

**DETERMINING ROOM RATES IN SWEDEN - A HEDONIC PRICES  
APPROACH OF THE STOCKHOLM HOTEL MARKET**

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## **Abstract**

Based on the hedonic pricing method, this paper investigates the way in which room rates are determined. I identify ten significant room rate determinants in the Swedish capital city of Stockholm. Two separate models for double rooms are estimated; one for the business week and one for the weekend. Initially, nineteen variables were considered, but since nine of them were shown to be jointly redundant, the model was narrowed down. Some results coincide with previous research by Thrane (2006) and Chen and Rothschild (2010). For example, centrally located rooms are much more expensive (28.4 percent during business week and 38.0 percent during the weekend), *ceteris paribus*. On the other hand, some variables have previously shown to be significant, nevertheless turned out to be insignificant in the case of Stockholm. Examples of such variables are the availability of a minibar or a flatscreen TV. Multicollinearity was not shown to be an issue, however, both models suffered from omitted variables. While the lion's share of all price variations could be described by the model(s), some significant variables were not captured. Even so, the findings of the paper should be valuable especially for those operating in the Stockholm hotel industry as useful tools are provided. Hence, the paper concludes with a discussion regarding some possible policy implications.

**Keywords** *hedonic prices; hotel market; room rates; Stockholm*

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## 1. Introduction

Hotel pricing is a complex phenomenon. As frequent travelers surely have noticed, accommodation costs vary enormously across hotels and markets. In the Swedish capital city of Stockholm, standard room rates for a one-night stay range between 470 SEK and 2,600 SEK for a random weekday in May. During the weekend, prices vary less as upscale hotels usually lower their prices. Now, the maximum price is below 1,800 SEK and the room that was 2,600 SEK is now 1,250 SEK. While the difference is not as whopping as in poorer parts of the world, where room rates may range between a few dollars per night to even thousands of dollars, it is definitely not negligible.

The perception is that guests get what they pay for. When forking out more money, guests normally expect something extra in return, *ceteris paribus*. The overall hotel experience will, presumably, in some sense differ depending on the given price. Evidently prices vary greatly, but why really? What is it that makes people want to pay many times more than they could have for something as basic as a hotel room? Maybe guests are looking for something else than just a good night's sleep. By analyzing the case of the Stockholm hotel market, I intend to identify a set of possible room rate determinants.

Research on hotel pricing has been carried out in different places throughout the world and in a somewhat similar fashion too. For example, Thrane (2006) studies room rates for a one-night stay in the Norwegian capital of Oslo, while Chen and Rothschild (2010) makes a similar approach to the case of Taipei, Taiwan. Both of them are based on the hedonic pricing method (which is later reviewed in this paper), but the results are not completely consistent. Chen and Rothschild (2010) finds that the availability of an LED TV strongly causes room rates to increase in Taipei, while complimentary car parking seems to heavily affect room rates in Oslo, according to Thrane (2006).

In the fashion of these papers and their common predecessor, I will in this paper perform a similar analysis, but of the less-researched Swedish hotel market. As far as I am concerned, similar research has not yet been carried out in Sweden. Since findings from Norway and Taiwan necessarily do not need to coincide with the case of Sweden, such an analysis is undoubtedly justified. Additionally, identifying room rate determinants is particularly interesting for those operating in the hotel industry. By using results from academic research, hotel managers can make sure that their prices are in line with the market's expectations.

Considering that the determinants of room rates could be infinite, covering them all is a hard thing to do. Consequently, only a limited set of variables will be considered in the analysis. Variables that are highly unlikely to affect prices will be excluded a priori. Based on basic microeconomic theory and previous research, I will test for nineteen variables that either theoretically or empirically (or both) are said to influence room rates. I argue that variables are either:

- *In-room variables*, such as the availability of a minibar or complimentary Wi-Fi,
- *Property variables*, such as the availability of a restaurant, or
- *Quality variables*, such as hotel rating or international chain affiliation.

The variables will be defined more explicitly later. Moreover, uncertainty upon booking may also influence prices and is therefore considered a variable of its own. Finally, because prices vary within the week, it is also interesting to investigate whether or not results from a weekday sample are consistent with results from a weekend sample. Since the purpose of the paper is to understand the way in which room rates are determined, the following research questions are established:

- 1) How are room rates affected by in-room/property variables?  
quality?  
uncertainty?
- 2) Are the estimates time consistent; do they differ between weekdays and the weekend?

### **1.1. Outline of the Paper**

The paper opens with a theoretical section that deals with some of the concepts that are essential to understand for this type of analysis, e.g. the meaning of hedonic prices. This is followed up by a methodology section where the relevant econometrics is described in detail, along with an overview of the data collection process. Some inevitable limitations are also mentioned here. Subsequently, the results are presented in chapter 4, including some remarks regarding a number of diagnostic tests. In chapter 5, the outcomes are interpreted and analyzed more deeply. Some possible policy implications are discussed, which should be particularly interesting for those active in the hotel industry. Lastly, the paper is summarized in chapter 6.

## 2. Theoretical Framework

Before going any further, the reader needs to familiarize herself with some theoretical concepts. Thus, this section begins with an explanation of hedonic prices and how it can be used trying to determine room rates in Sweden (or in any location). Finally, I review some available empirics and basic microeconomics to identify possible candidates of room rate-determinants.

### 2.1. The Hedonic Pricing Method

A method that can be used to identify the variables affecting room rates is the hedonic pricing method. The concept of hedonic pricing was first discussed by Rosen (1974). He suggests that "*goods are valued for their utility-bearing attributes or characteristics*". Note that the notion *hedonic* literally means *pleasure-related*<sup>2</sup>. Commonly, this phenomenon is used in real estate economics due to the heterogeneous nature of houses. It is being used to determine the exact value of a house with respect to a set of house-specific variables, like the number of bedrooms or bathrooms. For example, Anglin and Gençay (1996) show that the number of bedrooms, bathrooms and the lot size of the property all cause house prices to increase. Similarly, the same method has been used to explain prices of Bordeaux wines (Combris et. al, 1997), mobile phones in Iran (Mostafavi et. al, 2013), and even prostitutes' services in the United Kingdom (Moffatt and Peters, 2004).

Hotel pricing is assumed to coincide with the hedonic pricing hypothesis. The method has been used before in different places of the world. Due to its great amount of references, Espinet et. al (2003) seems to be a prominent example. This paper provides a hedonic approach to holiday hotels in Spain. Assuming that results from Spain will not coincide with each and every location of the world, similar research have been carried out in for example Taipei (Chen and Rothschild, 2010) and Oslo (Thrane, 2006). So far, there seems to be no similar research for Sweden.

When using the hedonic pricing method, each hotel room is described by a set of  $n$  characteristics,  $\mathbf{R} = (r_1, r_2, \dots, r_n)$ , where each room has a market price associated with  $\mathbf{R}$  so that  $p(\mathbf{R}) = p(r_1, r_2, \dots, r_n)$ . Theoretically, there is no limit to the number of characteristics, i.e.  $n \rightarrow \infty$ . However, in some sense, there are some utility-bearing attributes that are similar across rooms. For example, a standard room normally consists of at least a bed and a lockable door.

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<sup>2</sup> <http://economics.about.com/od/termsbeginningwithh/g/hedonic.htm>

Consequently, I will leave out such variables because, due to their basic nature, they are unlikely to differ significantly across hotels<sup>3</sup>. Instead, I will try to identify variables that definitely do differ across hotels and rooms. According to microeconomic theory and the previous research carried out on room rates, there exists a certain number of variables that are likely affect to a hotel's menu of prices. In the following part, section 2.2, I will go through some of most important ones.

## 2.2. Theoretical Variables that Might Affect Room Rates

### 2.2.1. Previous Research

In order to answer this paper's research questions properly, it is important to get an idea of what variables that should be considered in the first place. In table 1, I present a list of variables that have been considered by the above mentioned papers (Espinet et. al, 2003; Thrane, 2006, and Chen and Rothschild, 2010), along with the associated results. For any hesitation regarding the definitions of the variables, see the paragraphs on the next page.

**Table 1.** A schematic review of different variables that have been considered in previous research, along with their respective effects on room rates. Here, the variables are marked with ns (non-significant) whenever  $p < 0.05$ . In all regressions  $R^2 \approx 0.70$ .

Variable	Location	Effect
BATH	Taipei	ns
BAR	Taipei	+
BREAKFAST	Taipei	ns
BUSINESS	Taipei	ns
FITNESS	Taipei	+
HAIRDRY	Oslo	+
LOCATION	Taipei/Spain	-/ns
MINIBAR	Oslo	+
PARKFREE	Oslo	+
ROOMS	Spain	ns
RESTAURANT	Oslo	ns
ROOMSERV	Oslo	-
ROOMSIZE	Taipei	+
STAR	Taipei	ns
SWIM	Taipei/Oslo	ns/ns
TV	Taipei	+
WIFI	Taipei	+

<sup>3</sup> Neither of the prominent papers within the area have included such basic variables.

While some results are expected, some are not. According to these papers, the availability of a bar (BAR), a fitness center (FITNESS), a hair dryer (HAIRDRY), a minibar (MINIBAR), complimentary parking (PARKFREE), an LED TV (TV), as well as complimentary Internet access via Wi-Fi (WIFI) all cause prices to increase. In addition, the bigger the room is, the higher is the price (ROOMSIZE). All being utility-bearing attributes, this comes as no surprise. More surprisingly are the two variables that cause prices to fall; whether or not the property is located in the city center of Taipei (LOCATION) and the availability of room service (ROOMSERV). Chen and Rothschild argue that the reason hotel's are priced higher outside downtown Taipei is that "*hotels outside the city are associated with resorts*". While this certainly makes sense, it does not need to apply to Stockholm. Secondly, Thrane argues that by offering room service, this service should compensate for the slightly lower rates. On average, guests allegedly spend the difference (or more) on room service.

Many of the considered variables have no affect on prices, either because the coefficient is close to zero or non-significant; the availability of a private bathroom (BATH), complimentary breakfast (BREAKFAST), the availability of a business center (BUSINESS), the number of rooms (ROOMS), the availability of a restaurant (RESTAURANT), hotel rating (STAR), and the availability of a swimming pool (SWIM). From an economic perspective, some of these results are surprising. I argue that it needs further testing since some of the findings truly are in conflict with basic microeconomic theory.

### 2.2.2. *Basic Microeconomic Theory*

There are (at least) four microeconomic concepts that need to be reviewed in order to understand what results that are expected from this study. The first three are related to the previous findings, and explain why some of the results above are a bit puzzling: (i) marginal costs, (ii) quality, and (iii) economies of scale. The last one deals with a concept that has not been brought to attention in any of the papers I have studied, namely (iv) uncertainty.

