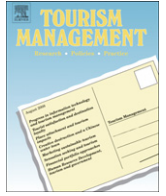




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## A room with a view—A valuation of the Mediterranean Sea view

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### ABSTRACT

Aesthetic view is one of the ecosystem services of the Mediterranean Sea which can be estimated using price differences in the hotel market. Hotels situated on the Mediterranean Sea charge higher prices for a room with a sea view than for a room without it. The value of this view in 10 major Mediterranean regions was estimated in this paper using a hedonic price method. Data on 2819 hotel rooms in high season and 2406 rooms in the low season were collected from [Booking.com](http://Booking.com) and fixed effects regression was used to estimate the model coefficients. Hotel room prices were found to be higher by about 10% for a room with a view than for one with no view specification. No significant difference was found between regions or season. These findings lend support to the fact that the view of the Mediterranean is equally valued in all regions.

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“The Signora has no business to do it,” said Miss Bartlett, “no business at all. She promised us south rooms with a view close together, instead of which here are north rooms, looking into a courtyard, and a long way apart. Oh, Lucy!”—A Room with a View by E.M. Forster

### 1. Introduction

When a hotel manager offers a room with a view for a higher price than a room without a view, she is actually selling something she does not own to a tourist who can only observe it from the privacy of his room. However, unlike museums where visitors can see the artifacts only at the museum, the tourist can look at the view from outside the hotel for free; nevertheless, he is still willing to incur a higher price for a room with a view. The view, although it is not owned by the hotels, becomes an attribute of the room and pecuniary transactions are conducted accordingly. I studied this phenomenon in the case of hotels in the northern Mediterranean region. By using a hedonic price method, the value of the Mediterranean Sea view was estimated based on data collected from an online travel agency.

The Mediterranean Sea is one of the largest tourist attractions in the world and consequently, a view of the sea is considered one of the most desirable views that a hotel can charge for. In 2006, about 200 million tourists visited the European Mediterranean region during the summer. The local population in the very same regions does not exceed 120 million ([Amico & Lo Giudice, 2006](#)), emphasizing the

importance of the Mediterranean as a tourist attraction. Although it is an important ecosystem, the valuation of its services, such as view, is not simple because there is no market for them. Access to many of the beaches is free, so is the view. One way to evaluate at least some of the Mediterranean ecosystem services is to perform a hedonic analysis of the hotel room market around it, where sea view is one of the room attributes ([Fausold & Lilieholm, 1999](#); [Santos, 1998](#)).

The attraction of the sea view does not only affect the prices of hotel rooms; it also has an important impact on the structure of Mediterranean resorts. Hotels are built as close to the seashore as possible and as tall as possible to gain maximum financial benefit from the view. This has led to the current highly homogeneous form of many Mediterranean resorts. A typical resort has the following structure: a strip of sea, a strip of sandy beach, a promenade dotted with restaurants, bars and coffee shops, a strip of hotels and behind these, the rest of the locality. In some cases, the hotel architecture also reflects the high value of the sea view: hotels are built perpendicular to the beach because land is expensive, and balconies are built on the diagonal so that guests can get as much of the view as possible. The implication of this structure is that view becomes rivalrous: it is taken away from the local population, as hotel buildings prevent the locals from having a view of the sea from their own home, and is basically exported to tourists. Evaluating sea view services enables to demonstrate that under certain conditions there might be a transfer of welfare from the host community to the tourists.

The paper is structured as follows. The next section presents a literature review, the third provides a detailed description of the empirical methods, the fourth presents the results and the final section concludes.

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## 2. Literature review

The hedonic price model (Rosen, 1974) is used in this paper to estimate the value of the Mediterranean Sea view. This model is commonly used to estimate the economic value of goods and services when a market does not exist; for example: the evaluation of ecosystem services, such as landscape, or of environmental amenities, such as air or water quality (Haab & McConnell, 2002). Most of the environmental and natural resource applications of the hedonic price model relate to housing prices. For example, air pollution (Smith & Huang, 1995), water pollution (Leggett & Bockstael, 2000) and landscape (Geoghegan, Wainger, & Bockstael, 1997) were evaluated based on differences in housing prices and level of pollution or distance from the landscape. In the present study, the existence of a hotel room market next to the Mediterranean Sea allows the use of a hedonic price analysis to evaluate the Mediterranean Sea view as an ecosystem service. Hotel rooms near the Mediterranean beaches have different attributes. Some of these attributes are market-induced (type of room) and some are non-market (sea view). The systematic variation in the price of hotel rooms that can be attributed to the characteristics of the rooms is used to impute the value of these characteristics, including sea view.

