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Weekend vs. midweek stays: Modelling hotel room rates in a small market☆,☆☆

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ABSTRACT

Using a hedonic model, we estimate the willingness to pay for different hotel characteristics for a small market environment. We uniquely collected a data set from a meta-booking engine including their detailed customer review ratings compiled from numerous individual hotel search engines. We argue that meta-search engines are well suited to gather prices to be used in hedonic models. In our estimation, we distinguish hedonic models for single room stays during the week potentially relevant for business travellers and double room stays during the weekend intended for leisure. Important determinants of hotel room prices are popularity ratings (derived from customer reviews), the hotel star rating, weeks of advance booking, and certain hotel characteristics such as express checkout, room service, or Internet access. A number of important characteristics such as wellness offers or wireless Internet in the rooms are insignificant pointing to the conclusion that these may be regarded as standard attributes and do not fetch additional economic value in terms of higher consumer willingness to pay.

1. Introduction

Since more and more travellers arrange trips online, convenient hotel accommodation options are nowadays a standard result of any location specific Internet search. When travellers look specifically for a hotel room at a desired location, they often try to identify particular hotel characteristics that are essential to them, such as distance from points of interest, Internet access, service quality, room features and so on. Moreover, business travellers staying during the week will have different hotel room needs relative to leisure travellers or those staying during the weekend. Online accommodation search engines usually provide numerous options to filter the search outcome in order to help individual travellers choose the optimal place to stay given their desired hotel features. The filtering of search results can be done according to the number of hotel stars, the price range, the distance from the city centre or train station, or customer reviews which may be translated into an online popularity rating. Moreover, the possibility to list accommodation search outcomes according to price per night, distance away from points of interest or popularity ratings will help travellers to quickly identify what they are looking for according to their preferences.

In this paper, we use location specific data generated through an online meta-booking engine for hotel rooms (trivago.com) in order to determine the willingness to pay for single and double room stays with particular hotel and/or room characteristics. In recent years, hedonic pricing models have been increasingly applied in tourism and hospitality research. We contribute to this literature in two unique ways. First, we use an online meta-search booking engine to generate a unique data set for hotel room rates in a small market specifying weekend and midweek stays and different advance booking times. By restricting our attention to a three month period in the short-run we avoid seasonality effects and can focus our attention to the location and hotel specific aspects. Second, we examine a unique quality related data feature in our empirical model which serves as an important factor for online customers looking to book a hotel room in the short-run. This data features comprises a comprehensive multi-source popularity score for hotels compiling quality ratings from 19 different online booking sites.

We argue that the way our data set was generated is unique and particularly applicable for a hedonic pricing models. It adds significantly to the current literature because it allows us to find the lowest price for a particular hotel room with a specific set of characteristics which according to the underlying economic theory for hedonic models is the relevant price to consider when consumers are to maximize utility. Studies compiling prices published in catalogues or derived from individual online sites of tour operators may not necessarily reflect the lowest price that the room is available in the short-run.

We generated our data set starting from the premise that a customer is looking to book a single room midweek stay (or a double

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room weekend stay) in a specific hotel market and with a given advance booking period at the lowest price possible. In this way, the customer is able to trade-off the value of specific features offered by the hotels in the market without paying extra for an identical set of features at a higher priced hotel. Moreover, the meta-booking engine generates a comprehensive multi-source online rating based on customer reviews provided across the contributing search engines. This online rating is calculated as a weighted average score on a 100-point scale providing for an easy to use reference in addition to the common hotel star rating. This online rating is highly significant but the willingness to pay for another point is relatively low (between 0.7% and 2.5%).

2. Literature

In the recent tourism and hospitality research, we increasingly observe the use of hedonic pricing models, many of which are applied to hotel room prices. Beyond hotel rooms, hedonic studies in tourism include innovative applications to ski lift ticket prices (Falk, 2008; Pawlowski and Pawlowski, 2010), bed and breakfast amenity prices (Monty and Skidmore, 2003), pricing related to rural tourism (Vanslembrouck et al., 2005; Fleischer and Tchetchik, 2005) or restaurants (Gergaud et al., 2007).

