

Willingness to pay for green hotel attributes in the Norwegian hotel industry: A hedonic pricing approach



Source: <http://www.hotelroomsearch.net/kazakhstan/green-hotel>

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ABSTRACT

Environmental friendly or green travel has emerged to be a vital part of the global travel industry over the past decade. Travel agencies and online travel search engines are therefore offering consumers sustainable lodging possibilities e.g. green hotels.

This thesis focuses on exploring whether consumers are willing to pay the potential increased price to accommodate for their sustainable preferences i.e. a green price premium. Data on prices and amenities of green and non-green hotels in Norway is used to estimate a hedonic model of hotel room pricing, where the eco-friendly “Swan label” is used as a green certificate. The estimated results shows that consumers would be willing to pay between 157 - 193kr to avoid staying at a certified green hotel, i.e. the results does not suggest that the consumers are willing to pay a green price premium in the Norwegian lodging market.

1. INTRODUCTION

"The environment is everything that isn't me"

- Albert Einstein

The global travel and tourism industry as a whole represents approximately 10% of Gross Domestic Product (GDP) on a worldwide scale and is estimated to be among top five export earnings in 4 out of 5 countries. It is also one of the worlds fastest growing industries (Deloitte, 2017b). A key part of the growth is the hospitality sector, where the hotel industry is estimated to have contributed 550 billion American dollars to the global economy in 2016 (Statista, 2017). As a result of the economic relevance the hotel industry represents, extensive research is applied to investigate various areas (Sánchez-Ollero, García-Pozo, & Marchante-Mera, 2014). The focus of this research paper is to further expand the knowledge of this industry by investigating the environment friendly perspective.

The hotel industry is highly competitive and is extensively driven by customer demand. Moreover the customers' preferences and expectations are ever-changing. Therefore, to be able to win the attention of the consumers, it means being able to rapidly adjust for the changes that occurs in the market (Deloitte, 2017a). Over the last few decades, there has been a prominent change in consumer demand for green products and services. This change is more than a trend, but rather a result of a slowly growing movement. Green consumers simply refer to "consumers who seek products that have been created with the environment in mind" (Millar & Mayer, 2013). This includes consumption of goods and services that have minimal negative impact on the environment, for example in production or packaging (Jaiswal, 2012). It also consist of consuming products that uses less toxic materials or materials that can be recycled (Chen & Chai, 2010). Green consumer patterns are already eminent in big parts of the world and in the everyday life of the average consumer. It therefore makes sense to observe the interest in green travel as well. As put by The Washington post, "green travel is a portable lifestyle choice" (Saches, 2017).

In response to the consumers change of preference towards green products and services, the hotel industry is adopting sustainable practices, which again is advertised towards potential customers (Martínez García de Leaniz, Herrero Crespo, & Gómez López, 2017).

An environment friendly hotel can be categorized as a hotel that offers sustainable services and focus on minimizing its negative impact on the environment e.g. recycling or eco-friendly use of water and energy (Dalton, Lockington, & Baldock, 2008). “Going green” is important to attract the new segment of conscious consumers and stay competitively relevant in the market, but is also financially beneficial?

Research from all parts of the world has been applied to develop an answer to this question, where an important objective is the consumers’ willingness to pay for the sustainable services. To put it more precisely, are they willing to pay a green price premium, which refers to the willingness to pay more (a premium) for environmental friendly goods and services (Laroche, Bergeron, & Barbaro-Forleo, 2001). As will be shown in this thesis, the results from the existing research litteratur is unclear.

Continued research on this topic is, needless to say, crucial as this information is important to further develop the hotel industry and acquire the economic benefits in the most efficient way possible. In other words, the unclear understanding of how the “green” attribute affects the hotel industry, acted as the background for this paper. In addition, research is already collected from many parts of the world on this topic, but there are (to my knowledge) no studies that have focused on this topic in Norway. By using Norway as the target market, the results from this paper also contribute to expanding the body of international literature, which has revealed social and cultural differences. The following will be the objective of this paper:

Research question: Does is exist a willingness to pay a premium to stay at an environment friendly hotel in Norway?

This thesis will contribute to a continued understanding of the willingness to pay for green services in the hotel sector and the research question is therefore booth managerially and theoretically interesting. To be able to answer the proposed research question, information about room rates and attributes (which is expected to influence the price point) was collected from green and non-green hotels in the Norwegian market. The dataset was further processed to estimate a hedonic model of hotel room pricing. A hedonic model approach was used in previous research papers by Kuminoff, Zhang & Rudi (2010) and Sánchez-Ollero et al. (2014), which argued for the existence of a willingness to pay for green hotels in USA and Spain respectively. Finally, the results produced from simple linear regression provided

whether or not consumers are willing to pay a premium to stay an environmental friendly hotel in Norway.

This thesis will proceed as followed: First, background information on green consumption, a litterateur review of existing research on the topic of green travel and information of sustainable measurements in Norway is provided. Second, the hedonic model approach will be further explored. Third, methodology and the dataset will be presented in detail. Fourth, the estimated results will be presented before (fifth) the research paper will be concluded with some suggestions for further research.

2. BACKGROUND

2.1 Environmental attitude

Natural capital is one of the most (if not the most) important contributors to human welfare, but ever since the 1700s mankind has contributed to the decay of the environment. It is relevant to note that there are conflicting opinions regarding the role of “human influence” on the environment. There exist natural pollutants (arises from non-artificial processes in nature) and anthropogenic pollutants (human induced), which both affect the environmental quality (Callan & Thomas, 2010). Nevertheless, from an environmental perspective, there are multiple global challenges e.g. the ice caps are melting, decreasing biodiversity and air pollution. As a result of these challenges, we see the emergence of environmental responsibility, which is shared by government, companies and consumers (Kaufman, 1999; Sánchez-Ollero, et al., 2014). There have for instance been a noticable environemntal friendly change in consumer patterns in a sizeable part of the world over the past few decades, i.e. we are adopting a green lifestyle. For example, an international market study from 2012 found consumers to be committed to consuming environment friendly products and services and 40% of the respondents reported to be willing to pay a price premium for these products (Edelman, 2012). A more resent global study from 2017 shows that 33% of consumers buy products from brands that are belived to be less harmful on the environment regularly (Unilever, 2017).

“Consumers make product choices based on which combination of product attributes best

meets their needs based on dimensions of value, cost, and prior satisfaction” (Manaktola & Jauhari, 2007). The inclusion of the green attribute, when selecting which products to consume, can be traced back decades, but the 1990s can be considered an starting point as green consumption patterns began to surface on a worldwide scale (Kirkpatrick, 1990). Fast forward to the present day and demand for eco-friendly or green goods are prominent in variety of different industries, including the hotel industry. To mention some example, research has reveal positive eco-friendly attitudes in the car industry (Kahn, 2007; Delang & Cheng, 2012), the food industry (Yu, Gao, & Zeng, 2014) and clothing industry (Shaw, Hogg, Wilson, Shiu & Hassan, 2006).

The “going green to save the environment” attitude might be an important factor to explain why consumers are interested in eco-friendly products and services. However, there are also additional incentives, which needs to be addressed.

First) eco-friendly products are often produced with fewer toxic chemicals and are therefore considered a healthier alternative. This is especially important in products for children (Kangovou, 2017). Second) there might exist a social pressure to select green products and services, which also is enhanced by the media (Griskevicius, Tybur, Van Den Bergh, & Simpson, 2010). Third) the government has to meet certain environmental requirements both on a national, but also international level, and these requirements will affect which goods and services that are available for consumption and therefore also influence the consumption of green goods. I.e. the increasing interest in green products might be “forced” upon the consumers by the government. Fourth) choosing eco-friendly products and services is often a cost saving alternative, which means the products are selected by the consumers for the low price point (and possible other factors) and not solely for its environmental friendly attribute (English, 2014).