A frequent application of the hedonic price model in the tourism market is the analysis of prices of package tours for northern European tourists to Mediterranean destinations. Aguiló, Alegre, and Riera (2001) found in their study that hotel category, type of board, and location explain the distinct distribution of prices. They also point out that prices vary across tour operators due to the segmentation of the market. The paper of Espinet, Saez, Coenders, and Fluvia (2003) reveals large price differences between four stars hotels and the rest. Additionally, they show that the price is significantly affected by location, hotel size, distance to the beach and availability of parking. Thrane (2005) points out in his study that the following attributes of the package tours had a significant impact on price: the type of tour operator and location, breakfast, restaurant, TV, type of room and distance from the beach. The major finding in Haroutunian, Mitsis, and Pashardes (2005) study is that price variation is often more associated with the country of destination and the tour operator rather than the attributes of the holiday package. Other papers such as Aguiló, Alegre, and Sard (2003) and Papatheodorou (2002) used a hedonic price analysis, also based on package holidays, to determine the structure and competitiveness of the hotel markets in the Mediterranean. Israeli (2002), in his hedonic analysis of hotel prices in Israel, found that star rating has a positive and consistent impact on prices, in contrast to corporate affiliation, the impact of which was not consistent.

Whereas the above studies did not distinguish between private and public attributes of hotels or hotel rooms, there are two papers that did make this distinction in their hedonic analysis of hotel prices in the Mediterranean (Rigall-I-Torrent & Fluvia, 2007; Rigall-I-Torrent, Fluvia, Ballester, Saló, Ariza, and Espinet, 2011). In the first, hotels located in jurisdictions that were rich in public goods, such as attractions and natural environment, were shown to experience a faster growth rate than their counterparts situated elsewhere. In the second, the authors evaluated the contribution of the different beach attributes to hotel prices in Catalonia. Location in front of a beach increases price by 13–17%, beach width, coarse sand and natural beaches have a negative effect on hotel prices.

Other papers have focused more on the impact of water bodies as public goods on hotel and housing prices. These include a study on the value of coastal landscape in the Schleswig-Holstein coastal district in Germany (Hamilton, 2007) and a study of the aesthetic lake view of Lake Austin in Texas (Lansford & Jones, 1995). Hamilton (2007) evaluated the impact of climate change on hotel accommodation prices. She showed that coastal landscape has a positive impact on the

price of the accommodation and thus construction of dikes to prevent flooding would result in lower prices and accordingly, profits, in the accommodations market in the region. Lansford and Jones (1995) applied the hedonic price model to housing prices around the lake and showed that a lake view significantly increases the price of housing.

Most of the aforementioned studies dealt with the hotel and not the room attributes. They treated the hotel and room attributes similarly, even though hotel attributes are fixed effects. Some of the studies neutralized the room attributes by considering the price of the same type of room in each hotel. A sea view is an attribute of the room and not of the hotel because not all rooms in the hotel necessarily have a sea view. Ignoring the differences between the hotel fixed effects and the room effects can lead to biased estimates (Wooldridge, 2006). Thus, to evaluate the impact of room attributes on price, the hotel effects have to be removed. The uniqueness of the present study lies in its evaluation of one room attribute, the sea view, around the Mediterranean Sea. Moreover, in this study, unlike the aforementioned studies, the hotel effects were removed by using a fixed effects method in the regression estimations and only the contribution of the room attributes is evaluated.