In a recent paper, Zhang et al. (2011) examine how site and situation factors may affect prices for hotel rooms in Beijing. Their paper includes a comprehensive reference table of empirical evidence related to the analysis of hotel room pricing using different research methods (i.e. consumer behaviour analysis, conjoint analysis, hedonic price analysis) as well as relevant site and situation factors. A similar table of reference is provided by Abrate et al. (2011) contrasting existing hedonic studies according to physical and site specific attributes as well as reputation based quality signals used.

We add to the current literature by using a data set generated through an online meta-booking engine for hotel rooms (trivago.com) and we examine a unique data feature which comprises a comprehensive multiple-source customer review score for hotels compiling quality ratings from the 19 different online booking sites relevant in our market. To our knowledge, the only two other papers examine data with detailed location-specific online search results and customer review indicators related to hotel room prices and specific hotel attributes. The first is a computer science paper by Li et al. (2008) who employ an online generated data set from tripadvisor.com and apply a hedonic model to calculate a residual "value for the money" estimate for hotels located throughout the United States. However, tripadvisor.com is not a full-fledged meta search engine ranking hotel prices by vendors although it also uses multiple-source customer ratings for its popularity ranking. The second is by Andersson (2010) who estimates a hedonic model for Singapore's hotel market using online search results and customer reviews from a single website (hoteltravel.com).

A number of other recent contributions employ hedonic models to estimate implicit prices of hotel rooms, but they all differ from our model with respect to how the data set was generated and if multiple-source customer reviews are used. Many studies employ only a single website to collect prices and do not include a customer review score or ranking. Examples include Chen and Rothschild (2010) who analyse data for Taipei, Thrane (2007) who examines room rates for Oslo, or Kuminoff et al. (2010) who focus on environmental concerns and find that U.S. travellers are willing to pay a premium between $9 and $26 for certified "green" hotels.

Early hedonic applications to hotel room pricing are papers by White and Mulligan (2002) who examine room rates for budget hotels and motels belonging to certain national chains. Espinet et al. (2003) examine tour operator prices to estimate implicit prices for the attributes of holiday hotels in Spain. Thrane (2005) examines the prices for sun-and-beach package tours to the Canary Islands offered by Norwegian tour operators in a highly concentrated market environment paying particular reference to the endogeneity problem related to the hotel star ratings. To address the skewed nature of hotel prices in particular at the higher and lower end of the distribution, Hung et al. (2010) employ quantile regression analysis to estimate pricing determinants for tourist hotels in Taiwan.

Other hedonic studies have looked at time and location-related effects. Juaneda et al. (2011) study time and location components of prices for hotel rooms and apartments in Spanish resorts and conclude that lower seasonality effects but higher location variability can be observed for hotels relative to apartments. Raya (2011) looks at how hotel room prices change over time and finds that the largest marginal effects are based on location, hotel category and market share. Lee and Jang (2011) examine location-based premiums for hotels in proximity to U.S. airports.

3. Model and data

Rosen (1974) is widely credited for developing a formal model of hedonic prices arguing that goods (or services) can be described as composites of different attributes or characteristics. Subsequently, a diverse range of applications have been developed in order to derive implicit prices for attributes of consumption goods, hedonic property values due to environmental amenities or hedonic wages for different jobs or working conditions.

For hotel rooms, applicable product characteristics include the hotel star rating, customer ratings or reviews, room attributes (e.g. cable TV, Internet access, minibar, iron, etc.) or hotel services (e.g. express checkout, room service, hotel safe, hotel bar, etc.). The composite good "hotel room" has a price, but there is no explicit prices for each characteristic that compose this good. It is assumed that hotel customers maximize their utility. Constraints in the utility maximization problem are given by income, prices including taxes, as well as preferences for other goods. Transactions in the market reveal information on buyer preferences with respect to hotel rooms as a composite good, i.e. with respect to characteristics of rooms booked in a real market setting. Hedonic prices for a specific characteristic are identified through a comparison of similar goods that are identical except for that particular characteristic, i.e. to use systematic price variations that can be explained by specific room or hotel characteristics.