Although there are increased positive consumer attitudes towards green products and sustainable business measurements, it is not a reassurance that the consumers also are willing to pay a premium for these products and services. This behavior can be categorized as an attitude-behavior gap and is documented in research papers by (e.g.) (Carrigan & Attalla, 2001; Finisterra, Arminda, Raposo, Lino & Leal, 2009; Ferguson, 2011). The indication is that sustainability should be included in the existing price and not added as an “additional service” which then increases the price.

2.2 Green movement in the hotel industry

Majority of existing research literature regarding the green attribute in the hotel industry, has focused on establishing an understanding of how travelers (or consumers) participate in green travel, the motivation for hotels to implement environmental friendly practices and finding a potential willingness to pay for a green price premium.

An American survey from 2013, reports that 62% of the respondents “often or always consider the environment when choosing hotels” (Bender, 2013). There are multiple factors that influence whether the consumers selects the sustainable options when traveling, where important factors are the consumer’s personal view of being environmental friendly (Baker, Davis, & Weaver, 2014), social influence (Gao & Mattila, 2016) and branding (Lee, Hsu, Han, & Kim, 2010). This means that there are both external and internal forces, which affects the travelers to select green lodging. Therefore, green management is increasingly becoming a crucial tool to keep being relevant and attract costumers, however, how the “green strategy” affects potential costumers, depends on pre-conceived motion of being environmental friendly. There are also preventive barriers, where the main barrier is the customers perception of decreased luxury or cost cutting (Baker et al., 2014). An increased focus on sustainable practices might be viewed as less focus on quality and a hidden way to cut costs e.g. that the “green variable” will have a negative effect on the overall hotel experience. This is also consistent with findings by Newman, Gorlin, & Dhar (2014), who found that an increased focus on making a product green, has a negative impact on how customers perceive the product. This indicates that travelers are still “quality first”, meaning that quality from the hotel experience is valued higher then the impact it makes on the environment.

A survey from 2010, which focused on why a range of global companies had adopted sustainable measurements, list company image, cost saving and competitive advantage as the most influential factors (Phillips & Phillips, 2010). Similar, Lee, Hsu, Han, & Kim (2010) finds important factors for hotels to go green are image, keeping up with competitors and reducing costs. In addition Foster, Sampson, & Dunn (2000) mention consumer demand and costumer satisfaction as key motivations. These are all factors that are essential for the hotels long-term success. Further, this also means that the decision to implement sustainability is more or less a pure strategic move to stay relevant in the current market and being environmental friendly is a positive side effect.

As mentioned, the important question is if “going green” is financially beneficial, with focus on whether consumers are willing to pay the potential additional green premium.

Table 1 summarizes previous publications in the topic of green lodging. The publications show researcher collected from 2003-2016 in a variety of different countries. The main focus is to determine if there are a willingness to pay or not (as shown in 6th column).

Approximately half of the previous research argued for the existence of willingness to pay a green price premium and the other half argued for the opposite conclusion.

There is no simple answer for why there exist such different results regarding the same theme and there might be multiple explanations or factors that influence this difference. One possible factor might be the difference in survey design and sample. The previous research (shown in table 1) has collected data from online search engines, questioners and choice experiments. In addition to using different survey designs, there is also difference in sample size and which respondents that is included. As an example, it will exist a difference in willingness to pay between business and leisure travelers (Millar & Baloglu, 2011). The decision frame, which can be explained as “a decision makers view of the problem and possible outcomes” (Ackert & Deaves, 2016, s.14), might also be a possible explanation i.e. the presentation mode and the respondents’ personal attributes will influence the results collected. The framing effect is documented in diverse research fields e.g. economy and physiology. The research is also collect from all parts of the world to get a global understanding of the topic, which again might be a factor for the different results i.e. there might be cultural and social factors influencing the results.

Research also show that subjects with a higher regard for the environment are more willing to pay a green price premium to stay a green hotel (Kang, Stein, Heo, & Lee, 2012). Further, female subjects exhibit a higher willingness to pay to stay at a green hotel compared to men, and there is no significant difference between age and education groups (Chang, Hsiao, Nuryyev, & Huang, 2015; Han et al., 2011).

Table 1. Summary of publication in willingness to pay (WTP) for green lodging

Researchers	Year	Location	Design/Sample	Result	WTP (Yes/No)
Masau & Prideaux	2003	Kenya	Survey Sample: 237 respondents (Hotel guests)	The majority of respondents were willing to pay a higher rate for an environmental friendly hotel (approx. 66.5%).	Yes
Kasim	2004	Malaysia	Survey Sample: 225 respondents (Tourists)	Neither foreign nor domestic travelers were willing to pay more to stay at socio-environmental responsible hotel.	No
Manaktola & Jauhari	2007	India	Survey Sample: 66 respondents (Indian citizens + tourists)	Majority of consumers were not willing to pay a premium for environmental initiatives in hotel industry (approx. 85% were negative).	No
Dalton, Lockington & Baldock	2008	Australia	Survey and interview Sample: 280 respondents (Hotel guests)	Half of the respondents were willing to pay extra for hotels that participate in green practices (approx. 49%).	Yes/No
Choi, Parsa, Sigala & Putrevu	2009	USA and Greece	Survey Sample: 100 respondents from both countries (University students)	Respondents in both USA and Greece were willing to pay extra for environmental responsible practices of hotels. Results indicate a greater willingness to pay in Greece compared to USA.	Yes
Kuminoff, Zhang & Rudi	2010	USA	Primary data analysis Sample: 223 respondents (Hotels)	Travelers can expect to pay a price premium for standard room at Green hotel (approx. \$8.97-\$25.43*).	Yes
Millar & Baloglu	2011	USA	Conjoint Analysis Sample: 571 respondents (Business and leisure travelers)	Majority of respondents would pay the same or less to stay at environmental friendly hotel. Only 9.8% of leisure travelers were willing to pay more.	No
Kang, Stein, Heo & Lee	2012	USA	Survey Sample: 455 respondents (Travelers)	Respondents with higher regard for the environment exhibit greater willingness to pay for green hotels compared to respondents with lower regard for the environment.	Yes
Millar & Mayer	2013	USA	Survey Sample: 571 respondents (Travelers)	Only 13.8% of respondents were willing to pay extra to stay at green hotel.	No

Chan	2013	Hong Kong	Survey Sample: 1035 respondents (Hotel managers and customers)	Hotel managers exude more optimistic views regarding customer willingness to pay for green hotel initiatives compared to among the customers themselves.	Yes
Sánchez-Ollero, García-Pozo & Marchante-Mera	2014	Spain	Survey Sample: 232 respondents (Hotels)	Room prices increases after implementing environmental sustainability measures (approx. 5-15% higher).	Yes
Chia-Jung & Pei-Chun	2014	Taiwan	Survey Sample: 390 respondents (Taiwanese citizens + tourists)	Respondents would need a compensation to accept to cooperate with hotels environmental-friendly practices (approx. a compensation of negative \$337**).	No
Dimara, Manganari & Skuras	2015	Greece	Survey Sample: 973 respondents (Greek citizens + tourists)	Majority of respondents were not willing to pay an environmental price premium on top of room rate (approx. 71%).	No
Pulido-Fernández & López-Sánchez	2016	Spain	Survey Sample: 666 respondents (Tourists)	Minority of the respondents was willing to pay an environmental premium (approx. 26.6%). Majority of tourist who were willing to pay more are considered to be "pro-sustainable" tourists.	No

Publication in the table is sorted chronological. * Measured in American dollars. ** Measured in New Taiwan dollars.

To conclude: Previous studies have contributed key insight regarding green travel and the price premium for green lodging in the market for hotel rooms, but there are different opinions regarding the travelers (consumers) willingness to pay an additional price premium to stay at a green hotel.

2.3 Green tourism in Norway

A stereotypical view of the Norwegian culture is that Norwegians are committed to outdoor activities (e.g. skiing and hiking) and has a general high respect for the environment.