Evaluating sea view as a room attribute provides an evaluation of one ecosystem service of the Mediterranean Sea, i.e., aesthetic scenery or landscape. By estimating and accounting for the economic value of ecosystem services, hidden social costs and benefits are revealed and can be used for economic decision making at the local, national and international levels (Millennium Ecosystem Assessment, 2005). The Mediterranean Sea is considered a unique ecosystem having the same climatic conditions, hydrologic situations, rich biodiversity and flora and fauna (Bianchi & Morri, 2000). Since it is the same ecosystem the value of its services are expected to be the same across regions. A comparison of the view's value in 10 major regions enables an assessment of the hypothesis that the value of this ecosystem service is the same in all regions.

## 3. Empirical methods

In this section I present the empirical model, data and econometric methodology used for the analysis of this data set.

### 3.1. Empirical model

The hedonic price method has been used for almost a century in a variety of extra-market valuation contexts (see review paper by Palmquist, 2005). The strength of the hedonic price method is that it is based on actual market data and not on hypothetical situations the direct methods for the evaluation of environmental amenities rely on. Its weaknesses are its sensitivity to choice of functional form and to the definition and extent of the market (Haab and McConnell, 2002). It is also known to suffer from some subtle estimation issues associated with parameter identification (see Ekeland, Heckman, & Nesheim, 2004). Besides that the underlying theory is well established and thus it will be presented here in condensed form.

Following Freeman's (1993) presentation of the hedonic price analytical framework, let  $P_i$  represent the price of the  $i$ th room. Let  $Z_i = (Z_{i1}, Z_{i2}, \dots, Z_{ik})$  be the  $K$  attributes that determine the price of the room. The hedonic price equation receives the following form:

$$P_i = F(Z_i) \quad (1)$$

where  $F$  is the function that relates price  $P_i$  to the attributes of room  $i$ . The incremental contribution of the  $k$ th attribute to the price is given by the following partial derivative:

$$\partial P_i / \partial Z_{ik} = \partial F(Z_i) / \partial Z_{ik} \quad (2)$$

The exact functional form for (2) is discussed in the *Empirical strategy* section.

The hedonic price model assumes that consumers are familiar with the product's characteristics and accordingly, attach values to the different characteristics (Rosen, 1974). Estimation of the model reveals the marginal value of each characteristic. In this study, it can be assumed that the characteristics are known to the visitors at the time they make their reservation. This is a reasonable assumption since hotels in online booking sites are normally described in much detail, like a text description, star rating, pictures of hotel and rooms as well as reviews of past guests. Moreover, the reviews of past guests, presented on the site, can reveal other attributes such as courtesy of the staff or cleanliness of the rooms.

### 3.2. Data

Data were collected from *Booking.com*, an online site for booking hotels around the world. A special program was written facilitating data collection from the site in less than 1 h for the different regions. The short time span of data collection minimized the problem of price changes while the data were being collected.

*Booking.com* is one of the largest online hotel intermediaries. Not all hotels use it, and thus the possibility of sample selection exists. It is difficult to receive information on the full list of hotels that use *Booking.com* as an intermediary. The list of hotels in a region only appears after the exact dates of the stay have been chosen. For each date, a different list of hotels appears, depending on availability. However, judging by the large number and variety of hotels it offers, I could not detect any selection criterion that was correlated with the variables used in the analysis.

All the large sun, sand and sea regions around the northern Mediterranean that appeared in *Booking.com* were chosen for the data set. Regions that had less than nine relevant hotels were not chosen since the number of observations was not sufficient to conduct a regional comparison. The regions were: Costa del Sol, Costa Brava, Balearic Islands, French Riviera, Italian Riviera, Sardinia, Sicily, Greek Islands, Cyprus and Antalya. Rooms for the data set were selected following two selection processes. In the first, hotels which, on January 5th 2011, had rooms available for the night of June 20th 2011 or for the night of October 24th 2011 were chosen. These two dates for the data mining were selected randomly from a list of dates during the high season and a list of dates during the low season, respectively. The analysis was conducted on each data set separately to account for seasonality. It should be noted that observations in the two data sets were not identical. It is possible that a hotel or a room that appeared as available on June 20th did not appear as available on October 24th. Unlike tour organizers' brochures which list the prices of the same hotels in different seasons, here, the room appears in a search of *Booking.com* only if it is available on the specified date.