Hedonic models are based on the idea that the observed price for a product (or service) is the sum of unobserved prices for its individual attributes or characteristics and to estimate implicit prices for these attributes or characteristics. The hedonic function $P(z)$ describes how room prices change when attributes or characteristics of the room or hotel change. $P(.)$ is the room price per night (or expenditures per room and night) and z is a vector of hotel room attributes. In Fig. 1, indifference curves U define consumer expenditures on accommodation and the level of attribute z_j (at given levels of income and attribute levels z_i where $i \neq j$). Indifference curves below the hedonic price function are not affordable. Similarly, iso-profit curves π define constant room profits and the level of attribute z_j (at given attribute levels z_i where $i \neq j$). The partial of the hedonic function $\partial P/\partial z_j$ defines the implicit price of attribute z_j.

At any point along the hedonic function, for a change in room attribute z_j, the marginal willingness to pay for buyers (and marginal willingness to accept for sellers) is given by the partial derivative of the hedonic function with respect to z_j.

Critical underlying assumptions and to some extend also limitations of the hedonic model are that buyers are assumed to have perfect information and are able to observe all room/hotel

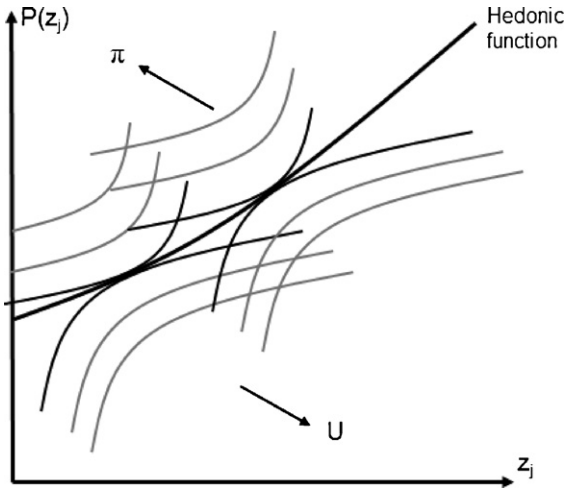

Fig. 1. Hedonic model.

attributes and may select the combination of features they prefer. Given that we collected our data set using a meta-booking engine that in our case is capable of combining online search results from 19 different online booking sites, any customer will get very detailed and comprehensive information of the hotel market that they are researching and will at least be able to observe all room/hotel attributes that are available in this market.

The other critical and limiting assumption of the hedonic model is that potential buyers are able to purchase any combination of attributes they wish or that they can find the combination of desired attributes. Again, given the comprehensive nature of the information provided, the ease with which customers can access any relevant information and the resulting detail in our data collection effort, we are confident that this preconditionis reasonably met by our data set, even though we apply it to a relatively small-sized market.

The online meta-booking engine trivago.com was used to define a small geographic market environment (10 km vicinity of Bolzano) as well as the location of the hotel within the market (distance from the city centre). Unlike Hung et al. (2010) who run a quantile regression analysis due to a highly skewed price distribution, we observe a normal distribution of hotel prices in this market over the time period analysed. Short-run time specific pricing attributes are related to the time frame of advance booking which is restricted to a 12-week period to eliminate any seasonality effects. Quality based hotel or room characteristics are related to the common hotel star rating as well as to the comprehensive multiple-source popularity score rating for hotels on trivago.com, which in our market environment compiles quality ratings from 19 different online booking sites. Moreover, we identify a number of hotel or room characteristics that may be of particular relevance for business travellers staying mid-week (e.g. Internet access, business centre, express checkout) and weekend leisure travellers (e.g. room service, cable TV).