According to a European survey, this might be an accurate view. Approximately 60% of the Norwegian respondents reported, “Being environmental friendly is an important part of my identity” and that nature is a vital part of the Norwegian culture (Andersson & Kuiper, 2017).

The tourism industry represents approximately 4,2% of total GDP (number from 2016), and 33 million guest nights was spent in commercial accommodations in Norway in 2016, which also is an increase of 5% from the previous year (Innovasjon Norge, 2016). A key part of this industry is the unique landscape, where nature attractions such as fjords, waterfalls and mountains are all examples of why both domestic and foreign travelers choose to explore Norway. Preserving the nature and the landscape is therefore essential. Sustainability is an increasingly important part of Norwegian politics (Regjeringen.no, 2014) and there are also indications that it is increasingly important in the tourism sector as well (Baglo, 2017). Online travel guides (e.g. VisitNorway) are listing multiple of popular and sustainable attractions and lodging opportunities across Norway for eco-friendly tourist. These travel guides also reports an increasing list of sustainability symbols or brands develop to make it easier for travelers to choose green alternatives. There are no exact numbers of how many sustainable hotels (or other lodging possibilities) there are in Norway, as there are multiple approaches to define sustainable lodging. However, the average Norwegian travel habits are still non-sustainable. Numbers from 2018 shows an average of five flight trips per year with an average travel time of approximately 4 hours (Grosvold, 2018).

Google Trend or Google search volume is an online search tool and provides interesting insight regarding green travel. A search for the Norwegian word “Miljøvennlig” (Environmental or eco-friendly) showed an increasing trend over the last few years (2010-2018). The index presents search patterns or search volume for a selected topic in a graph with values from 0-100, where 100 shows when the topic was most popular. This initially

indicated an increased interest in environmental friendly products/services, but when searching for green travel (miljøvennlig reise), there was not enough data to provide a graph. Searching for environmental friendly (miljøvennlig) and selecting “travel” as the only category did not provide any significant results as well. However, the search volume support the indication of the increasingly interest in green products in the Norwegian market. A search for Green travel (global numbers) revealed a stable interest for the topic in the same timeframe as before (2010-2018). But, unlike in Norway, there is a slight decreasing trend in the search pattern. Nevertheless, the high numbers still indicate that it is a popular topic.

As mentioned, there are no specific data of willingness to pay for green services in the tourism industry in Norway. However, reports shows that 33% of Norwegian consumers are willing to pay a price premium (up to 10%) for sustainable products compared to non-sustainable products (Falch & Bing, 2017).

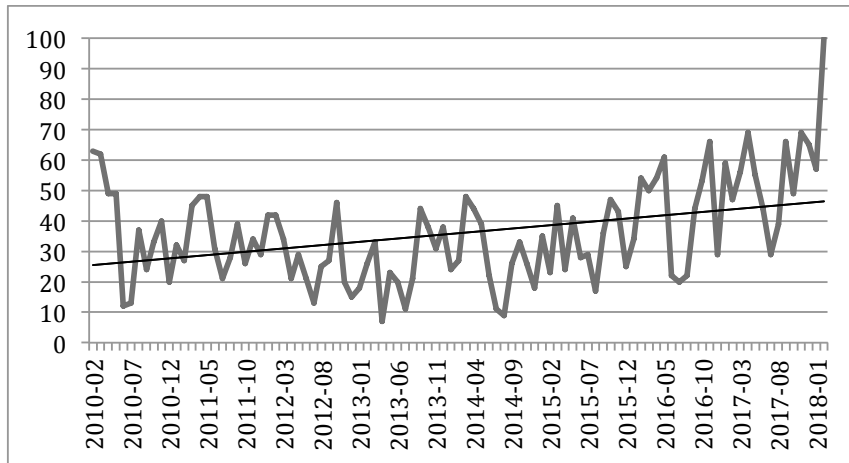


Figure 1: Google search volume for “Miljøvennlig”
 Note: The graph shows Google search volume for Norway between 2010-2018.
 The Linear trend-line shows an increasing interest for the search topic

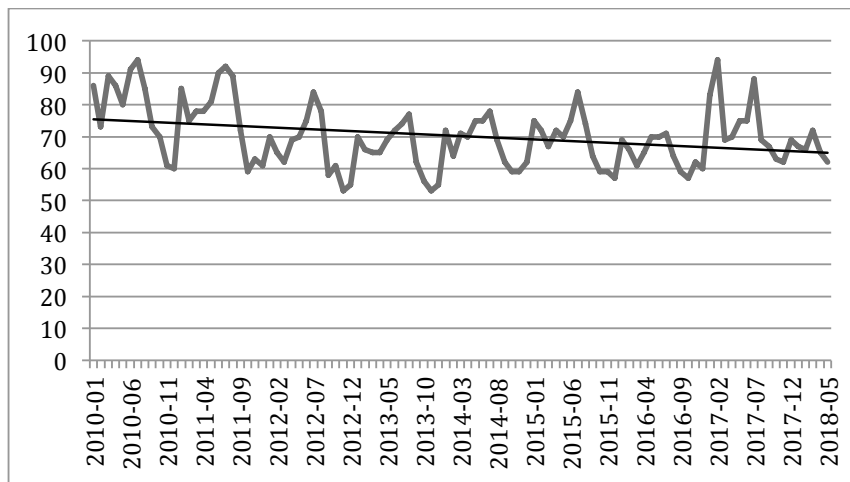


Figure 2: Google search volume for “Green Travel”
 Note: The graph shows Google search volume Worldwide between 2010-2018.
 The Linear trend-line shows a decreasing interest for the search topic

2.4 The certified green category: Swan label

There is no one-sided answer on what a green hotel actually is, but in this thesis the Swan label (Svanemerket) is used as the “green category”. The Swan eco-label is the official Nordic eco-friendly label managed by the “Miljømerking” foundation, which was established in 1989 by the Norwegian government to govern sustainable trademarks, such as the swan label (Miljømerking, 2017). According to a survey made by “Respons Analyse” in 2014, the swan label is the best-known eco label in Norway, as 94% of the Norwegian population had knowledge of this label (Framtiden i våre hender, 2014). Goods that are marked with the swan label are guaranteed to be among the goods with the least environmental impact in their group and the label is used in a range of different categories, including the hotel industry.

Hotels seeking to obtain the swan label must be able to document that they have met a range of different criteria regarding e.g. water consumption, usage of chemicals and offers eco-friendly products and food to their customers. In other words, they have adopted a “lifecycle

approach to its work on the environment”, and are working towards a sustainable society (Miljømerking, 2017). There are three core categories, where each of them has to be met to obtain the official swan label. These categories are 1) Limited values, which consist of energy, water and waste, 2) Use of chemicals with minor environmental impact, 3) purchase of eco-label ingredients and products. In addition, if the hotel has a restaurant or café, there are also specific criterias regarding the food, for example limited use of non-sustainable ingredients (Nordic Ecolabelling, 2013).

If a hotel is granted membership in the program, they will receive their own license number and be displayed on the official swan eco-label website. One important question is why does the hotels choose to apply for this membership in the first place? There are several key points for this. As shown above, the label is well-known and offers a effective way of communicating a environmental commitment to the public, the members are offered aid and consoling regarding a range of different environmental issues and another important factor is that reducing environmental impact not only is good for the environment, but it can also be a good way of lowering cost. For example cutting consumption of energy or use of water in a more efficient way. Hotels that have obtained the label can also display the label on their website and in marketing campaigns.

There also exist other “green certifications” programs and most travel and hotel guides offer some version of the “green category” which is directed towards potential customers. In addition, most hotels in the Norwegian market have some form of an environmental friendly program. However, only the swan labeled hotels has proven their commitment towards the environment trough an official government channel and documented a comprehensive sustainability practice. Therefore only these hotels will be recognized as green in this thesis. All other hotels will be categorized as “non-green”.