Of the rooms that were selected in the first stage, only hotels that offered at least one room with a sea view were selected in the second stage. Since the interest of this study lies in a comparison between rooms with a sea view and rooms without a sea view, hotels that do not have a sea view at all are not relevant.

A total of 589 hotels and 2819 rooms were selected for June 20th and 487 hotels and 2406 rooms for October 24th (see *Table 1*). For each observation, the following room attributes were extracted from *Booking.com*: type of room (standard, deluxe, etc.), number of persons per room (single, double, etc.), type of view which can be observed (sea view—when a full view of the sea is observed from a balcony or a window, side sea view—when the balcony is perpendicular to the sea, city view, etc.), the meal plan included in the room price (breakfast or halfboard), whether the reservation is refundable (not every room has a choice between refundable and

**Table 1**

Distribution of number of hotels, rooms and rooms with a view and average price by region for June 20th 2011 (20/6) and for October 24th 2011 (24/10).

Region	No. of Hotels		No. of Rooms		No. of Rooms with Sea View		Average Price (€)	
	20/6	24/10	20/6	24/10	20/6	24/10	20/6	24/10
Balearic Islands	70	48	461	326	187	122	137	106
Costa Brava	30	29	188	138	66	50	137	98
Costa del Sol	57	23	143	158	48	54	144	137
Cyprus	21	27	115	118	52	53	191	202
French Riviera	77	53	356	262	156	108	258	208
Italian Riviera	40	33	194	158	88	69	194	158
Greek Islands	114	139	521	593	233	285	152	115
Sardinia	48	27	242	131	96	52	203	167
Sicily	90	64	406	324	153	117	163	143
Antalya	42	44	193	198	69	72	141	122
Total	589	487	2819	2406	1148	982	171	139

non-refundable reservations) and finally, room price (see *Table 2* for a detailed description of the variables). The room-types were defined differently in each hotel; for example, deluxe room could be defined as luxury, royal, imperial, privilege, superior or prestige. In this case, the rooms were grouped into one room-type category.

Additional variables that were used in the analysis were interaction variables between sea view and the dummy for each region. These were needed to test the hypothesis that the sea view is similarly evaluated in all Mediterranean regions.

### 3.3. Empirical strategy

The data set is not a simple cross-sectional one because the same hotel can have different rooms. Thus, it should be treated as panel data for which each observation belongs to a well-defined cluster, i.e., the hotel (Greene, 2000). Fixed effects or random effects regression models can be applied, as with panel data,

**Table 2**

Descriptive statistics of the variables for the two time periods.

Variable	Description	Mean (S.D.)	
		Jun 20th 2011	Oct 24th 2011
Price	Room price in €	184.073 (187.6)	151.092 (168.0)
Persons	Number of persons per room	2.289 (0.79)	2.290 (0.80)
Breakfast <sup>a</sup>	=1 if breakfast is included	0.613	0.594
Halfboard <sup>a</sup>	=1 if halfboard is included	0.103	0.089
Seaview <sup>a</sup>	=1 if there is a sea view	0.408	0.408
Sideseaview <sup>a</sup>	=1 if there is a side sea view	0.008	0.008
Cityview <sup>a</sup>	=1 if there is a city view	0.008	0.009
Gardenview <sup>a</sup>	=1 if there is a garden view	0.043	0.044
Non_refund <sup>a</sup>	=1 if payment is non-refundable	0.165	0.177
Standard <sup>a</sup>	=if room is described as standard or without any description	0.610	0.552
Suite <sup>a</sup>	=1 if room is described as or similar to a suite	0.107	0.121
Apartment <sup>a</sup>	=1 if room is an apartment	0.054	0.068
Studio <sup>a</sup>	=1 if room is described as or similar to a studio	0.029	0.037
Bungalow <sup>a</sup>	=1 if room is described as or similar to a bungalow	0.010	0.017
Deluxe <sup>a</sup>	=1 if room is described as or similar to deluxe	0.142	0.146
Villa <sup>a</sup>	=1 if room is described as or similar to villa	0.016	0.014
Superior <sup>a</sup>	=1 if room is described as or similar to superior	0.032	0.045

<sup>a</sup> A dummy variable.

depending on the correlation between the observed room variables and the unobserved hotel variables. When an unobserved variable of the hotel is correlated with the rooms' explanatory variables, the appropriate method is fixed effects. The fixed effects method allows for the unobserved cluster effects and thus the regression does not include cluster variables such as hotel attributes. The random effects method can be used when the unobserved hotel attributes are not correlated with the explanatory variables. The Hausman test for fixed effects was applied (Cameron & Trivedi, 2010) to determine which of the methods is appropriate. The null hypothesis that the individual effects are random was rejected and thus the fixed effects method was used in the econometric analysis.

