 59–74.

Aguilo, E., Alegre, J., and Sard, M. (2003), 'Examining the market structure of the German and UK tour operating industries through an analysis of package holiday prices', *Tourism Economics*, Vol 9, pp 255–278.

Anglin, P.M., and Gençay, R. (1996), 'Semiparametric estimation of a hedonic price function', *Journal of Applied Econometrics*, Vol 11, pp 633–648.

Bartik, T.J. (1987), 'The estimation of demand parametres in hedonic price models', *Journal of Political Economy*, Vol 95, pp 81–88.

Bin, O. (2005), 'A semiparametric hedonic model for valuing westlands', *Applied Economic Letters*, Vol 12, pp 597–601.

Bover, O., and Velilla, P. (2001), 'Hedonic house prices without characteristics: the case of new multiunit housing', Banco de España, Estudios Económicos, 73, Madrid.

Coenders, G., Espinet, J., and Saez, M. (2003), 'Predicting random level and seasonality of hotel prices: a latent growth curve approach', *Tourism Analysis*, Vol 8, pp 15–31.

Court, L.M. (1941), 'Entrepreneurial and consumer demand theories for commodity spectra', *Econometrica*, Vol 9, pp 165–192, 241–297.

Ekeland, I., Heckman, J.J., and Nesheim, L.P. (2002), 'Identifying hedonic models', *The American Economic Review*, Vol 92, pp 304–309.

Ekeland, I., Heckman, J.J., and Nesheim, L.P. (2004), 'Identification and estimation of hedonic models', *Journal of Political Economy*, Vol 1, pp 60–109.

Espinet, J.M. (2003), 'The effect on prices of the attributes of holiday hotels: a hedonic prices approach', *Tourism Economics*, Vol 9, pp 165–177.

Garcia, J., Matas, A., Raya, J.M., and Raymond, J.L.L. (2006), 'Precios de la vivienda y localización: evidencia empírica para la ciudad de Barcelona', *Papeles de Economía Española*, Vol 109, pp 125–139.

Gençay, R., and Yang, X. (1996), 'A forecast comparison of residential housing prices by parametric versus semiparametric conditional means estimations', *Economic Letters*, Vol 52, pp 129–135.

Goodman, C.A. (1988), 'An econometric model of housing price, permanent, tenure choice and housing demand', *Journal of Urban Econmics*, Vol 23, pp 323–353.

Griliches, Z. (1971), *Price Indexes and Quality Change: Studies in New Methods of Measurement*, Harvard University Press, Cambridge, MA.

Halvorsen, R., and Pollakovsky, H.O. (1981), 'Choice of functional forms for hedonic price equations', *Journal of Urban Economics*, Vol 10, pp 37–49.

Hamilton, J. (2007), 'Coastal landscape and the hedonic price of accomodation', *Ecological Economics*, Vol 62, pp 594–602.

Lancaster, K.J. (1966), 'A new approach to consumer theory', *Journal of Political Economy*, Vol 74, pp 132–157.

Mendelsohn, R. (1984), 'Estimating the structural equations of implicit markets and household production functions', *The Review of Economic and Statistics*, Vol 66, pp 673–677.

Mills, S.E., and Simenauer, R. (1996), 'New hedonic estimates of regional constant quality house prices', *Journal of Urban Economics*, Vol 39, pp 209–215.

Palmquist, R.B. (1984), 'Estimating the demand for the characteristics of housing', *Review of Economics and Statistics*, Vol 64, pp 394–404.

Papatheodorou, A. (2002), 'Exploring competitiveness in Mediterranean resorts', *Tourism Economics*, Vol 8, pp 133–150.

Rigall, R. (2004), 'Hisendes locals i turisme: tres assaigs', unpublished PhD Thesis, Universitat de Girona.

Ropero, M.A. (2006), 'Competencia en Precios entre Establecimientos Turísticos en las Islas Canarias y Baleares', IX Encuentro de Economía Aplicada, 8-10 June, Jaen.

Rosen, S. (1974), 'Hedonic prices and implicit markets: product differentiation in pure competition', *Journal of Political Economy*, Vol 1, pp 34–55.

Saló, A. (2005), 'Estudi sobre l'habitatge a la demarcació de Girona: habitatges principals, segones residències i apartaments turístics', unpublished PhD Thesis, Universitat de Girona.

Silver, M. (2002), 'The use of weights in hedonic regressions: the measurement of quality adjusted price changes', mimeo, Cardiff Business School, Cardiff University.

Sinclair, M.T., Clewer, A., and Pack, A. (1990), 'Hedonic prices and the marketing of package holidays: the case of tourism resorts in Malaga', in Ashworth, G., and Goodall, B., eds, *Marketing Tourism Places*, Routledge, London, pp 85–103.

Taylor, P. (1995), 'Measuring changes in the relative competitiveness of package tour destinations', *Tourism Economics*, Vol 1, pp 169–182.

Thrane, C. (2005), 'Hedonic price models and sun-and-beach package tours: the Norwegian case', *Journal of Travel Research*, Vol 43, pp 302–308.

Tinbergen, J. (1951), 'Some remarks on the distribution of labour incomes', *International Economic Papers*, Vol 1, pp 195–207.

Uriel, E., and Ferri, J. (2004), 'Aplicación del enfoque hedónico para medir la evolución del precio de los hoteles en España', *Papeles de Economía Española*, Vol 102, pp 141–159.