3. THEORY

Hedonic pricing model

A Hedonic pricing model (HPM) can be explained as “A model, which identifies price factors, according to the premise that price is determined both by internal characteristics of the good and external factors affecting it” (Investopedia, 2018). There are multiple approaches to hedonic modeling and it is therefore used in a variety of different valuation situations from fairly simple to complex valuations. The versatility of this model means it is used in different areas. For example, a common application of the HPM framework is when pricing properties (Freeman, 1979). The groundwork to HPM can be traced back decades e.g. in research papers by Wallace (1926) and Court (1939). However, it was Rosen (1974) who merged the hedonic methodology with the fundamentals of micro economy (which is the approach used in this research paper). HPM, as suggested by Rosen, can be interpreted as a valuation of supply and demand interactions of the market as a whole i.e. it is equilibrium between all the buyers and the sellers’ interactions in the market.

Numerous research papers apply the HPM method to investigate consumers’ willingness to pay for a specific attribute of a product e.g. the method has previously been applied to study the price of avatar attributes in a synthetic world (Castronova, 2004) and how technological components affect the price of hearing aids (De Silva, Thakur, & Xie, 2013). The focus of this research paper is to establish an understanding of willingness to pay for green attributes in the Norwegian lodging industry. There is no specific method to explore this topic, but the framework used in this thesis is based on Kuminoff et al. (2010), who used “an environmental attribute to explain hotel pricing by using a hedonic function” (Sánchez-Ollero et al. 2014). The framework by Kuminoff et al. (2010) illustrates a traveler’s utility maximization problem and a hotel’s profit maximization problem (i.e. the demand and supply side of the hotel market). Following is an inspired illustration for the Norwegian market:

Price for a single night stay of a standard hotel room (y) is simply a function of an environmental factor (j) and other hotel attributes/characteristics, which is expected to influence the price point e.g. internet access or if pets are allowed. These “other” factors are put into a vector (k). This leaves us with the price function:

Equation 1:

$$y = y(j, k)$$

The demand side of the market can be model as shown below. The traveler (which is expected to act in accordance with utility maximization) choose quantity of composite good (z) and hotel which maximize utility given preference (a) and income (i).

Equation 2:

$$U(z, j, k; a) \text{ subjected to } i = z + y(j, k)$$

The next equation shows the supply side of the market. In this model, there is the cost function $c(j, k; b)$, where the vector b is used to describe the costs faced by the hotel. A hotel (which is expected to act in accordance with profit maximization) will choose the (j, k) combination, which maximizes its profit, given cost b.

Equation 3:

$$\pi = y(j, k) - c(j, k; b)$$

The equilibrium in the market occurs when the first order necessary conditions (with respect to environmental factor j) for the supply and demand functions are simultaneously satisfied for all travelers and hotels. This equilibrium is further used to provide an estimate of whether consumers or travelers are willing to pay for green lodging or not.

Equation 4:

$$\frac{\partial y(j,k)}{\partial j} = \frac{\partial c(j,k; b)}{\partial j}$$

The price of the hotel stay (room rate) is in this case the dependent variable of interest and the various hotel attributes or characteristics are the independent variables. The swan label (certified green hotel) is the main independent variable of interest.

4. HYPOTHESIS

Based on previous research from the field of green lodging, the expectation is to find that the “green variable” will have an affect on the price (room rate) in the Norwegian hotel market. Masau & Prideaux (2003), Choi et al. (2009), Kuminoff et al. (2010), Kang et al. (2012), Chan (2013) and Sánchez-Ollero et al. (2014), are some example of researches, which have all argued for the existence of willingness to pay a green price premium in the lodging industry. However, there are (as shown in the litterateur review) just as many researchers who argue for an opposite result e.g. Pulido-Fernández & López-Sánchez (2016). On the other hand, majority of the studies found that consumers where either willing to pay extra or expected the price to be unchanged by implementing sustainable practices, i.e. only a minority of the consumers did expect the price to decrease. In addition, we know that there is an attitude-behavior gap, where the average consumer is interest in green lodging, but not interested to pay additional charges for these practices. American survey findings reported that 62% of the respondents were positive towards sustainable travel, but the survey also shows that only 17% of the same respondents were willing to pay extra for these services (Bender, 2013). This gap also exists in the Norwegian market, but arguably not as extreme, as 33% are willing to pay extra for green products/services (Falch & Bing, 2017). As argued above, the reason for the attitude-behavior gap is that the consumers expects companies’ (or hotels) sustainable measurements to be included in the existing price and not added as an additional charge. These finding initially indicates that the price (room rate) will either be higher or unchanged by the hotels decision to “go green”. However, that is if the results where based on consumer attitudes only e.g. by using questionnaire.

The model approach also plays an important part for what to expect from the estimated results. Previous research, which has investigated the hotels price point after sustainable practices was included (Kuminoff et al., 2010; Sánchez-Ollero et al., 2014) found a positive effect. This shows that the consumers might expect the price, charged by the green hotels, to be unchanged, but in reality it is actually increased. By using a similar approach as Kuminoff et al. (2010) and Sánchez-Ollero et al. (2014), a realistic expectation is therefore that the price point will be increased for green hotels in Norway as well.

This leaves the initial hypothesis:

Hypothesis: Room rates are positively affected by if a hotel is certified green (in the Norwegian hotel market).

The linear price function shown below, only describes the key variables for this thesis: the dependent variable (price for hotel j) and the independent variable (the green variable). The notation ($\chi\delta$) is short for the remaining explanatory variables, as noted by Wooldridge (2013).

Equation 5:

$$P_j = \beta_0 + \beta_1 green_j + \chi\delta + u_j$$

The initial hypothesis or the null-hypothesis (H_0) is that the green variable has an positive effect on how much consumers are willing to pay to stay at a hotel, i.e. increases the price. This means that the expectation is to find a positive correlation between the dependent variable (P_j) and the independent variable ($\beta_1 green$).

$$H_0: \beta_1 > 0$$

Further, this also means that the alternative hypothesis (H_1) is that the green variable has a negative, or no effect on the willingness to pay for a hotel stay, i.e. the price will decrease or be unchanged.

$$H_1: \beta_1 \leq 0$$

5. METHODOLOGY & DATA

Data on hotel room rates and characteristics needed to be collected to be able to develop an estimated hedonic model. The focus of this thesis is green lodging. There are several lodging possibilities in Norway, e.g. hotels or bed & breakfast. However, hotels are the only lodging category, for private consumers, which offer certified green facilities and it also represents the majority of the lodging industry. Therefore it is focused exclusively on hotels and not

included data from other lodging possibilities in this study. Furthermore, there are over 1000 hotels in Norway, where the majority of these hotels are located in Oslo (Horwath Consulting, 2013). The most efficient way to collect the information needed about the hotel industry is to extract it from online search engines, e.g. TripAdvisor.com. TripAdvisor.com is one of the world's largest travel search engines, they offer a range of systematic information about the different lodging facilities and the search engine is also very consumer friendly (TripAdvisor, 2017). In other words, it is a great source to extract the information needed. The information collected, will then be checked against the database of Swan label hotels, which is provided by Svanemarket.no. This leaves the "green category" for the study. Finally, to determine if there exists a willingness to pay a premium for green hotels, the data will be processed by using statistical software programs.

5.1 Data description

Information about room rates, hotel facility and services was collected from 289 different hotels during April 2018. The hotels are selected at random and are spread over 5 different regions in Norway, which is summarized in Table 2. These 5 regions cover the Norwegian hotel market as a whole, which again creates a more accurate or representative result for the Norwegian market.