#### (i) Marginal costs

Assuming that the Swedish hotel market is a case of perfect competition, it can be shown that the price must equal the hotel's marginal costs. Conventionally, a hotel's profit function is expressed as a function of sold hotel nights<sup>4</sup>. Because hotels are assumed to be profit-

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<sup>4</sup> Namely  $\pi(Q) = PQ - c(Q)$ , where P = price per night; c(Q) = cost function.

maximizing, the first derivative of the profit function with respect to sold nights (quantity) must be, due to first order conditions, zero. By some simple manipulations<sup>5</sup>, a solution where price equals the hotel's marginal costs arises.

Hence, the higher marginal costs the hotel has, the higher will the output price be. The interesting question then is: what forms a hotel's marginal costs? Generally, anything that increases when an extra room is sold. Because you cannot get something for nothing, hotels offering complimentary breakfast or free use of a swimming pool are assumed to have higher costs than those which do not. The more guests that arrive, the more staff is required, which leads to higher costs. Thus, the finding that complimentary breakfast and the availability of a swimming pool has no significant effect on room rates is in conflict with microeconomic theory.

## (ii) Quality

When it comes to quality, it is assumed that individuals' utility is increasing in quality, so that:

$$U'(\text{quality}) > 0$$

Less generally speaking, individuals will be more satisfied the more amenities and services that are accompanied with the hotel room. Since the provision of amenities is not cost-free for the hotel, its marginal costs are assumed to increase, just like with the non-quality related variables BREAKFAST and SWIM above. Above it was shown that increased marginal costs are associated with higher output prices. How is quality assurance then accomplished in the hotel industry? There are two possible ways, both of which have been studied in the studies herein mentioned.

### (a) *Hotel Ratings*

Hotel ratings are frequently used to define hotels' quality. They are set either formally (Swedish hotels are rated by the European Hotelstars Union) or informally. Unfortunately, many Swedish hotels have not yet been reviewed by the EHU. Fortunately, Tripadvisor.com provides informal ratings based on reviews published by previous travelers. Each hotel is given a rating between 0.0 and 5.0, where 5.0 is the best rating. Assuming that higher rated hotels provide more amenities and therefore have higher marginal costs, a high rating may

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<sup>5</sup>  $\pi'(Q) = P - c'(Q) = 0 \rightarrow P = c'(Q)$ .

cause the price to increase. Note that the STAR variable is insignificant in Chen and Rothschild's study, but this somewhat puzzling results is explained due to the fact that many Taipei hotels have not been internationally recognized, but still offer a high quality service.

*(b) International Chain Affiliation*

In both Chen and Rothschild's and Thrane's studies, international chain affiliation causes prices to increase significantly. Based on user-published reviews on Tripadvisor.com, the quota of international chains found in the top-ten rated hotels are often greater than the quota of international hotels in the city in many locations, supporting the findings of Chen and Rothschild, as well as Thrane. This is illustrated in table 2 below.

**Table 2.** *As seen here, there is a bias of international chains in the top-ten rated hotels at Tripadvisor.com, suggesting that customer satisfaction and possibly quality is higher at these hotels.*

City	No. of hotels	No. of international hotel chains	Quota of international hotels in the city	Quota of international chains of the 10 best rated hotels
Mexico City	251	47	18.7 %	80 %
Jakarta	227	29	12.8 %	80 %
Cairo	125	26	20.8 %	70 %
Bangkok	726	128	17.6 %	50 %
Karachi	19	3	15.8 %	30 %

(iii) Economies of Scale

Larger hotels may exploit economies of scale, meaning that they could have cost advantages compared to smaller hotels. One could argue that for example, one front desk is needed no matter whether the hotel caters to ten guests or a thousand - no more and no less. Thus, the average cost of the reception is a negative function of the number of guests (or rooms). This *may* be reflected in the output price, causing larger hotels to offer lower prices. In this paper, this is the only variable that is expected to negatively affect prices. However, in Espinet et. al (2003), the number of rooms is shown to have no effect on room rates, which would suggest no exploitation of economies of scale.

(iv) Uncertainty

Today, many hotel bookings are carried out many weeks or even months in advance. For several reasons, plans sometimes fall through and people will not be able to make use of their bookings. Surely nobody wants to spend a large amount of money on something that goes to waste. Because of this, uncertainty is a concept that travelers need to deal with when making a booking. In the financial market, investors deal with uncertainty by buying call- or put options. These securities give the investor the right to buy or sell something. Of course, investors need to pay a premium (Byström, 2007). An industry that is more closely related to the hotel industry is the airline industry. Nowadays, airlines often offer different tariffs for the very same flight. Fares are either non-refundable (promo fares) or refundable (flexible fares). McAfee and te Velde (2006) suggests that price differences between the two are often a factor of four to five. A real-life example is obtained from CSA Czech Airlines below:

**Figure 1.** A ticket in economy class varies between 746 SEK (non-refundable) and 3304 SEK (refundable). The refundable fare is approximately 4.43 times more expensive than the promo fare (3304/746).

FROM	TO	FLIGHT	PROMO ▼	STANDARD ▼	PLUS ▼	FLEXI ▼	BUSINESS ▼
Copenhagen (CPH) 09:15, We, April 03 2013	Prague (PRG) 10:35, We, April 03 2013	OK 0505 CZECH AIRLINES	746 SEK	1 321 SEK	2 131 SEK	3 304 SEK	4 067 SEK
Prague (PRG) 11:40, We, April 03 2013	Bucharest (OTP) 14:30, We, April 03 2013	OK 0802 CZECH AIRLINES					

Time between change: 1hr 05min

Opting for the more expensive, but entirely refundable, choice makes sense if the expected value of the purchase is greater or equal to the expected value when opting for the cheaper choice, i.e. when:

$$EV(\text{Promo}) \leq EV(\text{Flexible})$$

Now, consider the example presented below this paragraph. On the left hand side, the ticket is non-refundable which leaves the consumer with a total wealth of  $(W - P_{\text{promo}})$  no matter whether the trip is realized or not. On the right hand side, the ticket is refundable and the ticket price is therefore refunded if the trip is not realized. In such a case, and if a cancellation is a hundred percent sure ( $p = 0$ ), then the consumer's expected value is just the initial wealth. Then again, why bother buying a ticket in the first place? Using algebra, this could be expressed and shortened in the following fashion:

$$p[W - P_{\text{promo}}] + (1 - p)[W - P_{\text{promo}}] \leq p[W - P_{\text{flex}}] + (1 - p)[W - P_{\text{flex}} + P_{\text{flex}}]$$

$$\Leftrightarrow$$

$$-P_{\text{promo}} \leq -pP_{\text{flex}}$$

where  $p$  = probability of realizing the trip;  $W$  = initial wealth;  $P_{\text{promo}}$  = promo fare;  $P_{\text{flex}}$  = flexible fare.

Note that consumers are indifferent between the two bundles when the expected value of both bundles are exactly the same, i.e. when  $-P_{\text{promo}} = -pP_{\text{flex}}$ . Thus, initial wealth does not in theory matter in the decision whether to buy a promo fare or flexible fare. What matters is the probability of realizing the trip, as well as the promo- and flexible fares. In the case of CSA Czech Airlines, consumers are likely to buy a flexible fare if the probability of realizing the trip is 22.6 percent or less (746/3304). Correspondingly, if the flexible fare was to increase significantly (*ceteris paribus*), an even lower probability is required to justify such a purchase.

When making a reservation, the two prices are considered as given. The remaining factor, the probability of realizing the trip, is therefore the main determinant. Unfortunately, this is not a dice-rolling game where probabilities are natural. Instead, the game revolves around the consumers' subjective probabilities, a concept that is defined by Varian (1992) as: "*a given agent's perception of the likelihood of some event occurring*". Some consumers may undervalue the chance of realizing the trip due to risk aversion and therefore opt for the flexible fare. Personally, because I made the reservation rather close to departure and felt secure about the chances of realizing the trip, I opted for the promo fare and had a lovely time in Bucharest.

### 2.2.3. Cultural Heritage

A final theoretical candidate in the pursuit of room rate determinants is cultural heritage. In their Stockholm city travel guide, Lonely Planet describes Stockholm as a world leader in, among other things, design and architecture. Most people who have visited Stockholm would surely agree on this. In the past, several hedonic pricing analysis' have been carried out on effects on cultural heritage on property values. For example, Ruijgrok (2006) illustrates that "*historical characteristics of buildings and their surroundings account for almost 15 percent of property values*". Thus, there is a chance that landmark hotels exploit this fact and set their prices accordingly. Hotels located in historic buildings may cause prices to increase just because guests' willingness to pay may be higher, *ceteris paribus*.

### 3. Methodology

This section opens with a review of the econometrics used to answer the research questions, i.e. which variables that are considered and how they are measured. It also addresses the importance of performing a series of diagnostic tests on the model. Finally, the data collection process is reviewed along with some inevitable limitations.

#### 3.1. Relevant Econometrics

Room rates can be estimated by regressing a set of independent variables on the dependent variable (price) using Ordinary Least Squares (OLS), followed up by simple t-tests that determine whether the variable in question is statistically significant or not. Using matrix notation, the model looks like this:

$$\mathbf{p} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon}$$

where  $\mathbf{p}$  = observed price per night;  $\mathbf{X}$  = a set of independent variables.

The more independent variables that are included in the analysis, the less is the risk of endogeneity and omitted variable bias. Therefore, a number of variables need to be included in  $\mathbf{X}$ . Verbeek (2012) illustrates this reasoning when initially only including a few variables in a hedonic regression. When more variables were included, the coefficient of determination ( $R^2$ ) increased. Based on previous research, around ten variables related to the theory on hotel pricing should be enough to reach a relatively high level of  $R^2$ .

Considering that some of the findings in Chen and Rothschild (2010) are a bit puzzling, I will include all of its variables along with most variables from Thrane (2006). All variables have been discussed in the theory section above and are likely to affect room rates due to their utility-bearing qualities. Yet, because of a rather large  $\mathbf{X}$ , there is a risk of some redundant variables. I follow the advice of Campos et al. (2005) by applying a general-to-specific approach. It is favorable because the OLS estimator remains the best linear unbiased estimator (BLUE), however, excluding the redundant variables is desirable as degrees of freedom are lost.

When degrees of freedom are lost, the variances of the coefficients will seem larger than they really are. As a result, t-values will decrease and the reliability of the statistical inference is harmed. Thus, the analysis will be carried out in two steps. After testing for redundant variables, the model will be narrowed down into a satisfactory number of regressors. In table

3, I present a list of the variables included in the first regression and how they will be approximated. By considering the previous research and/or what has been discussed in the theory section above, all variables (except for ROOMS) can be categorized as either utility-bearing or cost-increasing and should therefore affect prices positively. However, it is once again important to remember what is illustrated in table 1, i.e. that many of them have previously (and intriguingly) shown to be non significant meaning that the expectations necessarily do not need to be fulfilled here either.