The data set was collected during August 2010 for two-night stays in Bolzano (between late August and mid-November 2010). During this time no irregular period with unusual demand has disturbed observed market prices. In contrast to Chen and Rothschild (2010), we observe that the price differences between the different online booking sites checked by our meta-search are not negligible, but may range up to 30%. Thus, utilizing a meta-search we avoid any bias that may be introduced by using only an individual booking site to collect the data set. The overall presence of the hotel/room characteristics which are significant in the any of the three models is follows: express checkout 26.5%, minibar 56.7%, business centre access 25.4%, room service 49.8%, Internet access 79.4%, hotel bar 94%, hotel safe 65.8%, cable TV 24%, and iron in the room 5.3%. Descriptive statistics for all other non-dummy variables are listed in Table 1.

The booking sites used in the sample have been checked so that no hidden fees or service charges would inflate listed prices. Breakfast is a standard feature included for all hotels in this data set. Different rates with different terms for the same room are possible from a given booking site. In this case the lowest price for the room is used given the pre-defined search conditions, i.e. 2-day mid-week or weekend stay with a given advance booking period. This is in line with the premise set out earlier, i.e. that customers are looking to book a single room midweek stay (or a double room weekend stay) in a specific hotel market and with a given advance booking period at the lowest price possible.

In theory, our meta-search yields the minimum price available given the bundle of attributes z offered by the hotel or room and thus will correspond to the appropriate marginal willingness to pay for buyers given by the partial derivative of the hedonic function with respect to attribute z_j. The consumer rating (points) generated by the meta-search is obtained from up to 19 different booking engines and translated into a weighted popularity score for each hotel (100 points is the maximum). The well-known hotel star rating ranges between 2 and 4 stars in our sample. To avoid seasonality effects, the advance booking time was set between 4 days and 12 weeks as indicated above. We infer that midweek single room rates are more relevant for business travellers while weekend double room rates are likely to be booked by leisure travellers.

Following Rosen (1974) and other authors in tourism and hospitality research, we employ a log-linear rather than a linear specification for the hedonic function. Three separate regression models were estimated. Model 1 analyses the overall market situation for the any day/room sample. Models 2 and 3 will differentiate specific midweek effects associated with single room rates (i.e. the single weekday sample for business travel) and weekend effects associated with double room rates (i.e. the double weekend sample for leisure travel).

The following equation represents the general hedonic model estimated in this empirical application:

$$\ln P_i = \alpha + \beta_1 z_{1i} + \beta_2 z_{2i} + \ldots + \beta_k z_{ki} + u_i \quad (1)$$

where P_i are the room prices per night over a two night stay, z_{ki} are the associated hotel/room characteristics and the coefficients β_k are implicit prices for the hotel/room attributes included in our final model. Many authors suggest that multicollinearity may be a problem in estimating hedonic pricing models. Similar to Chen and Rothschild (2010), we checked in our data set and calculated variance inflation factors (VIFs) which turned out to be well below the critical values as suggested by Kennedy (2008). Thus, we may conclude that multicollinearity is not present.

4. Results and discussion

Table 2 reports the estimation results including standard errors and t-values for the three models listing only those qualitative hotel/room characteristics that are significant in at least one of the models analysed. In terms of adjusted R^2, the models' explanatory power is high, explaining between 84 and 90% of the variation in room prices.

Turning to the results presented in Table 2, we note that important determinants of hotel room prices are the hotel star rating, the popularity ratings (derived from online customer reviews), hotel location in terms of distance from the city centre, the period of advance booking, and particular hotel characteristics such as the availability of services such as express checkout, room service, or

Table 1
Descriptive statistics.