Table 2. Hotel locations

Region	Number of hotels (in %)
Nord-Norge	50 (17%)
Trøndelag	33 (12%)
Vestlandet	70 (24%)
Østlandet	102 (35%)
Sørlandet	34 (12%)
Norway	289 (100%)

Room rates are affected by both external and internal factors. To accommodate for this and create the most accurate representation of a "room rate model", the variables used in the

dataset, are based on two main sources. The first source is based on previous research, which gives the opportunity to compare the result form this thesis to previous findings from other countries. The variables are based on previous research from Spain (Sánchez-Ollero et al., 2014), USA (Kuminoff et al., 2010; Millar & Baloglu, 2011), Hong Kong (Chan, 2013) and Taiwan (Chia-Jung & Pei-Chun, 2014). The second source is TripAdvisor's own "search categories" e.g. hotel amenities. These search categories are what potential customers can apply when booking a hotel stay.

Table 3. Variable description

Hotel Characteristics (Internal features)	
Price:	The minimum price for a standard room at hotel
Green:	Hotels with a eco-friendly Swan label
Green-advise:	Hotels that are certified green by TripAdvisor.com
Rooms:	The number of rooms in hotel
Star:	Star rating of the hotel
Rating:	Customer rating of the hotel
Facility:	Facility factors
Dining:	Dining opportunities offered by hotel
Business:	Business opportunities at the hotel
Entertainment:	Entertainment factors at the hotel
Location (External features)	
Distance to Public Beach:	In number of meters from the hotel
Distance to City Centrum:	”
Distance to Nature Attraction:	”

Following is a description of all the different variables used in the dataset. Green, Green-advise, facility, dining, business, entertainment and attraction, are all reported as binary variable. The remaining variables (Price, Rooms, Star and Rating) are reported as discrete numerical variables.

5.2 Variables

Price:

It is the minimum price for a single night stay at a standard room, which in this case is a room with double/two beds. Information about the hotel room rates are collected from TripAdvisor.com, which collect information from different hotel booking sites to insure the lowest market price. The currency used is Norwegian kroner (NOK).

Green:

For this thesis, “Green” is hotels that have obtained the eco-friendly swan label. These are hotels that have been officially certified green through a government recognized program. The swan label symbolizes hotels that have adopted (and documented) an overall green practice.

Green-advise:

This variable consists of hotels that are listed as environmental friendly by TripAdvisor.com. The search engine uses a “Green leader program” that showcases hotels that are “committed to green practices” (TraipAdvisor, 2018a). However, the hotels themselves need to apply to be a part of this program/list. As TripAdvisor is only one of many travel search engines and the Green leader program only is advertised on this one search engine, it might not be a priority to apply for this program. Therefore, few hotels from the Norwegian market are a part of the “Green leaders program”.

Rooms:

This is the number of rooms at the hotel and work as a size variable.

Star:

Star rating of the hotel. This is a signal of what level of service and amenities that can be expected at the hotel. TripAdvisor.com use a star-rating system from 1-5, where 1 is the lowest possible rating and 5 is the highest. There are no official global star-rating system, but the 1 to 5 star system used by TripAdvisor.com is a considered a standard in Norway.

Rating:

Rating in this case, means customer rating. Travelers can leave a rating (1-5) and comments about how they experienced their hotel stay. There is no certification of these feedbacks, which means that there is no way to determine if they are accurate or not. Nevertheless, it is still an indication about how previous customers have experienced a hotel and can influence potential customers about whether to stay at the hotel or not.

Facility:

Facility factors can have an important influence on potential customers. These factors describe what can be expected to find at the hotel. For example, this includes if pets are allowed and if the hotel is a smoke free facility.

Dining:

This means if the hotel offers any dining opportunities e.g. offer breakfast included or a restaurant at the hotel.

Business:

This is whether or not there are any business opportunities at the hotel. This includes meeting room, conference center and Internet access.

Entertainment:

The entertainment variable is whether or not the hotel offers any leisure activities. These are factors such as swimming pool, spa and fitness center.

Attraction:

This variable is a distance variable to tourist attractions. As the dataset consist of hotels collected from different parts of Norway, there are no specific attractions included, but instead attraction categories. There are three categories included, which is City Centrum, Public Beach and Nature Attraction. The distance measurement used is within 25km, as this can be considered from walking distance to a short drive.

- City Centrum = Proximity to one of Norway's 10 largest cities based on number of population (Statistisk Sentralbyrå, 2018)

- Public Beach = Proximity to one of Norway's 10 biggest public beaches based on numbers of visitors (Nettavisen, 2017)
- Nature Attraction = proximity to top Norwegian attractions in each region based on reviews from TripAdvisor.com (TripAdvisor, 2018b)

5.3 Summary statistics

Summary statistics from the collected data are shown in Table 4. The price range for a single night stay at a standard room varies from 598 to 4598 (measured in NOK), and number of room varies from 3 to 673. The average hotel however, was priced at 1387kr with 130 rooms. Some common characteristics include dining opportunities e.g. free breakfast (81%) and restaurant in the hotel (80%), some form of laundry service (79%), free Internet in lobby (98%) and in hotel room (91%).

There were also some rare characteristics including kitchenette (6%), concierge (6%), airport transportation (9%) pool or spa (11%). Most of the hotels are classified as a 3 star hotel (69%) and majority of the hotels (67%) had a top travel rating (4 or 5 of a scale of 5). 18 percent of the hotels are certified green or labeled with the eco-friendly swan label and only 7 percent of the hotels are included in TripAdvisor's own green category. About half of the collected data was located near a city centrum of Norway's largest cities (49%). This means that about half the data set is located in a defined urban area.

As a result of the Norwegian "smoke free act" to prevent damage from tobacco, a large proportion of the 289 hotels were smoke free (93%). In addition, unlike similar previous studies, data on number of floors is not included. This information was not available to extract from the hotel search engine and there was also few hotels that provided this information on their web site. As a result, this information is not included in this thesis. However, it is important to note that the number of floors is also strongly correlated with number of rooms (which is included).

Table 4. Summary Statistics

Category	Variable	Obs	Mean	Std. Dev.	Min	Max
Basic	Price (NOK)	289	1387.083	489.2485	598	4598
	Green certification	289	.183391	.387658	0	1
	Green TripAdvisor	289	.0692042	.2542412	0	1
	1-star	289	.0069204	.0830445	0	1
	2-star	289	.017301	.1306168	0	1
	3-star	289	.6920415	.4624501	0	1
	4-star	289	.266436	.4428617	0	1
	5-star	289	.017301	.1306168	0	1
	Travel rating-1	289	0	0	0	0
	Travel rating-2	289	.0242215	.1540027	0	1
	Travel rating-3	289	.3079585	.4624501	0	1
	Travel rating-4	289	.615917	.4872214	0	1
	Travel rating-5	289	.0519031	.2222162	0	1
	Rooms	289	129.9135	104.7774	3	673
Facility	non-smoking	289	.9273356	.260035	0	1
	Suits	289	.5363322	.4995432	0	1
	Kitchenette	289	.0622837	.2420894	0	1
	Pets allowed	289	.432526	.4962857	0	1
	Concierge	289	.0622837	.2420894	0	1
	Room-service	289	.4048443	.4917133	0	1
	Reduced mobility	289	.4290657	.4958013	0	1
	Air-condition	289	.2595156	.4391292	0	1
	Bar	289	.799308	.4012128	0	1
	Laundry services	289	.7889273	.4087777	0	1
	Airport transportation	289	.0899654	.2866285	0	1
	Free parking	289	.4013841	.4910287	0	1
	Dinning	Free breakfast	289	.8062284	.3959377	0
Restaurant		289	.7958478	.40378	0	1
Business	Internet (room)	289	.9134948	.2815962	0	1
	Business center	289	.6089965	.4888216	0	1
	Meeting-room	289	.7543253	.4312333	0	1
	Internet (lobby)	289	.9792388	.1428314	0	1
Leisure	Pool	289	.1107266	.3143376	0	1
	Fitness center	289	.449827	.4983392	0	1
	Spa	289	.1072664	.3099885	0	1
Spatial Variable	Within 25km of...					
	City Center	289	.4948097	.5008403	0	1
	Public Beach	289	.0726644	.260035	0	1
	Nature Attraction	289	.16609	.3728069	0	1