The hedonic model can be applied to different functional forms. To determine which functional form best suits the data, the test for Box–Cox model was performed (Cameron & Trivedi, 2010). The null hypothesis that  $\theta = 0$  was not strongly rejected and thus the preferred functional form was the log-linear:

$$\log P_i = \beta Z_i + \varepsilon_i, \quad (3)$$

where  $\beta$  is a vector of K coefficients and  $\varepsilon_i$  is a random error.

The impact of the estimated coefficient  $\hat{\beta}$  on the price in the log-linear model is interpreted as follows  $\% \Delta \text{price} = 100[\exp(\hat{\beta}) - 1]$ . For a small percent change, the value of  $\hat{\beta}$  is a good approximation of the rate of change in price (Wooldridge, 2006).

To assess the hypothesis that the value of the sea view is the same in all regions, interaction variables between the dummy variables for region and 'seaview' were included in the regressions. Although the dummy variables for the regions cannot be included in the model because they do not vary between rooms, the interactions between them and 'seaview', which does vary between rooms, can be included (Allison, 2009, p. 37).

#### 4. Results

Table 3 presents the results of the fixed effects regression estimates for the two data sets, the high season (June 20th 2011) and the low season (October 24th 2011). The coefficient of the dummy variable 'seaview' is significantly different from zero in both data sets. This suggests that the price of a room with a view is higher by 11% in the high season (and by 10% in the low season) than that of a room without a view in the reference region Cyprus. The interpretation of the 'seaview' coefficient is just like in a linear model with interactions. This means that it is interpreted as the additional value for a room with a sea view in the reference region (the region in which its dummy was not included in the regression), Cyprus. To obtain the effect for each region separately, the coefficient of the interaction variable with each region should be added to the main effect (for further discussion of interactions in a fixed effects regression model see Allison, 2009, p. 37). The coefficients of the interaction variables between 'seaview' and the regions are used to assess the hypothesis that the value attached to sea view is the same in all regions around the northern part of the Mediterranean Sea. The coefficients of the interaction variables represent the difference in price change between a room with a view in Cyprus and a room with a view in each one of the studied regions. None of these variables are significant in either season. In other words, there is no significant additional value to the sea view in Cyprus in any other region. The hypothesis that the Mediterranean Sea view has the same value in terms of price percentage is not rejected.

The control variables in Table 2 provide a rich set of results in and of themselves. The price of a room with a side sea view is not significantly different from that of a room with no view specification. In these destinations, a city view and a garden view are considered less desirable than no view at all. The coefficients of these two dummy

**Table 3**

Estimations of the log-linear fixed effects hedonic price models for Jun 20th 2011 and Oct 24th 2011.

Variable	Jun 20th 2011		Oct 24th 2011	
	coefficient	S.E. <sup>b</sup>	coefficient	S.E. <sup>b</sup>
seaview	0.113**	0.037	0.102**	0.040
side-seaview	-0.010	0.050	0.010	0.062
cityview	-0.091*	0.048	-0.137**	0.059
gardenview	-0.087**	0.022	-0.077**	0.027
breakfast	0.035*	0.017	0.097**	0.020
halfboard	0.171**	0.021	0.281**	0.026
non_refundable	-0.154**	0.022	-0.163**	0.027
number of persons	0.223**	0.006	0.218**	0.007
deluxe	0.122**	0.014	0.112**	0.017
suite	0.441**	0.016	0.438**	0.018
apartment	0.024	0.030	-0.013	0.034
studio	0.006	0.033	-0.031	0.037
bungalow	-0.021	0.056	0.120**	0.053
superior suite	0.154**	0.026	0.144**	0.029
villa	0.642**	0.038	0.648**	0.045
seaview × Costa Brava <sup>a</sup>	0.030	0.048	0.080	0.056
seaview × Balearic Islands <sup>a</sup>	0.057	0.041	0.077	0.047
seaview × Costa del Sol <sup>a</sup>	-0.026	0.050	-0.006	0.054
seaview × French Riviera <sup>a</sup>	-0.023	0.043	0.029	0.049
seaview × Italian Riviera <sup>a</sup>	0.002	0.046	0.017	0.054
seaview × Sardinia <sup>a</sup>	0.007	0.045	0.042	0.056
seaview × Cisily <sup>a</sup>	-0.026	0.042	-0.006	0.047
seaview × Greek Islands <sup>a</sup>	-0.043	0.041	-0.063	0.044
seaview × Antalya <sup>a</sup>	-0.049	0.047	-0.038	0.051
constant	4.318	0.019	4.078	0.023
R <sup>2</sup>	0.65		0.60	
No of observations	2819		2406	