**Table 3.** *A description of the nineteen variables to be initially considered in the study, as well as how they are measured. Note: all variables except for ROOMS are expected to positively affect prices.*

Variable	Measured by
BATH	Private bathroom (yes = 1)
BREAKFAST	Complimentary breakfast (yes =1)
BUSINESS	Business center available (yes = 1)
CHAIN	Owned by an international chain (yes = 1)
FITNESS	Fitness center available (yes = 1)
HAIRDRY	Hair dryer available (yes = 1)
LOCATION	Hotel centrally located (yes = 1)
MINIBAR	Minibar available (yes = 1)
OLD	Building built before WWII (yes = 1)
PARKFREE	Complimentary parking (yes = 1)
REFUNDABLE	Price is refundable (yes = 1)
ROOMS	Number rooms in the hotel
RESTRAURANT	Restaurant available (yes = 1)
ROOMSERV24	Room service available 24/7 (yes = 1)
ROOMSIZE	Room size (m <sup>2</sup> )
STAR	Hotel rating (1 to 5)
SWIM	Swimming pool available (yes = 1)
TV	Flat screen available (yes = 1)
WIFI	Complimentary Wi-Fi (yes = 1)

When the model has been narrowed down, it will then be exposed to three traditional diagnostic tests; for multicollinearity, for misspecification, and for homoscedasticity. The importance of these tests are discussed below.

### 3.1.1. Multicollinearity

Chen and Rothschild (2010) argues that when applying the hedonic pricing model, multicollinearity is often issue. Multicollinearity occurs when at least two of the independent explanatory variables are highly linearly correlated. Applying this to our model,

multicollinearity could for example occur between a hotel's rating (number of stars) and its location or international chain affiliation if the relationships below were to hold:

$$(\text{STAR})_i = \gamma_0 + \gamma_1(\text{LOCATION})_i \quad \text{or}$$

$$(\text{STAR})_i = \varphi_0 + \varphi_1(\text{CHAIN})_i$$

Theoretically, if a hotel's rating depends heavily on its location or chain affiliation, then the coefficient of correlation would be high, which cause unreliable regression estimates (Verbeek, 2012). Multicollinearity is detected by performing Variance Inflation Factor-tests (VIFs). Generally, multicollinearity is considered a serious problem whenever VIF values are greater than 10 (Kennedy, 1985; Gross, 2003).

### 3.1.2. Omitted Variables

In the introduction chapter, I declared hotel pricing as a complex phenomenon. Sticking to this thought, it makes sense to ask the question whether or not all variables have been captured in the above presented model. Even though the coefficients of determinations have been shown to be rather high (around 70 percent of all variations in prices are explained by the independent variables in the analysis'), it does not mean that the models have not missed variables. If so, even though the model describes the reality fairly well, it does not tell the full story.

A way of detecting omitted variables is to perform the Ramsey Regression Equation Specification Error Test (RESET), first discussed by Ramsey (1969). By adding the dependent variable (in this case, PRICE) raised to the power of, for example, two and three in the regression, the RESET tests whether these terms have any power in explaining PRICE. The null hypothesis assumes no misspecification (i.e. the coefficients of these terms are jointly zero), whilst under the alternative misspecification is fact and thus making the model slightly less forceful.

### 3.1.3. Homoscedasticity versus Heteroscedasticity

Finally, because we are dealing with cross-sectional data, tests for heteroscedasticity are in order. Whenever there is absence of homoscedasticity, the model is said to be heteroscedastic, when means that the variance is not constant ( $\sigma_i \neq \sigma$ ). In such a case, the OLS estimator is still unbiased and consistent, but no longer BLUE. Considering that statistical inference is based on the variable's variances, inferences becomes unreliable (Verbeek, 2012). There are several

tests for heteroscedasticity. The Breusch-Pagan test is the most general one since the variance  $\sigma_i$  (under the alternative hypothesis) is simply assumed to be a function of some unknown function  $h$ , i.e.  $\sigma_i = \sigma h(z_i \alpha)$ . A Breusch-Pagan test will thus be performed, as opposed to the less general tests.

### 3.2. Data Collection and Limitations

In Sweden, most hotels are bookable on several websites throughout the Web. Price differences are either non-existent or negligible. Thus, for this study data on hotels is obtained exclusively from the undeniably popular Hotels.com<sup>6</sup>. By simulating a booking, all available rooms in the Stockholm metropolitan area along with their associated prices will appear in a list. By selecting a hotel, general information regarding the hotel is presented in bullets. Also, detailed information regarding the rooms are presented in submenus for each room type (e.g. a standard room or a superior room) available in the hotel. The data collection process is described more explicitly in figure 4 to figure 9 (appendix; pages 39-43).

The dependent variable, PRICE, is defined as the room rate per night and is measured in Swedish kronor (SEK). Prices were collected between March 11th, 2013 and March 14th, 2013 and addresses stays as of June 2013. Since the bookings are simulated three months prior to the stay, this allows controlling for uncertainty. Before presenting the final model, some remarks are in order:

- **Double rooms only.** Because double rooms are widely more available than single rooms, I will only include double rooms in the study. As a matter of fact, double rooms are normally not much more expensive than single rooms. Often, the only difference is the bed type as everything else in the room is required regardless of the number of people staying (e.g. a bathroom, a wardrobe, a TV set, etc). Note that junior suites, presidential suites etc. will be excluded. Standard rooms, superior rooms, and executive/club rooms will on the other hand be included, as long as two guests are allowed. In many cases, hotels offer more than one type of room and in such case, several observations (rooms) will be obtained from the very same hotel.
- **Two models.** Because upscale hotels tend to offer lower rates during the weekend, two separate regressions need to be run; one for a weekday (Monday, June 10th,

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<sup>6</sup> Note that Chen and Rotschild used a Taiwanese website for Taiwan while Thrane used a Norwegian website for Oslo. Thus, following their footsteps is unfeasible. Hotels.com is owned by American Expedia Inc. (NASDAQ: EXPE) and is, according to their website, "a leading provider of hotel accommodation worldwide".

2013), and one for the weekend (Saturday, June 8th, 2013). Chen and Rothschild (2010) derives evidences of some interesting differences between the two samples. By studying the same month, problems due to seasonality are avoided.

- **Logged prices.** I will follow the advice of Rosen (1974) as well as most of its following research by using a log-model. There are several advantages from using natural logarithms. First of all, it reduces bias created by potential outliers. Also, each coefficient (the  $\beta$ -values below) represents the elasticity of the variable with respect to the price. This means that the coefficient describes the percentage change in price as result of a one percent increase in each variable at question.
- **Sample.** According to Tripadvisor.com, there are 162 hotels operating in the Stockholm metropolitan area. Just like Chen and Rothschild, as well as Thrane, did not include all hotels in their respective research locations, I will not include all hotels either. Instead, I will focus on finding a great variation across rooms. Therefore, about half of all hotels will be included (79 hotels).

Thus, we end up with the following conventional model:

$$\begin{aligned} \ln(PRICE)_i = & \beta_0 + \beta_1(BATH)_i + \beta_2(BREAKFAST)_i + \beta_3(BUSINESS)_i + \beta_4(CHAIN)_i + \\ & \beta_5(FITNESS)_i + \beta_6(HAIRDRY)_i + \beta_7(LOCATION)_i + \beta_8(MINIBAR)_i + \\ & \beta_9(OLD)_i + \beta_{10}(PARKFREE)_i + \beta_{11}(REFUNDABLE)_i + \beta_{12}(RESTAURANT)_i + \\ & \beta_{13}(ROOMS)_i + \beta_{14}(ROOMSERV24)_i + \beta_{15}(ROOMSIZE)_i + \beta_{16}(STAR)_i + \\ & \beta_{17}(SWIM)_i + \beta_{18}(TV)_i + \beta_{19}(WIFI)_i + \varepsilon_i \end{aligned}$$

Now, some words of caution should be mentioned. First of all, hotel prices are dynamic and ever changing. Because it took nearly a week to collect all data, the data is only 'semi-cross-sectional'. Prices may be altered during the data collection process and thus creating some sort of bias correlated with the time of booking. However, it is hoped for that the prices did not change vastly during the time of research and that such bias is negligible.

Second of all, when using Hotels.com as the one and only source, some sort of selection bias exists. The reason is simply that all available hotels in Stockholm are not bookable through Hotels.com. For example, neither of the 19 Scandic hotels in Stockholm are bookable through the site. Scandic is a popular Swedish midrange hotel chain operating around 160 hotels across Europe, which is why the absence of these hotels is a bit unfortunate.

Finally, like always there is a slight risk of measurement errors. While the observed prices are indeed correct, in some cases Hotels.com may have failed to provide correct up-to-date information regarding all attributes considered. For example, it may say that a minibars are available in all rooms even though they were recently removed. Furthermore, hotels appearing to offer room service at limited hours only may just have changed their policy and could now be offering the service around-the-clock. Prices may have been adjusted accordingly and some form of bias is thus created. Hopefully, such bias is small and will not harm the results.

#### **4. Results**

At the time of research, available rooms could be found in 79 hotels around the Stockholm metropolitan area. Because most hotels offered more than one bundle, where at least one of the considered variables varied (often room size or refundability), the number of observations almost reached 200 for both the weekday and the weekend sample. As anticipated, prices do vary a lot. Budget travelers will survive on 570 SEK per night, but will then have to settle for a small room in a no-frills hostel (Skanstulls hostel). Guests looking for a splurge face the respectable price of 5,100 SEK per night, but will then be rewarded with night in a spacious room at a luxurious landmark hotel in the city center (Grand Hôtel Stockholm).

In both the weekday and the weekend sample, there were nine cases where the absolute values of the t-statistics were smaller than 0.67, suggesting that associated p-values were greater than 0.50. Thus, these variables were considered as non-significant and presumably also redundant in the analysis. Performing a redundant variables tests on these variables, it is shown that they all were jointly redundant as the F-values of the tests were close to zero (0.248 in the weekday sample and 1.502 in the weekend sample). Note that the critical value on the 5 percent level is approximately 1.936 in both cases. The following nine variables were therefore excluded:

1. BUSINESS
2. FITNESS
3. MINIBAR
4. PARKFREE
5. RESTAURANT
6. ROOMS
7. SWIM
8. TV
9. WIFI

When these nine variables had been excluded, a total of ten independent variables remained (as well as the avid constant). An OLS regression was once again estimated and since neither

of the remaining independent variables could be shown to be redundant, the general-to-specific approach turned out to be successful. The final model was now set for the diagnostic tests discussed in chapter 3. Results from the OLS regression, and the heteroscedasticity and misspecification tests are presented in table 4 below. Results from the VIFs are found in the appendix (table 6, page 39). Subsequently, I will briefly comment on the outcomes of the diagnostic tests. Deeper interpretations of the coefficients are found in chapter 5.