		Count	Mean	S.D.	Min.	Max.
Any day/room	Price	911	101.40	29.6	41	177
	Hotel stars	911	3.45	0.59	2	4
	Rating (points)	911	80.5	5.2	68	90
	Distance (km)	911	2.38	2.52	0	8.4
	Advance (weeks)	911	6.50	3.51	0.57	12.0
Single weekday	Price	467	81.76	17.9	41	163
	Hotel stars	467	3.42	0.59	2	4
	Rating (points)	467	80.4	5.1	68	90
	Distance (km)	467	2.32	2.51	0	8.4
	Advance (weeks)	467	6.27	3.47	0.57	11.6
Double weekend	Price	444	122.14	25.0	63	177
	Hotel stars	444	3.47	0.59	2	4
	Rating (points)	444	80.6	5.2	68	90
	Distance (km)	444	2.43	2.54	0	8.4
	Advance (weeks)	444	6.74	3.55	1.0	12.0

Data source: www.trivago.com (2010).

Internet access. A number of characteristics such as wellness offers or wireless Internet in the room are insignificant and thus not included in Table 2.

Since our independent variables are both 'quantitative' and 'qualitative' in nature, we need to make appropriate adjustments for all dummy variable coefficients estimated with a log-linear regression model in order to obtain an economically useful interpretation in percentage terms (Halvorsen and Palmquist, 1980). Table 3 reports the dollar value equivalents of the estimated coefficients for a marginal change in the quantitative variables as well as for the coefficients of the qualitative attributes which we obtained by multiplying the derived percentage term with the average room rate for the applicable sample.

First note that on average, that the willingness to pay for a double room weekend rate is about 48% or 49€ higher than a single room weekday rate. Also note that the hotel star rating is the most significant variable affecting room prices in all three models. Another hotel star rating would add about 21€ to the predicted rate for a single room during the week and over 27€ to the predicted price for a double room during the weekend. Although the online rating based on customer reviews is also highly significant, its overall contribution to predicted room prices is low. The model predicts that another point in the online rating will add about 2€ to the single room rate but only 54 cents for a double room. We interpret this result to say that mobile business travellers making online bookings and thus are also likely to contribute to such online ratings are also willing to pay a higher premium for another point obtained in such ratings than leisure travellers who may rely more on the traditional hotel star rating.

Distance to the city centre is another important variable contributing to the willingness to pay for a hotel room in Bolzano. As expected, the further the hotel is away from the attractions of the city centre, the lower the predicted room rate. Another distance kilometre will lower the predicted price by 1.50€ in the any day/room model. The estimated coefficient is much higher for double room weekend rates suggesting that leisure travellers place a higher value on relative closeness to their hotel.

We included advance booking time (in weeks prior to the stay) as an explanatory variable in the model. The estimated coefficients confirm our expectations related to this variable. First, that it contributes negatively to predicted room rates and second that the discount for another week of prior booking is larger for midweek

Table 2
Estimation results [log(price) = dependent variable].

Parameter	Model 1 Any day/room (n = 911)		Model 2 Single weekday (n = 467)		Model 3 Double weekend (n = 444)	
	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
Constant	2.427*** (.108)	22.4	1.629*** (.140)	11.7	3.637*** (.133)	27.4
Hotel stars	0.299*** (.009)	33.5	0.255*** (.011)	23.2	0.338*** (.011)	30.4
Online rating	0.016*** (.001)	13.9	0.025*** (.0015)	17.1	0.007*** (.0014)	4.69
Distance	−0.018*** (.002)	−8.26	−0.010*** (.003)	−3.52	−0.028*** (.003)	−10.2
Advance booking	−0.006*** (.001)	−6.40	−0.007*** (.0012)	−5.69	−0.005*** (.001)	−4.24
Double Room	0.393*** (.007)	59.4	–	–	–	–
Express checkout	0.156*** (.011)	14.4	0.155*** (.013)	12.0	0.154*** (.013)	11.2
Business centre	−0.108*** (.012)	−9.10	−0.046*** (.014)	−3.19	−0.167*** (.015)	−11.3
Internet access	−0.263*** (.011)	−23.9	−0.218*** (.014)	−16.1	−0.301*** (.014)	−21.7
Room service	−0.123*** (.013)	−9.33	−0.072*** (.017)	−4.29	−0.169*** (.016)	−10.3
Hotel bar	−0.203*** (.020)	−10.4	−0.095*** (.024)	−3.91	−0.320*** (.024)	−13.1
Minibar	0.075*** (.014)	5.49	0.080*** (.017)	4.57	0.069*** (.017)	4.09
Cable TV	0.034** (.012)	2.80	−0.028* (.015)	−1.84	0.091*** (.015)	6.08
Hotel safe	0.182*** (.010)	18.9	0.198*** (.012)	16.9	0.167*** (.012)	14.0
Iron in room	0.022 (.022)	1.03	0.137*** (.028)	4.98	−0.094*** (.027)	−3.54
F-Stat.	555.9***		239.2***		187.7***	
Adj. R^2	89.5		86.9		84.6	