Information about which hotels are certified eco-friendly was collected from Svanemarket.no. (<http://www.svanemarket.no/aktuelt/nyheter/svanehoteller-over-hele-norge/>). All other information in this table is collected from TripAdvisor.com during April 2018. (<https://www.tripadvisor.com/>)

5.4 Comparison of the green and non-green hotels

An important part is to compare the green to the non-green hotels. The green hotels are the hotels that are certified green by obtaining the swan label. All other hotels are categorized as non-green even if they have obtained other potential green certifications e.g. from TripAdvisor.com. A chow test could be applied to test the two hotel groups against each other, however, this would only reveal whether there the two groups are different or not. It would be more beneficial to evaluate each of the included variables against each other. A thorough t-test of each variable is therefore needed to determine specific significant differences (Wooldridge, 2013). Each variable from the dataset is tested to determine whether the mean (from the two groups) is significantly different from each other. As an example, is the mean price of hotel rooms at green hotels significantly different from the mean price of hotels rooms at non-green hotels?

The following hypothesis will be tested for each variable:

$$H_0: \mu_{green} = \mu_{non-green}$$

⋮

$$H_1: \mu_{green} \neq \mu_{non-green}$$

The null-hypothesis states that the variable mean from the green hotels are not significantly different from the variable mean of the non-green hotels. If the null-hypothesis is rejected, it suggests that there is a significant difference. The t-statistics is calculated by using the following formula:

Equation 6:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

\bar{x}_1 = Mean for group 1 (green)

\bar{x}_2 = Mean for group 2 (non-green)

S_1^2 = Standard error group 1 (squared)

S_2^2 = Standard error group 2 (squared)

n_1 = Number of observations in group 1

n_2 = Number of observations in group 2

A two-tailed test with 52 degrees of freedom is applied. As the sample size (number of hotels in each group) is different, the smallest number is selected, which in this case is 53 green vs. 236 non-green hotels. If the calculated t-statistics for a variable is higher than the critical value, the null-hypothesis is rejected.

The comparison of each hotel group (Table 5) reveals some important facts.

The average green hotel has 209 rooms with an average price of 1247kr for a one-night stay at a standard room. The average non-green hotel has 112 rooms with an average price of 1419kr for a one-night stay at a standard room. This reveals a 12% price difference in the average room rate. The price and number of rooms are also significantly different between the two hotel groups at a 1% significance level. Majority of the green hotels has a star rating of 3 (64%) and a customer travel rating of 4 (64%). None of the hotels have less than 3 stars or higher than 4 stars i.e. there are only average to higher average hotels in this group. A high percentage of these hotels offered dining or business opportunities. Majority of the hotels (64%) are also located within 25km of a city centrum of Norway's largest cities i.e. located in urban areas. Majority of the non-green hotels has also a star rating of 3 (70%) and has a customer travel rating of 4 (61%). However, the hotels in this group have anything from 1-5 stars and this shows a bigger variation in this hotel group. Majority of these hotels offer dining and business opportunities as well, but the majority is not located near a city centrum (54%).

Non-smoking, kitchenette, concierge, bar, laundry services, free parking, free breakfast, business opportunities and fitness center are all hotel attributes that are significantly different between green and non-green hotels. In addition, spatial variables (being located within 25km of a city or nature attraction) are also significantly different.

What the statistics from the two different hotel groups tells us, is that there are many similarities, but a higher majority of the green hotels offers "additional benefits", e.g. fitness center, bar, laundry services and room service. This indicates that the green hotels offer more benefits to their customers at a lower

Table 5. Mean (standard errors) for the hotels (separated by green and non-green)

Category	Variable	Green Hotels (53 obs)	Non-Green Hotels (236 obs)	t-value
Basic	Price (NOK)	1247.038 (361.3524)	1418.534 (508.9581)	-2.875***
	Green TripAdvisor	.2264151 (.4225158)	.0338983 (.1813521)	3.251***
	1-star	0	.0084746 (.0918614)	-1.417
	2-star	0	.0211864 (.1443115)	-2.255**
	3-star	.6415094 (.4841463)	.7033898 (.457734)	-0.849
	4-star	.3584906 (.4841463)	.2457627 (.4314536)	1.562
	5-star	0	.0211864 (.1443115)	-2.255**
	Travel rating-1	0	0	0
	Travel rating-2	0	.029661 (.1700109)	-2.680***
	Travel rating-3	.3584906 (.4841463)	.2966102 (.457734)	0.849
Travel rating-4	.6415094 (.4841463)	.6101695 (.4887483)	0.425	
Travel rating-5	0	.0635593 (.2444848)	-3.994***	
Rooms	209.2453 (122.5726)	112.0975 (91.60593)	5.439***	
Facility	Non-smoking	.9811321 (.1373606)	.9152542 (.2790949)	2.515**
	Suits	.6226415 (.4893644)	.5169492 (.5007747)	1.415
	Kitchenette	0	.0762712 (.2659957)	-4.405***
	Pets allowed	.4528302 (.5025335)	.4279661 (.4958355)	0.326
	Concierge	.0188679 (.1373606)	.0720339 (.2590935)	-2.101**
	Room-service	.490566 (.5046949)	.3855932 (.4877696)	1.377
	Reduced mobility	.3773585 (.4893644)	.440678 (.4975236)	-0.849
	Air-condition	.3396226 (.4781131)	.2415254 (.4289177)	1.375
	Bar	.9433962 (.2332953)	.7669492 (.4236729)	4.173***
	Laundry services	.9811321 (.1373606)	.7457627 (.4363571)	6.902***
	Airport transportation	.0943396 (.2950978)	.0889831 (.2853244)	0.120
	Free parking	.2075472 (.4094316)	.4449153 (.4980126)	-3.657***
	Dinning	Free breakfast	.9245283 (.2666788)	.779661 (.4153562)
Restaurant		.8679245	.779661	1.629

		(.3418128)	(.4153562)	
Business	Internet (room)	.9245283 (.2666788)	.9110169 (.2853244)	0.329
	Business center	.8679245 (.3418128)	.5508475 (.498465)	5.556***
	Meeting-room	.9245283 (.2666788)	.7161017 (.4518464)	4.437***
	Internet (lobby)	1	.9745763 (.1577428)	2.476**
Leisure	Pool	.1132075 (.3198784)	.1101695 (.3137664)	0.062
	Fitness center	.6603774 (.4781131)	.4025424 (.4914524)	3.529***
	Spa	.0943396 (.2950978)	.1101695 (.3137664)	-0.349
Spatial Variable				
Within	City Center	.6415094 (.4841463)	.4618644 (.4996032)	2.427**
25km of...	Public Beach	.0754717 (.2666788)	.0720339 (.2590935)	0.085
	Nature Attraction	.0943396 (.2950978)	.1822034 (.3868325)	-1.841*

*Significant at 10% two tailed test with 52 df, **Significant at 5%... and ***Significant at 1%....

5.5 Estimation

As argued previously, a linear hedonic price function will be applied to solve the research question. The first independent variables (green, green-advise, rooms) are in a scalar measurement and the remaining independent variables are vectors.