**Table 4.** Results from the OLS regression based on the hedonic pricing model where the nine redundant variables have been removed.

	Monday (n = 197)		Saturday (n = 188)	
	Coefficient	t-value	Coefficient	t-value
BATH	0.236*** (0.053)	4.464	0.225*** (0.057)	3.982
BREAKFAST	0.060* (0.036)	1.676	0.037 (0.038)	0.990
CHAIN	0.084** (0.037)	2.301	-0.146*** (0.039)	-3.790
LOCATION	0.284*** (0.039)	7.349	0.380*** (0.041)	9.271
OLD	0.073** (0.036)	2.020	0.028 (0.038)	0.731
HAIRDRY	0.059 (0.044)	1.363	-0.091* (0.047)	-1.931
REFUNDABLE	0.116*** (0.030)	3.912	0.098*** (0.032)	3.067
ROOMSERV24	0.221*** (0.045)	4.964	0.271*** (0.047)	5.816
ROOMSIZE	0.019*** (0.003)	6.708	0.019*** (0.003)	6.220
STAR	0.191*** (0.029)	6.452	0.169*** (0.032)	5.391
Constant	5.757*** (0.081)	70.769	5.760*** (0.086)	67.292
<b>Adj. R<sup>2</sup></b>	0.840		0.787	
<b>F-value</b>	97.494***		69.938***	
<b>Ramsey RESET</b>	9.939***		10.725***	
<b>Breusch-Pagan</b>	4.602***		1.848*	

Note: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

## 4.1 Analysis of the Diagnostic Tests

### 4.1.1. Multicollinearity

By performing VIFs on the independent variables, it is shown that multicollinearity is not an issue since neither of them have a VIF value greater 5 (see appdenix; table 6 on page 39). Note that STAR has the highest VIF-value (around 3.50 in both regressions), which comes as no surprise. Hotelstars Union, a European organization for hotel classification, for example suggests that in order for a hotel to receive a fifth star they need to offer around-the-clock room service. Thus, there is some correlation between STAR and ROOMSERV24. However, if a hotel fails to satisfy *all* of the many requirements for the desirable fifth star, they will not receive it. In Stockholm, only 4 of the 16 hotels offering around-the-clock room service had been rewarded five stars (Grand Hôtel Stockholm, Nobis Hotel, Radisson Blu Strand, and Sheraton Stockholm Hotel).

Additionally, thinking about the equations described in section 3.1.1, does it make sense for a hotel's rating to depend on its location or chain affiliation? Naturally, no, it does not! Some of the higher rated, and somewhat resort-like hotels (like Grand Hotel Saltsjöbaden and Radisson Blu Royal Park Stockholm) are not centrally located. Also, international chains are found in all categories, except for 1 star-rated properties. In conclusion, the tests for multicollinearity are all satisfactory.

#### *4.1.2. Omitted Variables*

Both coefficients of determination are shown to be high, around 80 percent of all variations in prices are explained by variations in the ten variables included in the analysis. Considering that the models presented in previous research have slightly lower coefficients of determination, this outcome is satisfactory. The risk of omitted variables is nevertheless imminent.

Performing the Ramsey RESET test for misspecification (with two fitted values), the associated F-values are much greater than the critical values at both the 1 percent and 5 percent levels of significance. For the weekday sample, the F-value is 9.939 and for the weekend sample, the value is even larger (10.725). Since that the critical values are 3.07 (5 percent level of significance) and 4.79 (1 percent level of significance), the null hypothesis, which suggests no misspecification, is rejected. Both models thus suffers from omitted variables, which was expected.

#### *4.1.3. Homoscedasticity versus Heteroscedasticity*

Performing the Breusch-Pagan test on the two samples, two different results are generated. The F-value for the weekday sample is 4.602, while for the weekend sample it is remarkably lower; 1.848. Considering that the critical value at the 5 percent level of significance is approximately 1.883 for both samples, the null is rejected in the weekday sample, while it cannot be rejected in the weekend sample. Thus, the weekday sample suffers from heteroscedasticity, while the weekend sample is homoscedastic (again, at the 5 percent level of significance). Heteroscedasticity may be eliminated by using Generalized Least Squares (as opposed to Ordinary Least Squares), i.e. an estimator that does not suffer from heteroscedasticity. Had it not been already a log model, logging the model would have been a possible alternative. Since this cannot be done, constructing such an estimator is awfully complicated.

Another conceivable action is to apply heteroscedasticity-consistent standard errors (HC std. errors), first proposed by White (1980). I will choose this action both because it is easier and because it does not change the otherwise satisfactory OLS estimates. By applying the heteroscedasticity-consistent standard errors, inference is now reliable. As seen in table 7 (appendix, page 38), some standard errors increase (BATH, CHAIN, LOCATION, Constant) while some decrease (OLD, HAIRDRY, REFUNDABLE, ROOMSERV24, STAR). Because neither of the new t-values change dramatically, all estimates from the original model remain statistically significant at the same level of significance as before.

## 5. Analysis of Results

In the previous chapter, detailed results regarding the coefficients were presented, as well as a brief review regarding some diagnostic tests. Now the fun will begin as it is time to more deeply interpret the coefficients. Before doing so, a summary illustrating the differences between the expected results and the results in this study is presented below in table 5. This is then followed by interpretations of (a) the significant variables and (b) the redundant variables. Finally, I illustrate how the results may be useful in the real world by discussing some policy implications.

*Table 5. An overview of all variables included in the analysis along with their expected results and the demonstrated effects of this study. As seen here, only seven of the nineteen variables fully fulfilled the expectations. Two variables met the expectations only partly, while the remaining ten variables were jointly redundant and thus not in line with expectations.*

Variable	Expected effects	Effect in this study
BATH	+	+
BREAKFAST	+	+
BUSINESS	+	ns
CHAIN	+	+/-
FITNESS	+	ns
HAIRDRY	+	ns/-
LOCATION	+	+
MINIBAR	+	ns
OLD	+	+/ns
PARKFREE	+	ns
REFUNDABLE	+	+
ROOMS	-	ns
RESTRAURANT	+	ns
ROOMSERV24	+	+
ROOMSIZE	+	+
STAR	+	+
SWIM	+	ns
TV	+	ns
WIFI	+	ns

## 5.1. Interpretations of Coefficients

### 5.1.1. Significant Variables

Pleasantly, a large number of variables were shown to (positively and negatively) affect room rates, at least in one of the two samples. Additionally, most of them were also shown to be significant at a satisfactory statistical level of significance. All variables were significant at a statistical level of 5 percent or less, except for BREAKFAST and HAIRDRY, which were significant at the 10 percent level only. In this section I will go through each variable one by one<sup>7</sup>. In the following subchapter, section 5.1.2, I will deal with the variables that were shown to be redundant.

#### (i) BATH

In Stockholm, rooms with of a private bathroom (sometimes referred to as *ensuites*) heavily cause prices to increase. The difference between the weekday and weekend sample could be considered as negligible. During the weekday, the availability of a private bathroom causes the price to increase by 23.6 percent, while during the weekend the increase is slightly lower

<sup>7</sup> Except for the constant which cannot really be interpreted considering that it is a log-model.

(22.5 percent). In both cases, the outcome is statistically significant at the 1 percent level of significance.

The result is not surprising. It is pretty safe to say that a bathroom is one of the few things that a guest needs during their stay. Guests will be able to make it without a flat screen TV, in-room Wi-Fi, room service, etc. The opportunity of using a bathroom is, on the contrary, essential. Under the assumption that people prefer to use one nearby, which could be exceptionally convenient at night, then it is not hard to understand why  $\ln(\text{PRICE})$  is increasing in BATH. Additionally, since less people are using the bathroom, the cleanliness is probably higher too. The reasoning seems to apply both during weekdays and the weekend.

#### (ii) BREAKFAST

Some hotels offered complimentary breakfast on all their rooms, while some offered different bundles where breakfast was complimentary in some cases only. Generally, complimentary breakfast causes room rates to increase by 6.0 percent during the week, and only by 3.7 percent during the weekend. In the weekday sample, BREAKFAST is significant at the 10 percent level of significance, suggesting that the significance is tolerable. In the weekend sample, the associated t-value is 0.990, suggesting that the variable cannot be considered as significant.

Just like having to use a bathroom, humans need to eat. By eating out, guests will be able to more easily understand how locals eat their breakfast. Therefore, it makes sense that the coefficient of BREAKFAST is significantly smaller than the one of BATH. That being said, a 6.0 percent increase (during the week) is not a negligible increase. Because the price mean during the week was 1,911 SEK, guests would then have to pay around 115 SEK for a breakfast buffet ( $0.06 * 1911$ ). Under the assumption that hotels cater to more leisure-oriented guests during the weekend, it seems like holiday makers are less willing to pay for breakfast the guests on business. Maybe people become more price conscious when paying for their own meals (as opposed to if the employer pays for it), and therefore looks for cheaper options. Stockholm is not the cheapest city in the world, nevertheless a breakfast does not necessarily have to cost 115 SEK.

#### (iii) CHAIN

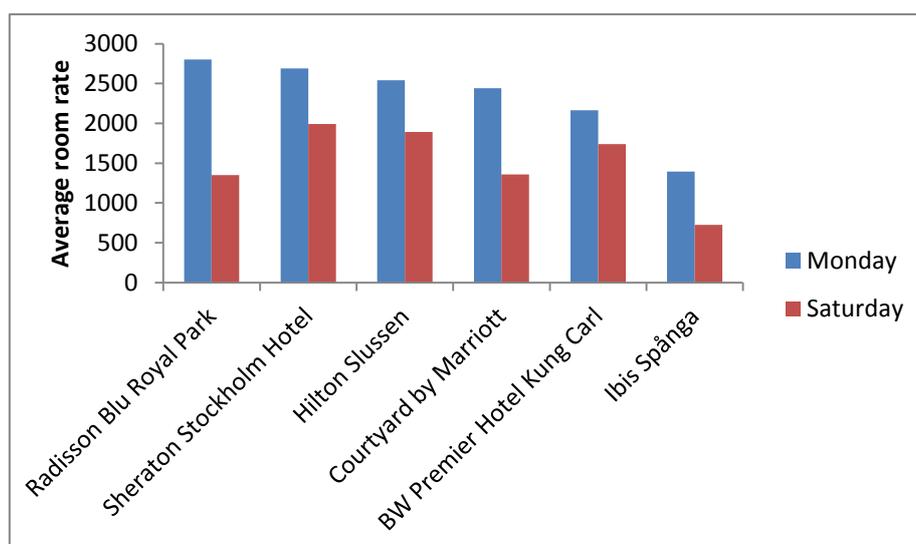
Whether or not the hotel is operated by an international hotel chain has two dissimilar effects on room rates. During the business week, international chain affiliation causes prices to

increase by 8.4 percent and is statistically significant on the 5 percent level of significance. Interestingly, the similar characteristic causes prices to decrease by 14.6 percent during the weekend and is now statistically significant at the 1 percent level of significance. In the previous research,  $\ln(\text{PRICE})$  has been exclusively increasing in CHAIN, which makes this outcome particularly interesting.