Source: own calculation.
* $p = 0.1$.
** $p = 0.05$
*** $p = 0.01$.

Table 3
Estimation results [log(price) = dependent variable].

Parameter	Model 1 Any day/room			Model 2 Single weekday			Model 3 Double weekend		
	Coefficient	%	€-Value	Coefficient	%	€-Value	Coefficient	%	€-Value
Hotel stars	0.299***	–	24.42	0.255***	–	20.82	0.338***	–	27.63
Online rating	0.016***	–	1.31	0.025***	–	2.07	0.007***	–	0.54
Distance	−0.018***	–	−1.50	−0.010***	–	−0.81	−0.028***	–	−2.26
Advance booking	−0.006***	–	−0.49	−0.007***	–	−0.54	−0.005***	–	−0.40
Double room	0.393***	48.1%	48.79	–	–	–	–	–	–
Express checkout	0.156***	16.9%	17.09	0.155***	16.7%	13.69	0.154***	16.7%	20.40
Business centre	−0.108***	−10.2%	−10.34	−0.046***	−4.5%	−3.69	−0.167***	−15.3%	−18.75
Internet access	−0.263***	−23.1%	−23.44	−0.218***	−19.6%	−16.04	−0.301***	−26.0%	−31.75
Room service	−0.123***	−11.6%	−11.76	−0.072***	−7.0%	−5.69	−0.169***	−15.6%	−19.02
Hotel bar	−0.203***	−18.4%	−18.64	−0.095***	−9.1%	−7.42	−0.320***	−27.4%	−33.41
Minibar	0.075***	7.7%	7.84	0.080***	8.3%	6.78	0.069***	7.1%	8.69
Cable TV	0.034**	3.4%	3.50	−0.028*	−2.8%	−2.25	0.091***	9.5%	11.63
Hotel safe	0.182***	19.9%	20.19	0.198***	21.9%	17.91	0.167***	18.2%	22.22
Iron in room	0.022	2.3%	2.28	0.137***	14.7%	12.02	−0.094***	−9.0%	−10.98

Source: Own Calculation.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

single room stays as business travellers are expected to be less price sensitive than leisure travellers searching for weekend double room rates. However, in monetary terms, the discount is small and equal to 54 cents for another week of prior booking a midweek single room and 40 cents for another week of prior booking a double room during the weekend.

Next we turn to the qualitative factors included in the model characterizing the presence of specific hotel or room attributes. The availability of express checkout services will contribute positively to expected room prices with an identical premium of 16.7% for both single room midweek and double room weekend rates. The presence of a business centre in the hotel will contribute negatively to predicted room rates even for business-related midweek single room rates. In an age of mobile technology and laptop computers, business centres may become obsolete, which is a trend reflected in the results of this study. A similar conclusion may hold for Internet access services. In all three models, Internet access is negatively related to room rates, suggesting that customers do not value anymore such services given the availability of mobile Internet technology. In this context, we note again that the availability of wireless Internet access in the room was not significant.