\*, \*\* Significant at 5% and 1% respectively.

<sup>a</sup> Dummy variable of 'seaview' multiplied by the dummy for each region. The reference region is Cyprus.

<sup>b</sup> Robust Standard Error.

variables are negative and significant and they range around 10% (the coefficients range between -0.08 and -0.13) less in price than the price of a room with no view specification.

The price of rooms with breakfast or halfboard is higher than that of rooms without them in both seasons. A non-refundable room reservation is offered in these regions for a price that is 16% less than that of a room with a refundable policy. Each additional person in a room increases its price by over 20%. There are significant differences between types of rooms. The price of rooms categorized as deluxe, superior suite and villa is higher by about 11%, 15% and 64%, respectively, than that of a standard room in both seasons. The prices of rooms defined as suite, apartment, studio or bungalow are not significantly different from the price of a standard room.

#### 5. Summary and conclusions

A hedonic price model was employed to estimate the value of a sea view from hotels around the Mediterranean Sea. The model's parameters were estimated using fixed effects regression. The estimated results indicated that a room with a sea view is valued higher than a room without a view. However, a view of the sea from only the side of the balcony was not enough to accrue additional value. Moreover, no significant difference, in terms of percent change, was found between regions or seasons. These findings lend support to the notion that the view of the Mediterranean is equally valued in all regions. These findings can be useful information for hotel managers in forming the pricing strategy of their rooms. For investors in the hotel industry these results provide information needed in the business plan stage with regards to hotel design. Due to the difference in pricing of rooms with a sea view and rooms without, the structure of the hotel itself can determine its profitability and not only its proximity to the beach.

Other views from hotel rooms, such as a city or garden view, are considered inferior in these regions and are valued significantly less than rooms with no specification of view. This would not be the case in hotels located in cities where the main attraction is the city itself and a city view is considered desirable. This result probably reflects the fact that the city itself in these resorts is unattractive, to say the least. It is located behind the hotel strip and it functions as a back stage, while the front stage is the beach. This aesthetic inferiority is reflected in the lower prices of rooms with city or garden views. The fact that the city view is specifically mentioned in [Booking.com](#) strengthens the observation that this view is inferior and thus guests feel that they have to be compensated for it by the lower price.

To evaluate the total revenues that hotels in the studied regions manage to charge for a view of the Mediterranean, the exact number of rooms with a sea view sold in a year's time in hotels around the Mediterranean is needed. This is a number which is difficult to pin down and thus the total value cannot be estimated without strong assumptions. However, it should be noted that the total extra welfare accrued by the hotels comes at a cost, which falls on the local residents. The hotels that are built along the beach usually block the view from the local residents. Thus it can be said that this extra welfare is the value of the utility taken from the locals and exported to tourists who pay the hotels for it. This loss of welfare for the local population is reflected in the prices of their housing, in the same way that the view is reflected in the prices of hotel rooms. If the hotel existed before a local resident moves into his or her house, then the lack of a sea view is imputed in the price of the newly bought house. However, when a new hotel is built and it blocks the view for an existing house, than that house's re-sale value would probably decrease. In this case, the decrease in the housing price reflects the loss of welfare and the local residents should be compensated accordingly.

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