Equation 7:

$$\begin{aligned} P_j = & \beta_0 + \beta_1 green_j + \beta_2 green-advise_j + \beta_3 rooms_j + \delta \times star_j + \phi \times rating_j \\ & + \gamma \times facility_j + \eta \times dining_j + \kappa \times business_j \\ & + \theta \times entertainment_j + \varepsilon \times attraction_j + u_j \end{aligned}$$

Although the approach is similar to Kuminoff et al. (2010), the specified model above contains a few additional variables. First, “green-advise” is added as a variable. The reasoning is to compare if there are any difference in willingness to pay to stay at hotels that are officially certified green by the swan label and other hotels that claim to be an eco-friendly choice, but not certified by the Swan label. Second, “rating” is also included to determine if customer rating has an effect on the willingness to pay. Lastly, “attraction” is included instead of using “space” which was used in the original model. This is because unlike Virginia (which was used in the previous study) it is no significant variations in room rates from the 5 different regions in Norway i.e. there is no need to adjust for any regional price difference. The “attraction” variable is included to enable if it exist an effect on room rates by hotels being located near a) a public beach, b) a city centrum or c) nature attraction, which are all typical tourist attractions. In addition, the number of floors was also included in the original model. As this information (as already mentioned) is not included in the dataset, it is not included in this model as well.

6. RESULTS

The estimated results are shown in the five columns in Table 6. The first column reports the result from a restricted regression, where “green” is the only independent variable used. The results suggest a negative impact on the price i.e. that customers would pay a premium of 172kr to avoid staying at a certified green hotel.

The second column reports a simple model where the price (P) is regressed with some basic variables e.g. star rating of the hotel, the number of rooms and the green certification factor is included as above. In this column, all the variables except for the “certified green by TripAdvisor” and “number of rooms” are statistically significant.

As expected, hotels with a lower rating (either star or customer rating) have a lower price than the hotels with a higher rating. In addition, all rating variables (star and customer rating) are negative. This is because the top rated hotels work as a base group, and compared to these hotels the customers would pay less and less the lower the hotel is rated. The results from this column also indicate that customers would be willing to pay a premium (193kr) to avoid staying at a certified green hotel.

In the third column, the facility factors (e.g. non-smoking and air-condition) are included in the regression. These variables should intuitively have an effect on the price, but few of these variables are statistically significant different from 0. There is also a similar pattern in the fourth column, where the rest of the facility factors (dining, entertainment) are included. Although not all of the variables are significant, they still have expected magnitude and sign. As an example, customers are willing to pay a premium to avoid staying at a hotel with pets allowed (40kr) and to have access to room service (108kr).

Finally in the fifth column all the variables are included, revealing the final result. Moving from the fourth to the fifth column only has minor impact on the variables. Few of the included facility factors are significant. This means that even though they are expected to influence the room rates, the results can not provide proof that they actually has any effect at all. Star rating of the hotel is the variable with biggest magnitude on price. An interesting observation is that only distance to a public beach is significant among the “distance

variables” and this also shows that customer are expected to pay a premium to avoid staying by the beach (256kr).

Left to right, the estimated result appears to make intuitive sense. The magnitude the “green variable” has on the price varies with the number of independent or control variables included, but both magnitude and statistical significance has declined when comparing the estimated results from column 1 to column 5. It is clear that the certified green variable has a negative effect on the room rate. Travelers are expected to pay between 157-193kr less for a standard room at an environmental friendly hotel versus a non-environmental friendly hotel i.e. travelers are not willing to pay extra to stay at an environmental friendly hotel.

Table 6 also presents the R-squared (R^2), which can be interpreted as “percentage of variance explained” (idre, 2017) and measures the overall fit of the model. As expected the R^2 is increasing as more variables are included. In the first column ($R^2 = 0.0185$) and in the final column ($R^2 = 0.33$). This means that even when all variables are included, it still only account for about 33% of the variation in the room rate. The explanation of the relative low R^2 value is found in the summary statistics (Table 4), which shows a large variation in the data sample and therefore the Norwegian hotel market. The R^2 measures the variability in the sample, and as the “scatter” is large (e.g. the variation in price and number of rooms), this will create a less “perfect” fitted model, which then leaves a rather low R^2 value (Frost, 2017).

Table 6. Coefficients (standard errors) for models of hotel room pricing

Variable	Column 1	Column 2	Column 3	Column 4	Column 5
Green certification	-171.4962*** (59.4528)	-193.1763*** (64.07636)	-156.972** (63.01314)	-167.038** (66.1865)	-159.1433** (67.4122)
Green TripAdvisor		102.8891 (72.90629)	44.2706 (77.05082)	28.6111 (81.08515)	22.73029 (82.30611)
1-star		-878.4856** (375.5753)	-676.3126* (347.467)	-643.2554 (339.9558)	-651.3006* (340.7081)
2-star		-1413.347*** (271.2177)	-1134.575*** (224.5066)	-1084.424*** (230.9441)	-1105.637*** (234.5955)
3-star		-928.8546*** (269.2001)	-784.824*** (215.5556)	-761.3086*** (208.2076)	-762.5939*** (210.7705)
4-star		-785.2108*** (273.497)	-679.3756*** (214.5333)	-654.6251*** (218.2076)	-647.4035*** (220.9406)
Travel rating-2		-683.1379*** (227.251)	-536.9586** (205.9496)	-494.3082** (219.6602)	-524.963** (217.1511)
Travel rating-3		-502.9862** (211.2628)	-520.0022** (208.044)	-519.3235** (214.0769)	-528.8846** (213.8458)
Travel rating-4		-346.455* (208.3778)	-397.7515** (199.5891)	-403.9134** (205.2414)	-420.7503** (204.9506)
Rooms		.1774738 (.2997865)	-.275092 (.3515587)	-.3686001 (.3907483)	-.4294149 (.4009815)
Non-smoking			19.88901 (67.07263)	-52.56307 (83.05742)	-52.33411 (83.16584)
Suits			122.4239** (53.62837)	98.39553 (53.21653)	108.0612** (54.70652)
Kitchenette			-313.6074*** (114.8583)	-296.2605** (121.8113)	-287.689** (124.1792)
Pets allowed			-21.87968 (56.66478)	-40.0971 (54.03576)	-31.07687 (53.146)
Concierge			131.2859 (94.40824)	149.7196 (96.35056)	129.8182 (98.91574)
Room-service			108.1374* (59.92385)	107.6896 (66.5791)	114.4755* (65.48586)
Reduced mobility			142.7349** (54.84088)	135.9401** (60.50194)	139.5705** (60.21237)
Air-condition			79.79147 (69.68035)	70.72693 (69.31062)	63.06955 (72.70883)
Bar			-1.67576 (69.14462)	-64.2741 (70.90083)	-68.83783 (69.75398)
Laundry services			-48.02209 (77.57251)	-58.42547 (76.11227)	-55.3824 (75.47214)

Airport transportation	13.85047 (109.7321)	5.209641 (109.9374)	-13.73588 (109.8171)		
Free parking	-5.700861 (63.45134)	-38.68986 (62.65293)	-39.93483 (63.62096)		
Free breakfast		87.48218 (78.38073)	93.97062 (78.27566)		
Restaurant		89.14074 (72.45998)	87.36411 (69.69286)		
Business center		-4.021687 (58.71294)	-31.99635 (58.00843)		
Meeting-room		46.39988 (65.89848)	36.30331 (63.46787)		
Internet (lobby)		2.533522 (136.6494)	6.611079 (132.3425)		
Internet (room)		171.9164** (77.37626)	168.7181** (81.66164)		
Pool		-36.64061 (149.1807)	-21.58972 (148.4031)		
Fitness center		34.51473 (65.92028)	21.79078 (65.78266)		
Spa		13.18989 (114.0671)	34.99731 (112.7386)		
City Center			18.40836 (58.26245)		
Public Beach			-256.1783*** (77.26057)		
Nature Attraction			26.36257 (76.10797)		
Constant	1418.534*** (33.17507)	2659.712*** (336.1715)	2466.366*** (312.2883)	2277.046*** (344.5631)	2297.211*** (341.117)
R²	0.0185	0.21	0.29	0.31	0.33
Observations	289	289	289	289	289

All Variables are summarized in Table 3. *Significant at 10% ($p < 0.1$), **Significant at 5% and ***Significant at 1%.