Next we turn to amenity items like the availability of personal room service, hotel bars, or minibar access. Interestingly only the latter contributes positively to predicted room prices. There is no extra willingness to pay for room service even for leisure-related double room weekend rates. Travellers seem to prefer the scenic and culinary attractions of the city as opposed to staying and being served in their hotel rooms. The fact that there is a positive contribution of minibar access to both single room midweek and double room weekend rates seems to support this conclusion.

Access to cable TV contributes negatively to single room midweek rates (−2.8%) and positively to double room weekend rates (9.5%). An explanation for this may be that midweek business travellers discount cable TV access because of possible distractions or any time constraints to watch TV for entertainment reasons and the fact that mobile technology now enables them to gather news and information. In contrast, the availability of an iron in the room contributes positively to single room midweek rates (+14.7% or 12€) and negatively to double room weekend rates (−9% or 11€). Apparently, midweek business travellers booking single room rates value the convenience to iron their shirts as opposed to weekend leisure travellers who discount the inconvenience to have such a device in the room while on vacation.

Finally, the presence of a hotel safe (as opposed to room safe which is insignificant) for the purpose of heightened security of valuable personal belongings will contribute positively to both single room midweek and double room weekend rates (+22% and +18%, respectively).

5. Conclusions

In this paper, we estimate the willingness to pay for different hotel characteristics in a small city market. In contrast to previous studies, we have uniquely collected a data set using a meta-booking engine to define the market size, the location of the hotel within the market, related online customer review scores as well as different advance booking times. In particular, we stress the fact that meta-booking engines are particularly well suited to gather price data to be used for hedonic pricing models. This is so because it allows us to find the lowest price for a particular product or service with a given set of characteristics which according to the underlying hedonic theory is the relevant price to consider when consumers are assumed to maximize utility. Moreover, we argue that some of the limiting assumptions related to hedonic pricing models, i.e. that buyers have perfect information, are able to observe all product or service related attributes available, and are able to purchase any combination of attributes they wish are best supported by employing meta-search engine data. For consumers, this type of technology offers very detailed, easily accessible and comprehensive information about the hotel market that they are researching and enables them to observe all product (and/or service) attributes that are available. In turn, it also renders a more valid estimation of implicit prices. Establishing this result implies that in future hedonic applications more accurate results can be obtained when meta-search engine data is used.

In terms of the estimated coefficients, the hotel star rating is the most significant variable affecting room prices adding about 21€ to the predicted rate for a single room during the week and over 27€ to the predicted price for a double room during the weekend. Although the effect of the multi-source online ratings based on customer reviews is highly significant, its overall contribution to predicted room prices is low but somewhat higher for midweek stays. We interpret this result to say that business travellers are willing to pay a higher premium for another point obtained in online ratings as they are likely to make online bookings and therefore also likely to contribute to such rating systems. In contrast, leisure travellers continue to rely relatively more on the traditional

hotel star rating system. Distance from the centre also contributes significantly to the willingness to pay for a hotel room. The results suggest that leisure travellers place a higher value on relative closeness. The advance booking period is significant and contributes negatively to predicted room rates, but since business travellers are known to be less price sensitive, the discount for another week of prior booking is larger for midweek single room rates. Thus, differentiating between mid-week and weekend stays and relating it to business vs. leisure travel also allows to confirm that business travel is regarded less price sensitive. Finally, a number of room characteristics such as wellness offers or wireless Internet in the rooms are insignificant pointing to the conclusion that these may be regarded as standard attributes and do not fetch additional economic value in terms of higher consumer willingness to pay.

The main limitations of our study are related to the small-sized market being analysed. A larger sample size with more hotels as well as more applicable individual booking sites to be compared would clearly raise the accurateness of the generalizable results of the study. Thus, further research on this topic should look at a larger-sized hotel market using meta-search engine data. Moreover, the data generation technique could also be tested in relation to the results of existing studies, i.e. resampling data for market environments that have been studied using meta-search engine data. Because of the theoretical appropriateness and detail of the data collection efforts involved, we are confident that such an application would yield very interesting further results and provide valuable insights to ordinary consumers and hospitality professionals alike.