In the Stockholm sample, there were 6 international hotel chains, or rather international hotel brands, present (Best Western, Marriott, Hilton, Ibis, Radisson, and Sheraton). The hotels covered the entire spectrum of stars, except for the one-star category. In accordance with the theory, at least weekday guests seem to prefer internationally run hotels to their local counterpart. A possible explanation could be that foreign companies have agreements with a certain number of (international) chains and therefore prefer if their employees stay at these hotels. In some sense, seeking to brands like Marriott or Hilton could be seen as 'quality-hedging' as these brands certainly have to fulfill some from above set requirements.

During the weekend, a dramatic change is observed. The dependent variable,  $\ln(\text{PRICE})$ , is now decreasing in CHAIN. By studying the data, the reason is that many of the internationally run hotels significantly lower their rates (as illustrated below). Note that these hotels now offer prices much closer to the average weekend price of 1,522 SEK. Most of the hotels not belonging to an international chain also lower their prices during the weekend, but apparently not that much.

**Figure 2.** An illustration of the observed price decreases by internationally run hotels.



For example, an average night at the Berns Hotel, located in the heart of Stockholm's nightlife district, is actually 8 percent higher during the weekend (2,614 SEK as opposed to 2,421 SEK). A similar event occurs at Hotel Skeppsholmen where prices are 9 percent higher during the weekend (3,068 SEK as opposed to 2,815 SEK). Other hotels that remain way above the average are Grand Hôtel Stockholm (3,777 SEK), Hotel Birger Jarl (2,790 SEK), Hotel Hansson (2,140 SEK), and Hotel Rival (2,238 SEK). By comparing these figures with the bars in figure 2, an explanation to why the coefficient of CHAIN is negative during the weekend is derived.

The pattern is still interesting though, why do international hotel chains lower their prices that much during the weekend? Do leisure travelers care less for international chains while on vacation in Stockholm? Possibly, yes. While choosing an international hotel brand could be seen as quality-hedging, it also means some downsides. These hotels often look very similar, meaning that they could be seen as soulless or uncharming by some travelers. Sometimes when browsing for Ibis hotels at Hotels.com, the pictures representing the room do not need to illustrate the very same room because Ibis rooms are so standardized. While business guests do not seem to bother, but rather enjoy this, holiday makers may appreciate something unexpected.

#### (iv) LOCATION

The strongest variable to cause room rates to increase was shown to be LOCATION. In the weekday sample, a room located in the city center of Stockholm is 28.4 percent more expensive, *ceteris paribus*. During the weekend, location matters even more as centrally located rooms are now 38.0 percent more expensive than similar hotels outside the city center. Both outcomes are significant at the 1 percent level of significance, suggesting that there is no doubt that a central location is one of the prominent room rate determinants.

There are reasons to believe that when people are traveling, they want to get out as much as possible from the trip. Since most of Stockholm's main tourist attractions (like the Vasa Museum, the Old Town, and City Hall), top-rated restaurants, and shopping are located in the city center, staying here makes sense if you want your trip to be time efficient. Staying outside the city center means that you will have to use some sort of transport to get into town. Not only does it cost extra money, it is also time consuming. Sure there is public transport, but having to pay up to 100 SEK for a return ticket, spend hours per day commuting and

likewise face the risk of the seemingly never-disappearing delays occurring every winter due to snow fall, is probably considered a turnoff for short-term visitors.

#### (v) OLD

Apparently, hotels situated in buildings built before the second world war started in 1939 charge slightly higher prices. During the business week, these rooms were 7.3 percent higher, while during the weekend, the rooms were only 2.8 percent higher. The weekday estimate is significant at the 5 percent level of significance, while the weekend estimate is not even significant at the 10 percent level of significance. Weekday guests seem to value historic hotels more than weekend guests, but the question is why? It is a hard question to answer. At least the weekday result coincide with the theory that that cultural heritage causes prices to increase, so this result is hardly surprising. Unfortunately, I see no reason to why the variable should appear as insignificant in the weekend sample. Finally, a word of caution is in order here. All hotels categorized as old are also located in the city center meaning that there could in fact exist some collinearity between the two variables. Thus, the outcome is a bit unsatisfactory.

#### (vi) HAIRDRY

The availability of a hairdryer causes prices to increase by 5.9 percent during the business week, but the estimates cannot be confirmed at the 10 percent level of significance ( $p = 0.129$ ). In the weekend sample, the estimate is negative and now significant at the 10 percent level of significance. The availability of a hairdryer causes prices to *decrease* by 9.1 percent during the weekend. This is explained by the failure of two above averaged-priced hotels (not offering a hairdryer) to cut their prices during the weekend (Hotel Aldoria and Hotel Skeppsholmen). Considering that a hairdryer cannot be categorized disutility, i.e. that  $U(\text{hairdryer}) < 0$ , the outcome is unsatisfactory. If anything, the availability of a hairdryer should be considered as utility-bearing, and thus cause prices to increase - not decrease.

#### (vii) REFUNDABLE

Refundable rooms turned out to be 11.6 percent more expensive during the business week, while refundable rooms caused prices to increase by slightly lower 9.8 percent during the weekend. Both estimates are significant at the 1 percent level of significance. The outcome certainly coincide with the theory regarding uncertainty, i.e. the existence of some positive premium to paid, in order to deal with uncertainty. What is interesting is that the premium is

remarkably lower for hotel rooms than for air tickets. As discussed above, refundable air fares costing four to five times more than regular, non-refundable fares, are not unheard of in the airlines industry.

This outcome has a huge implication on whether to book a refundable room or not. Hence, purchasing the more expensive, but entirely refundable, bundle makes sense if the expected value of the purchase is greater than when buying the non-refundable bundle. As shown, this depends on the respective prices, as well as the probability of realizing the trip (or in this case, make use of the hotel room). During the business week, when refundable rooms are 11.6 percent more expensive than other rooms (*ceteris paribus*), the consumer is indifferent between the two bundles when the probability of making use of the room is 89.6 percent ( $1/1.116$ ), on average. Whenever the probability is lower, the expected value of the purchase is larger if opting for the refundable room. Thus, because refundable rooms are not that more expensive, a remarkably higher probability of making use of the booking (compared to an air ticket) is required in order to justify a non-refundable purchase. Similarly, during the weekend, the subjective probability of 91.1 percent is required to justify such a purchase.

#### (viii) ROOMSERV24

The availability of around-the-clock room service seems sought after in the Swedish capital; ROOMSERV24 caused weekday prices to increase by 22.1 percent and weekend prices to increase even more (27.1 percent). Both estimates are significant at the 1 percent level of significance. While most guests will probably not order up a hamburger at 3:45 am, it is probably considered nice by many to know that they could if they wanted to. Note that this is a hypothesis only. If the hypothesis was not to hold, another explanation can be found. Offering this service is definitely not cost-free; extra staff is required around-the-clock. Thus, marginal costs increase prices are set accordingly.

#### (ix) ROOMSIZE

In both samples, an extra square meter caused prices to increase by 1.9 percent, *ceteris paribus*. There is no doubt regarding the statistical significance as both estimates are significant at the 1 percent level of significance. In Stockholm, non-suite sizes vary between 5 square meters (Hotel Micro) and 35 square meters (Elite Hotel Marina Tower). Note that if these rooms would have been completely similar otherwise, the latter would be approximately

75.9 percent more expensive than the former<sup>8</sup>. Thus, the conclusion is that size matters! By drawing a parallel to real estate economics, the outcome is not surprising. For instance, as mentioned above, Anglin and Gencay (1996) finds that the lot size of a property positively affects the selling price of the house. More is more, simply, and a similar reasoning evidently applies to the case of hotel rooms. It is no secret that people value space. Crossing the Atlantic and if the air fare was the same, would you rather stay back in coach or choose a first class cabin?

### (x) STAR

Finally, the hotel's rating significantly causes prices to increase. In the weekday sample, an extra star is associated with a 19.1 percent increase. In the weekend sample, an extra star caused to prices to increase by slightly lower 16.9 percent. Both estimates are significant at the 1 percent level of significance. Again it is necessary to emphasize that some of the other variables constitute part-requirements for achieving an extra star. Additionally, there exists a set of other variables that are also required for a star promotion. For example, a requirement for the fourth star (according to the Hotelstars Union) is a bathrobe and slippers on demand (or in the room). Concierges and valet parking are requirements for the fifth and final star. These should all be considered as utility-bearing, at least to some guests, and should thus according to theory cause prices to increase. Because these variables are not included in this paper, but rather hidden within STAR, it comes as no surprise that the coefficient of the variable is positive. A final remark is in order, though. Note that if all variables that constitute a part requirement for a specific star would have been included, the coefficient would surely decrease. However, the problem of multicollinearity would then rise (see chapter 3.1.1.)

#### *5.1.2. Redundant Variables*

Despite being either significant in other studies or supported by microeconomic theory, nine of the total nineteen considered variables were shown to be jointly redundant in the analysis. Four variables had previously been shown to be non-significant (BUSINESS, ROOMS, RESTAURANT, SWIM), while the remaining five are non-significant only in this study (FITNESS, MINIBAR, PARKFREE, TV, and WIFI). The question is now why these nine variables do not affect room rates in Stockholm. A discussion is followed below.

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<sup>8</sup>  $1.019^{30} \approx 1.759$ .

### (i) BUSINESS

For business clients, the availability of a business center should be considered as a utility-bearing attribute and thus cause prices to increase. The perception is that leisure travelers, on the other hand, care less about the availability of a business center. However, because running a business center is not cost free, hotels providing a business center should have higher marginal costs. From microeconomic theory, we know that this causes prices to increase as  $P = MC$  under the assumption of perfect competition.