References

Abrate, G., Capriello, A., Fraquelli, G., 2011. When quality signals talk: evidence from the Turin hotel industry. Tourism Management 32, 912–921.

Andersson, D.E., 2010. Hotel attributes and hedonic prices: an analysis of Internet-based trans-actions in Singapore's market for hotel rooms. The Annals of Regional Science 44 (2), 229–240.

Chen, C., Rothschild, R., 2010. An application of hedonic pricing analysis to the case of hotel rooms in Taipei. Tourism Economics 16, 685–694.

Espinet, J.M., Saez, M., Coenders, G., Fluvià, M., 2003. Effect on prices of the attributes of holiday hotels: a hedonic prices approach. Tourism Economics 9, 165–177.

Falk, M., 2008. A hedonic price model for ski lift tickets. Tourism Management 29, 1172–1184.

Fleischer, A., Tchetchik, A., 2005. Does rural tourism benefit from agriculture? Tourism Management 26, 493–501.

Gergaud, O., Montano Guzman, L., Verardic, V., 2007. Stardust over Paris gastronomic restaurants. Journal of Wine Economics 2 (1), 24–39.

Halvorsen, R., Palmquist, R., 1980. The interpretation of dummy variables in semi-logarithmic equations. American Economic Review 70, 474–475.

Hung, W., Shang, J., Wang, F., 2010. Pricing determinants in the hotel industry: quantile regression analysis. International Journal of Hospitality Management 29, 378–384.

Juaneda, C., Raya, J.M., Sastre, F., 2011. Pricing the time and location of a stay at a hotel or apartment. Tourism Economics 17 (2), 321–338.

Kennedy, P., 2008. A Guide to Econometrics, 6th ed. John Wiley & Sons.

Kuminoff, N., Zhang, C., Rudi, J., 2010. Are travelers willing to pay a premium to stay at a "green" hotel? Agricultural and Resource Economics Review 39 (3), 468–484.

Lee, S.K., Jang, S., 2011. Room rates of U.S. airport hotels: examining the dual effects of proximities. Journal of Travel Research 50 (2), 186–197.

Li, B., Ghose, A., Ipeirotis, P., 2008. Stay elsewhere? Improving local search for hotels using econometric modeling and image classification. In: Proceedings of the 11th International Workshop on Web and Databases, Vancouver, Canada.

Monty, B., Skidmore, M., 2003. Hedonic pricing and willingness to pay for bed and breakfast amenities in Southeast Wisconsin. Journal of Travel Research 42 (2), 195–199.

Pawlowski, T., Pawlowski, C., 2010. The monetary value of winter sport services in the european alps. IASE Working Paper Series, Paper No. 10-03.

Raya, J.M., 2011. The effect of time on hotel pricing strategy. Applied Economics Letters 18 (13), 1201–1205.

Rosen, S., 1974. Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. Journal of Political Economy 82, 34–55.

Thrane, C., 2005. Hedonic price models and sun-and-beachpackage tours: the Norwegian case. Journal of Travel Research 43 (3), 302–308.

Thrane, C., 2007. Examining the determinants of room rates for hotels in capital cities: the Oslo experience. Journal of Revenue and Pricing Management (5), 315–323.

Vanslembrouck, I., van Huylenbroeck, G., van Meensel, J., 2005. Impact of agriculture on rural tourism: a hedonic pricing approach. Journal of Agricultural Economics 56 (1), 17–30.

White, P.J., Mulligan, G.F., 2002. Hedonic estimates of lodging rates in the four corners regions. The Professional Geographer 54 (4), 533–543.

Zhang, H., Zhang, J., Lu, S., Cheng, S., Zhang, J., 2011. Modelling hotel room price with geographically weighted regression. International Journal of Hospitality Management 30, 1036–1043.