Still, because BUSINESS is shown to be non-significant in both the case of Taipei and Stockholm, either the number of leisure travelers outweigh the number of business travelers - or running a business center does not increase the hotel's marginal costs that much. The first case is not likely, Stockholm caters to a lot of business travelers (Stockholm Visitors Board). Upscale- and business-oriented hotels significantly lower their room rates during the weekend when leisure travelers invade the city. Therefore, an explanation to why the variable is non-significant (in both samples, not only the weekend sample as you might have expected) can be found by again considering the marginal costs. Consider the case where instead of a business center, there is a hotel room. Just like a business center requires staff, the hotel room too requires staff like maid service and maintenance personnel. It could be the case of a zero-sum game (Varian, 1992), i.e. that the marginal costs remain unchanged when transforming a room into a business center or vice versa. In such a case, the room rate will also remain unchanged.

### (ii) ROOMS

Of the 79 hotels included in the analysis, the average number of rooms in a Stockholm hotel turned out to be 123 rooms, but the variance is rather large. There are 9 hotels in Stockholm operating more than 250 rooms (Courtyard by Marriott Stockholm, Grand Hôtel Stockholm, Hilton Stockholm Slussen, Nordic Sea Hotel, Radisson Blu Arlandia Hotel, Radisson Blu Royal Viking Hotel, Radisson Blu Waterfront, and Sheraton Stockholm). Note that these hotels all cater to the upscale market and thus considered as relatively pricey.

On the other hand, there are 4 hotels operating 20 rooms or less (Columbus Loft, Hotel Söder, Hotell M/S Monika, and Old Town Lodge). Interestingly, all of these hotels offer prices below the mean (1,911 SEK for the weekday and 1,522 SEK for the weekend). Therefore, by studying the outliers only, a positive relationship between the number of rooms and room rates could be expected (as opposed to the negative relationship expected from theory). As

seen in figures 3a and 3b, which are found in the appendix on page 40, there actually seems positive relationship between the two variables.

However, when performing the redundant variables test, ROOM is shown to be redundant, and this theory is shattered. Suspecting that this may have to do with the large variance (remember that number of rooms ranges between 5 and 465 with  $\mu_{\text{rooms}} = 123$ ), I once again ran a regression with  $\ln(\text{ROOM})$  as one of the regressors. Now the coefficient appears to be 0.011, but due to a relatively large standard error (0.020), the variable remains statistically insignificant. Because ROOM is non-significant in all of my models, i.e. weekday and weekend with ROOM or  $\ln(\text{ROOM})$  as a regressor, as well as in previous research by Espinet and his colleagues, there is no evidence of hotels exploiting economies of scale and setting their prices accordingly. Surely larger hotels do benefit from them, but this not to be reflected in the pricing of rooms.

### (iii) RESTAURANT

In the Stockholm study, a restaurant could be found in the majority of the hotels; in 47 of 79 hotels. Generally, I would consider the availability of a restaurant as a utility-bearing attribute. When travelling it is sometimes it is convenient to have restaurant located in (or in the vicinity of) the hotel that you are staying in. Regardless of whether visiting a freezing cold Prague during winter, being solo traveler in Bangladesh, or feeling under the weather in Thailand, I have personally appreciated the availability of a restaurant nearby.

However, the variable RESTAURANT was insignificant in Stockholm, just like in Oslo, based on Thrane's work. A possible explanation for the outcome is that restaurants are found in all types of hotels, but the quality of the restaurants differ enormously across them. For example, a restaurant is available at both Reimersholme Hotel, a relatively inexpensive two star hotel west of Södermalm, and at Grand Hôtel Stockholm. There is a great chance that dining at one or the other may generate different overall experiences.

For example, Reimers Restaurang (the restaurant located at Reimersholme Hotel), serve mains at an affordable rate of 119 SEK - 135 SEK. On the other, Guide Michelin has awarded Mathias Dahlgren Matsalen (one of the two restaurants located at Grand Hôtel Stockholm) with two of their prestigious stars. Additionally, the sub brand Mathias Dahlgren Baren (also located at the hotel) holds one star. The perception is that quality is higher at the Michelin star-granted restaurants. Thus, gourmands may be willing to pay more not just for the

availability of a restaurant, but rather for the availability of a high-quality restaurant. This could explain the finding that RESTAURANT is non-significant, but could have been (positively) significant if the variable had been adjusted for quality.

#### (iv) SWIM

Just like in Oslo and Taipei, SWIM was insignificant in Stockholm. A swimming pool was available in only 6 of the hotels in the metropolitan area of Stockholm (Grand Hotel Saltsjöbaden, Grand Hôtel Stockholm, Radisson Blu Arlandia/Royal Park/Royal Viking, and Welcome Hotel). A possible explanation for the insignificance of (or rather the redundancy of) SWIM could be that the first 5 hotels are all among the most expensive hotels in Stockholm, while a room at the Welcome Hotel costs significantly less than the mean. In the weekday sample, a room at the Welcome Hotel costs 1,117 SEK or 1,595 SEK, depending on the refundability ( $\mu_{\text{week}} = 1,911$  SEK). Similarly, a room costs 788 SEK or 1125 SEK during the weekend, when the mean is 1523 SEK. Because some of the rooms at the upscale hotels costs thousands of SEK above the mean, the price variance is large. A large variance causes high standard errors, which in turn lowers the absolute value of the t-statistic, ceteris paribus. Normally, this is taken care of by log-transformations. Because SWIM is a dummy variable, it is not possible to make such a transformation. Secondly, because the dependent variable,  $\ln(\text{PRICE})$ , is already logged, the huge variance is already taken care of - but SWIM remains insignificant.

#### (v) The remaining five

Until now, the variables were shown to be insignificant in Stockholm, but also in Taipei or Oslo or both. Now it is time to deal with the remaining five insignificant variables in the Stockholm study. These variables were not insignificant elsewhere, which makes them particularly interesting.

Surprisingly, a fitness center was only found in approximately one-third of the Stockholm hotels (27/79). Because it was available in a wide scale of hotels, from out-of-town cheapies to full-service properties, FITNESS was shown to be insignificant. A reason could be that running a fitness center in Stockholm does not significantly affect the hotel's marginal costs, just like with BUSINESS. However, in the case of Taipei, prices were increasing in FITNESS. It could therefore be the case that Stockholm-located hotels are more productive than their counterparts in Taipei. Since this a rather strong conclusion based on weak

information, it should be stressed that the difference might as well be caused by different tastes. Guests in Taipei may value the availability of a fitness center more than the Stockholm guests, for example.

While offering complimentary car parking increased prices in Oslo, PARKFREE was shown to be insignificant in Stockholm. Note that neither of the hotels located in the city center offered this service. In central Stockholm, parking spaces are actually for sale. For example, in 2012 a parking space was sold for 650,000 SEK in Östermalm. Many of hotels located outside the city center offered complimentary car parking, but 7 out of 22 did not. *Ceteris paribus*, these 7 hotels should then be priced lower than the remaining 15 as they are offering a service that either costs the hotel money or could be considered as utility-bearing. However, these rooms turned out to be more expensive, but evidently for other reasons (discussed in the following sub-chapter).

Finally, three in-room variables included in the analysis were shown to be insignificant in Stockholm; MINIBAR, TV, and WIFI. Once installed, the costs of maintaining these variables should be considered as relatively low, thus marginal costs of these attributes are either close to or equal to zero. By analyzing marginal costs only, then these results come as no surprise. However, one could argue that both the availability of a minibar, a flat screen TV, and complimentary Wi-Fi should be considered as utility-bearing. This seems to have been the case in Taipei, but not in Stockholm.

Note that only 8 of the 79 hotels did not offer complimentary Wi-Fi. Today, Internet plays an important part of our lives, even when traveling. In the past few years, mobile devices have become increasingly popular. Having studied hundreds of user-published reviews on Tripadvisor.com, the absence of complimentary Wi-Fi (or rather the indefensible high fees for it) seems to be one of the greatest annoyances when traveling, all over the world. Because the vast majority of Stockholm hotels offer complimentary Wi-Fi, Stockholm hotels are considered to be at the forefront of this service. Therefore, it could be the case that guests simply expect this kind of service nowadays - just like people expect basics like a bed or a lockable door. The insignificance of WIFI is thus not very surprising; the availability of complimentary Wi-Fi may not be utility-bearing, instead the absence of complimentary Wi-Fi could be considered as utility-reducing.

The number of hotels offering a flat screen TV was 46, which represents about 58 percent of the total sample. A minibar could be found in 24 hotels, which represents about 30 percent of

the total sample. By some considered as utility-bearing (obviously, otherwise they would not have existed!), the conclusion is that these attributes cannot alone justify a price increase. As with WIFI, a similar approach can be made with respect to TV. Flat screen TVs, as opposed to old-school CRTs, could widely be taken for granted by guests in Sweden.

As for MINIBAR, there is chance that Swedish guests are price conscious and therefore do not care for the often overpriced minibar items. On the other hand, I do not see any particular reason as to why such price consciousness should differ significantly between the Oslo and Stockholm crowds. According to an article published in *The Economist* in April 2013, major chains such as Marriott and Hilton have started scrapping their minibars, not only in Sweden but in all of their worldwide hotels. Since this is a fact and because MINIBAR was shown to be non-significant, it seems as if the golden days of the minibar are now history.

## **5.2. Policy Implications**

### *5.2.1. Pricing Strategy*

The findings are valuable especially for those operating within the hotel industry in Stockholm. Setting a price reflecting what is being offered is crucial in a competitive market like the case of Stockholm. If the price/quality ratio were to significantly deviate upwards, i.e. a high price vis-a-vis quality, guests could end up being disappointed. These days, hotels cannot afford all too many disappointed guests as the word of mouth has never been so strong. As guests have become increasingly more active in the decision of where to stay (and maybe more picky too?), hotels with many bad reviews may be deselected in advance. Hence, it is advisable to pay attention to what has been said in this paper. For example, if rooms are small, the hotel is located outside the city center, and no around-the-clock room service is available, it is strongly advised not to charge the same price as a hotel which offers all of this - if everything else is the same.

Naturally, such a scenario is unlikely because hotels may differ with respect to variables that have not been brought to attention here. Still, most price variations do originate from the ten variables discussed herein, meaning that setting a price way above what the model predicts is risky! Hotel managers uncertain whether or not their pricing is in line with the market's expectations can make use of the two models presented in the paper. For example, the final weekday model can be summarized as:

$$\begin{aligned} \ln(\text{PRICE})_i = & 5.757 + 0.236(\text{BATH})_i + 0.060(\text{BREAKFAST})_i + 0.084(\text{CHAIN})_i + \\ & 0.284(\text{LOCATION})_i + 0.073(\text{OLD})_i + 0.059(\text{HAIRDRY})_i + \\ & 0.116(\text{REFUNDABLE})_i + 0.221(\text{ROOMSERV24})_i + 0.019(\text{ROOMSIZE})_i + \\ & 0.191(\text{STAR})_i + \varepsilon_i \end{aligned}$$

By inserting the number of stars, the room size (in square meters), as well as ones whenever the remaining eight statements are true,  $\ln(\text{PRICE})$  is generated. For example, a relatively spacious room (25 square meters) at a five star-rated hotel with all of the remaining attributes met should on average cost approximately 3,429 SEK<sup>9</sup>. On the other hand, a much more cramped room (5 square meters) at a two star-rated hotel with none of the attributes met should on average cost 510 SEK<sup>10</sup>. Deviating upwards is advised only if the hotel can provide a certain set of utility-bearing attributes, in addition to those already mentioned here. What they are and how they are valued is a different story, though.

### 5.2.2. Marketing Strategy

Thanks to the arguments that have been forwarded in this paper, hotel managers should better know what attributes to advertise and highlight. For example, by only boasting a good location and the official rating (which seems to be top marketing priorities), hotels miss out on great marketing opportunities. Evidently, around-the-clock room service is sought after in Stockholm and marketing it should be a top priority. Hence, prices increase (presumably along with the willingness to pay) by approximately 25 percent if this service is present. Surprisingly, only one of the fifteen hotels offering the service actively wrote about it on their website (Hotel Rival). Additionally, size matters (1.9 percent per square meter is quite a lot actually) and should also be emphasized in case the hotel offer spacious rooms. In case the hotel offer refundable rates this is something that also is worth mentioning as uncertainty is something we all have to deal with constantly.

The non-significance of a large number of variables (nine) should moreover not be forgotten as ambitious efforts *may* end up being in vain. Flat screen TVs and complimentary Wi-Fi do not seem to be room sellers (any more). The same reasoning applies to the case of the availability of a fitness center, a restaurant, or a swimming pool. Before scrapping the idea of not marketing such attributes entirely it should be stressed that this paper only controlled for the availability of such attributes and not their quality. If these variables had been adjusted for

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<sup>9</sup>  $e^{8.140} \approx 3429$ .

<sup>10</sup>  $e^{6.234} \approx 510$ .

quality, it is not certain that they would appear as non-significant or redundant. Hosting a Michelin star granted restaurant or a reputable fitness center is very likely something that should be advertised, but this paper has not provided evidence for this hypothesis.

## 6. Conclusion

As shown, room rates in Stockholm vary between 570 SEK and 5,100 SEK per night. Of course, the overall experience of the stay will heavily depend on the price paid. In loose terms, you get what you pay for. As expected, no-frills hotels soar in the lower-end price spectrum, while guests can expect genuine service if opting for an upscale hotel.

Returning to the research questions in chapter 1, it is safe to say that in-room/property-, quality-, and uncertainty-related variables all play a role in hotel pricing. Mainly, these variables cause prices to increase, i.e. this paper has provided very little evidence on variables causing prices to decrease. Secondly, some minor differences between the two samples have also been detected. As for the in-room variables (BATH, HAIRDRY, ROOMSIZE), the most prominent one is BATH, causing prices to increase by more than 20 percent in both samples. As for the property variables (BREAKFAST, at least vaguely, LOCATION, OLD, ROOMSERV24), the most prominent one turned out to be LOCATION, causing prices to increase by almost 30 percent during the business week and by nearly 40 percent during the weekend.

The quality variables (CHAIN, STAR) mainly cause prices to increase, where STAR is the head variable. An extra star causes prices to increase by around 17 - 19 percent, *ceteris paribus*, and in both samples. However, CHAIN is shown to cause prices to increase during weekdays, but to decrease during the weekend. As for uncertainty, it is shown that guests need to pay a slightly higher price (around 10 percent depending on the day of the week) for refundable rates. Interestingly enough, the price of uncertainty is remarkably lower in the hotel industry than in the airline industry, where refundable fares are four to five times more expensive than non-fundable fares.

Generally, the majority of the results have been satisfactory, both with respect to theory and after diagnostic tests. Some results were a bit confusing (and unsatisfactory), for instance that the availability of a hairdryer (HAIRDRY) caused prices to increase during weekdays, but the reverse during the weekend. Similarly, cultural heritage (OLD) caused prices to increase during the week, but had no affect at all during the weekend. Second of all, the weekday

model was shown to suffer from heteroscedasticity. This issue was remedied by applying heteroscedasticity-consistent standard errors.

In conclusion, both models suffered from omitted variables. For future references, these findings are important to embrace. When performing a hedonic prices analysis on hotel pricing, it is important to understand that the variables determining room rates cannot be captured entirely. This paper used a general-to-specific approach, starting with a large number of possible candidates (nineteen), which was narrowed down to ten as almost half of them were jointly redundant. Evidently, there are still some determinants missing, which is why follow-up research is encouraged. Additionally, the reader should once again note that these results are not likely to be universal. For example, results from Stockholm may not apply in developing countries, where the institutional context is different. For that reason, follow-up research is again encouraged.

The purpose of the paper was to increase to understanding concerning the way in which room rates are determined. Hopefully, things are now a bit clearer. Booking a hotel room means much more than just going for a good night's sleep. In the introduction chapter, I argued that hotel pricing is a complex phenomenon. As shown in this paper, this was not an overstatement.

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## **7.2. Online Sources**

Economics.about.com (February 2013)

Economist.com (April 2013)

Hotelstars.eu (February 2013)

Michelin.se (March 2013)

Tripadvisor.com (March 2013)

VisitSweden.com (March 2013)

## 8. Appendix

**Table 6.** VIF tests of the regressors. A VIF value greater than 5 usually requires further investigation; a value greater than 10 is a serious indicator of collinearity.

	Monday VIF	Saturday VIF
BATH	1.569	1.563
BREAKFAST	1.440	1.226
CHAIN	1.592	1.349
LOCATION	1.383	1.302
OLD	1.806	1.458
HAIRDRY	1.336	1.909
REFUNDABLE	1.021	1.033
ROOMSERV24	2.335	2.048
ROOMSIZE	1.523	1.629
STAR	2.956	3.507

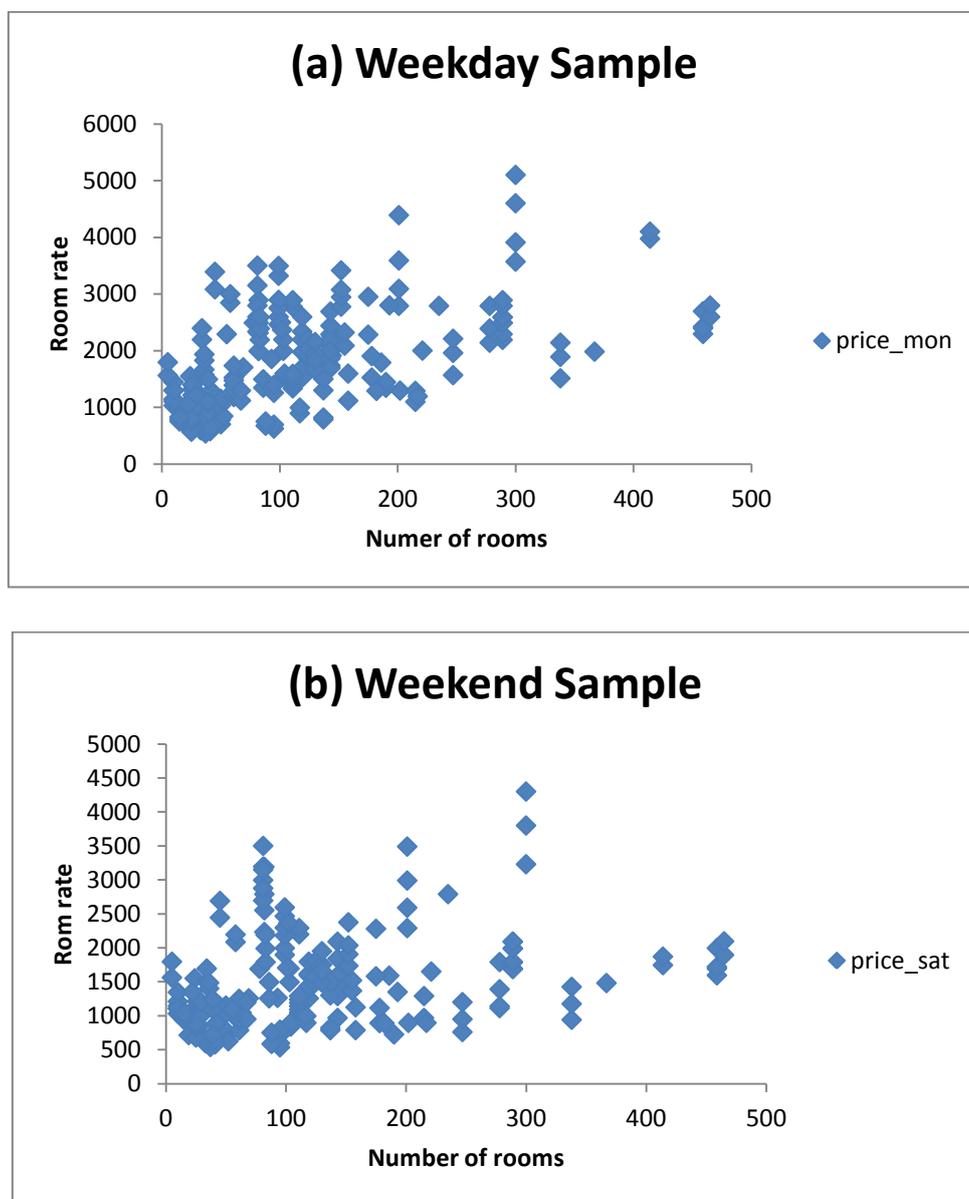
**Table 7.** Inference changes when applying heteroscedasticity-consistent standard errors on the heteroscedastic weekday model. However, by comparing the *t*-values from table 4 it appears that they do not change dramatically. All estimates from the original model remain statistically significant at the same level of significance as before. Also, the coefficient of determination as well as the results from all other diagnostic tests remain unchanged.

	Monday (n = 197) HC std. errors		Saturday (n = 188) Regular std. errors	
	Coefficient	t-value	Coefficient	t-value
BATH	0.236*** (0.067)	3.519 (↓)	0.225*** (0.057)	3.982
BREAKFAST	0.060* (0.036)	1.676 (.)	0.037 (0.038)	0.990
CHAIN	0.084 (0.033)	2.547 (↓)	-0.146*** (0.039)	-3.790
LOCATION	0.284*** (0.050)	5.644 (↓)	0.380*** (0.041)	9.271
OLD	0.073** (0.031)	2.328 (↑)	0.028 (0.038)	0.731
HAIRDRY	0.059 (0.039)	1.524 (↑)	-0.091* (0.047)	-1.931
REFUNDABLE	0.116*** (0.029)	4.031 (↑)	0.098*** (0.032)	3.067
ROOMSERV24	0.221*** (0.038)	5.743 (↑)	0.271*** (0.047)	5.816
ROOMSIZE	0.019*** (0.003)	7.064 (↑)	0.019*** (0.003)	6.220

STAR	0.191*** (0.027)	6.935 (↑)	0.169*** (0.032)	5.391
Constant	5.757*** (0.102)	56.549 (↓)	5.760*** (0.086)	67.292
<i>Adj. R<sup>2</sup></i>	0.840		0.787	
<i>F-value</i>	97.494***		69.938***	
<i>Ramsey RESET</i>	9.939***		10.725***	
<i>Breusch-Pagan</i>	4.602***		1.848*	

Note: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Figure 3a+b.** A seemingly and unexpected positive correlation between the number of rooms and room rates.

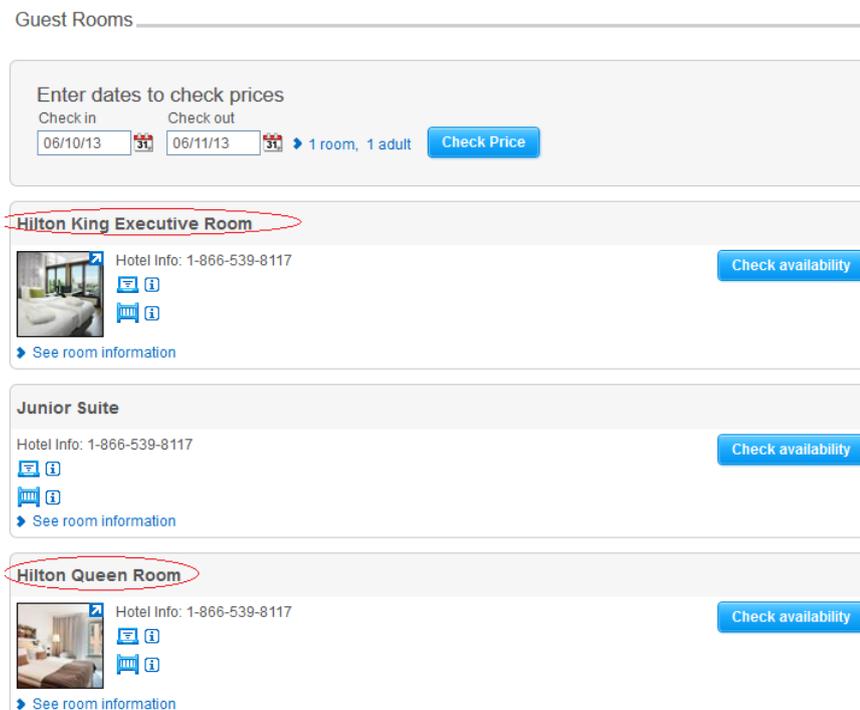


## 8.1. An Illustration of the Data Collection Process

**Figure 4.** All 162 hotels in Stockholm appear at Tripadvisor.com. This example covers the Hilton Stockholm Slussen. When selecting the hotel, official rating is presented. We learn that STAR=4. We also learn that LOCATION=1 as Guldgränd 8 is located within the city limits of Stockholm (in Swedish: "innanför tullarna"). Finally, CHAIN=1 because the hotel is operated by Hilton Hotel. Now we can leave Tripadvisor and head for Hotels.com.



**Figure 5.** Looking up the hotel at Hotels.com, a list of all offered room types is presented. In this study, I will include the rooms marked in red (the Hilton King Executive Room and the Hilton Queen Room). Suites are often more luxurious in a way that is a bit complex to measure, which is why they are left out in the study. The correct dates are entered and availability is checked.



**Figure 6.** If the room is available, prices are generated. In this case they appear in USD because the example is from the US site<sup>11</sup>. Prices are final, i.e. taxes are included. As seen, different bundles are offered, which means that some of my variables are varied in the fashion as below. When this data had been collected, "See room information" was selected.

\$244 ⇔ REFUNDABLE = 0; BREAKFAST = 0.

\$260 ⇔ REFUNADBLE = 0; BREAKFAST = 1.

\$290 ⇔ REFUNDABLE = 1; BREAKFAST = 0.

\$306 ⇔ REFUNDABLE = 1; BREAKFAST = 1.

**Hilton Queen Room** Hotel Info: 1-866-539-8117

**Option 1:** Hilton Queen Room - Book Early & Save. **\$244**  
average nightly rate

- ✓ Non-Refundable Rate ⓘ
- ✓ Free Wireless Internet
- ✗ Breakfast Included

Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19	(Average)	Total
\$244	-	-	-	-	\$244	\$244

▶ Cancellation policy

---

**Option 2:** Hilton Queen Room - Book Early & Save BB. **\$260**  
average nightly rate

- ✓ Non-Refundable Rate ⓘ
- ✓ Free Wireless Internet
- ✓ Breakfast Included

Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19	(Average)	Total
\$260	-	-	-	-	\$260	\$260

▶ Cancellation policy

---

**Option 3:** Hilton Queen Room - Best Available Rate. **\$290**  
average nightly rate

- ✓ Free cancellation ⓘ
- ✓ Price Match Guarantee ⓘ
- ✓ Free Wireless Internet
- ✗ Breakfast Included

Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19	(Average)	Total
\$290	-	-	-	-	\$290	\$290

▶ Cancellation policy

---

**Option 4:** Hilton Queen Room - Best rate B&B. **\$306**  
average nightly rate

- ✓ Free cancellation ⓘ
- ✓ Price Match Guarantee ⓘ
- ✓ Free Wireless Internet
- ✓ Breakfast Included

Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19	(Average)	Total
\$306	-	-	-	-	\$306	\$306

▶ Cancellation policy

**▶ See room information** ←

<sup>11</sup> In the study I used the Swedish website, but for language reasons the example presented here is from the US site.

**Figure 7.** Detailed information regarding the queen room now appear. Variables of interest are marked in red. From this, we learn that ROOMSIZE=16; WIFI=1; BATH=1; TV=1; HAIRDRY=1; MINIBAR=1. We now have 8 variables still to cover.

### Hilton Queen Room



[See room information](#)

Hotel Info: 1-866-539-8117

Room description

One queen bed or two twin beds, 16 square meters. Air conditioning. Flatscreen cable TV with premium channels and pay movies. Wireless Internet access. Telephone with voicemail. Minibar and safe. Modern marble bathroom with walk-in shower or bath/shower combination and hair dryer. Iron/ironing board. Non-smoking.

Room Details

- Air conditioning
- Cable TV service
- Clock radio
- Connecting / adjoining rooms available
- Daily housekeeping
- Direct-dial phone
- Free Wi-Fi
- Hypo-allergenic bedding available
- In-room safe
- Iron/ironing board
- Pay movies
- Private bathroom
- Voice mail
- Bathrobes
- Climate control
- Complimentary toiletries
- Cribs/infant beds available
- Desk
- Flat-panel TV
- Hair dryer
- In-room childcare (surcharge)
- In-room safe (laptop compatible)
- Minibar
- Premium TV channels
- Trouser press
- Wake-up calls

[Check availability](#)

**Figure 8.** Below the detailed room information, general hotel information is presented. From this figure we learn that RESTAURANT=1; FITNESS=1 (see the red marks).

## Dining

**Eken Matsal** - This à la carte restaurant offers International dishes as well as Swedish specialities, with an eco-friendly design focus using high quality raw materials. The view of the water and city lights combine to achieve a light and pleasant atmosphere

**Panorama Restaurant** - Panorama Restaurant features floor-to-ceiling windows with views over the old town and the waters of Riddartjarden. In the morning, we serve pastries and fresh fruit at our renowned Hilton Breakfast, while during the day and evening it is used for conference lunches and dinners.

**Eken Bar** - Refreshing cocktails. Live DJs on weekends. Eken's terrace is open during summer months.

**Views Bar** - Great views of Stockholm.

## Recreation

The recreational activities listed below are available either on site or near the hotel; fees may apply.

- Aerobics on site
- Dock nearby
- Golf - driving range nearby
- Golf - miniature nearby
- Motor boating nearby
- Yoga classes/instruction on site
- Bicycle rentals on site
- Fishing nearby
- Golfing nearby
- Kayaking nearby
- Swimming nearby

**Figure 9.** Finally a large bullet list regarding the property. Variables of interest are marked in red. We learn that  $ROOMS=289$ ;  $PARKFREE=0$ ;  $BUSINESS=1$ ;  $ROOMSERV24=1$ ; Because there is no information regarding the age  $OLD=0$ , and similarly  $SWIM=0$ .

## Amenities

### General

- Air-conditioned public areas
- Gift shops or newsstand
- Number of buildings/towers - 1
- Total number of rooms - 289
- Bar/lounge
- Luggage storage
- Number of floors - 8
- Elevator/lift
- Meeting facilities size (feet) - 108
- Suitable for children
- See more facilities
- Meeting facilities size (meters) - 10-259
- Number of meeting/conference rooms - 16
- Number of restaurants - 2
- Parking limited (surcharge)
- Tours/ticket assistance

### Rooms (all rooms include)

- Bathrobes
- Cribs/infant beds available
- In-room childcare (surcharge)
- Trouser press
- See more room details
- Air conditioning
- Connecting / adjoining rooms available
- Flat-panel TV
- In-room safe (laptop compatible)
- Premium TV channels
- Wake-up calls
- Clock radio
- Desk
- In-room safe
- Complimentary toiletries
- Hair dryer
- Iron/ironing board
- Cable TV service
- Daily housekeeping
- Free Wi-Fi
- Minibar
- Private bathroom
- Climate control
- Direct-dial phone
- Hypo-allergenic bedding available
- Pay movies
- Voice mail

### Services

- Laundry facilities
- Parking (surcharge)
- Safe-deposit box at front desk
- Valet parking
- See more services
- Babysitting or childcare
- Concierge services
- Health club
- Medical assistance available
- Parking garage
- Sauna
- Multilingual staff
- Porter/bellhop
- Shoe shine
- Breakfast available (surcharge)
- Currency exchange
- Complimentary newspapers in lobby
- Doorman/doorwoman

### Business & Event

- Business center
- Dry cleaning/laundry service
- Room service (24 hours)
- Translation services
- See more business & events
- 24-hour front desk
- Business services
- Multiple large conference rooms
- Secretarial services
- Computer rental
- Multiple small meeting rooms
- Technology helpdesk
- Audiovisual equipment
- Banquet facilities

### Accessibility Features\*\*

- Accessible bathroom
- In-room accessibility
- Accessible parking
- Roll-in shower
- Accessible path of travel

\*\*These amenities may be available only in some rooms or units. Some amenities may incur additional fees.