7. DISCUSSION

The developed hypothesis for this thesis was that the “green variable” would have a positive effect on the room rate, i.e. consumers would be willing to pay a premium to stay at a green hotel. The estimated results suggest that the certified green variable has a negative effect on room rate, which further means that the travelers or customers are not willing to pay a premium. The results do not support the developed hypothesis or it can also be put as to reject the hypothesis.

As shown previously, research from USA and Spain (Kuminoff et al., 2010; Sánchez-Ollero et al., 2014), which has applied a similar framework as used in this paper, has found a positive willingness to pay for hotels that has implemented sustainable practices. Particularly, Kuminoff et al. (2010) established a willingness to pay between \$17.09 - \$22.82 (approximate 133-177kr) to stay at an environmental friendly hotel. But in this research paper the results are almost the exact opposite, with the appearance that customers would be willing to pay between 157-193kr to avoid staying at a certified green hotel. It is interesting to find such variation in the American and Norwegian hotel market, however, as argued previously there are also research (Chou Chia-Jung & Chen Pei-Chun, 2014), which finds a willingness to pay a premium to avoid staying at a certified green hotel, so it not highly unlikely that the results would vary.

There might be different factors, which contributes to the negative result, but based on the information gathered in this research paper, there is arguably one main reason for the result and why it differs from previous similar research: the price difference.

There are significant differences between the green and non-green hotels in the collected sample, where the price is a key part to explain the negative results. A traditional view of adopting a green practice is that it might be an expensive investment, e.g. large sunk costs and higher operating costs of purchasing eco friendly products and installing green services at the hotel (Kang et al., 2012). To alleviate these additional costs, the hotels may charge a premium, i.e. the additional costs are passed on to the customer through higher room rates. These concerns are shared by both Kuminoff et al. (2010) and Sánchez-Ollero et al. (2014), even though they also recognize that going green can decrease a range of the hotels costs.

Although the researchers have some valid points, they do not provide any more information about their cost concerns in the long-term perspective. There are clearly additional costs by going green in the short-term, however, there are many cost cutting opportunities in the long-term (e.g. water and energy savings). Which of these posts (short-term additional cost vs. long-term cost savings) are highest, might vary from hotel to hotel. Overall, recent literature suggests that there are more costs saved than added by adopting a green lifestyle (Knox, 2015). This view also seems to be reflected in the Norwegian hotel market, where the statistical findings shows that implementing sustainable measurements decreases the average room rate by 12%, which means that going green is not only beneficial for the environment, but also cost effective. In addition, the statistics also suggest that these hotels does not provide less benefits towards their customers, i.e. going green does not effect the quality of the hotel experience. In fact, these hotels provide even more benefits towards potential customers. This suggests that the difference in room rates is based on lower cost as a result of going green. By sharing the cost savings/cuts with the customers, it would be natural that the “green variable” would have a negative effect on the room rates. Moreover, the hotel industry is highly competitive and as technology provide accessible consumer tools (travel search engines), it has never been easier for the consumers to compare hotels where price is king. Lowering the room rate is therefore arguably an important competitive advantage. This means that sustainability is not only financial beneficial because it is a cost saving strategy, but also because it is a competitive advantage and will attract new customers (Claver-Cortés, Molina-Azorín, Pereira-Moliner, & López-Gamero, 2007).

Another possible explanation is that the majority of the green hotels did not actively advertise that they were certified green, possibly as actively advertising sustainability might have a negative effect on consumers (Newman et al., 2014). Therefore the average customers might not know that they are actually staying at a certified green hotel or not.

Further, there might exist cultural or social differences, which could explain the difference in results (as argued by Kang et al., 2012). However, survey findings reveal that majority of Norwegians are interested in products and services that are sustainable (Andersson & Kuiper, 2017). The positive consumer attitudes towards green products and services would initially indicate that the “green variable” would have a positive effect on room rates and therefore does not explain the negative result.

7.1 Limitations

There are some limitations of this research paper that needs to be addressed. Although the chosen approach to answer the research question provides the means to solve it in an objective way and let the numbers speak for themselves, there are also some drawbacks.

First, the room rates will vary throughout the year, e.g. the prices will be affected by season and more importantly the consumers' willingness to pay will also vary throughout the year (in the hotel industry). The result is that the proposed conclusion on whether consumers are willing to pay a price premium, is condition on the period where the sample was collected. The information used in this thesis was collected during April 2018 and this might have implications on the result.

Second, the researcher has to select which hotel characteristics to include in the analysis, which means that the dataset and the results will be defined by the researcher's individual choices. As noted by Kuminoff et al. (2010), the true shape of the price function is also unknown and therefore again need to be selected. Yet again this means that the result of this thesis will be affected by individual choices and therefore it is crucial which factors are included and not. For example, omitted variable bias (when excluding relevant factors) and undesirable effects on the variance of estimations (when include irrelevant factors) are two important problems that might occur as result of the variable choices.

Lastly, many of the estimated variables were not statistically significant different from 0. This might indicate that sample might be flawed or not represent reality in a proper way. The sample used consisted of 289 observations. Westland (2010) recommends sample size of 200-400 when performing a data analysis as done in this research paper. This means that even though the sample size surpasses the criteria of recommended number of observations, it is still fairly low. The limitations of this thesis leave opportunities for further research.

7.2 Suggestions for further research

As a result of multiple pressing global environmental challenges, awareness of how government, corporations and consumers can decrease its environmental impact is key. A thorough book of research literature of "the green topic" is therefore needed.

This thesis focus on one small aspect of the environmental friendly theme and there are room for extended research on several important parts on this topic. For example, there are geographical differences when it comes to understanding how environmental friendly

products and services affects and are received by consumers. Continued research on the personal views of consumers or more precisely, their views of being environmental friendly, is important to increase our understanding of the true willingness to pay for environmental friendly goods and services.

The results provided in this research paper are conditioned by my decisions. This means that the reported result is affected by the way this research paper is conducted. Kuminoff et al. (2010) argues for performing an internal meta-analysis to increase the robustness of the reported result and make it less condition by the researchers decisions. This involves running multiple regressions with different parametric forms of the equilibrium hedonic price function and different combinations of included variables (which is expected to influence the room rates). This produces a range of different results, which can further be compared and finally reveal a more robust solution and a better understanding of willingness to pay for certified green hotels.

It might also be interesting to investigate the short-term added cost vs. the long-term saved costs of adopting a green lifestyle. A deeper understanding of the true cost of going green is important in multiple business areas. In addition, it is also important on a government level, as the need to implement “green politics” is increasingly. To understand the economics of environment friendly practices is arguably the best way forward to expand its position in the global market.

8. CONCLUSION

The purpose of this thesis was to establish if it exists a willingness to pay a price premium to stay at an environmental friendly hotel in the Norwegian market. In order to assess this, a hedonic price function was used to accommodate both internal and external factors of the pricing of hotel rooms (the room rate). The main focus is to investigate the effect from the “certified green variable” has on room rates. This builds on existing litterateur and increases the knowledge on the topic of green lodging.

The results from the hedonic price function shows that the green variable had a negative effect on the price (room rate) for a single night stay at a standard room. The magnitude of the effect is estimated between negative 157kr to negative 193kr. Based on the presented findings in this research paper, it does not appear to exist a willingness to pay a premium to stay at an environment friendly hotel in the Norwegian market. The main reason to explain this seems to be that the certified green hotels offer lower room rates on average. The traditional idea that going green increases the cost and therefore needs to be addressed through a green price premium seems therefore to be somewhat exaggerated.

Even though this thesis does not provide any evidence supporting that consumers are willing to pay a green price premium, consumers are still aware or interested in green consumption. In fact, the world is moving in a green direction. Green products and services represent an eminent part of today's market and its also increasing at a rapidly pace. The term "going green" is no longer only found on government or corporate level, but has actually found its way into the everyday life of consumers in big parts of the world. The motivation behind this is still somewhat unclear, as there are intertwining factors and incentives involved. However, regardless if "helping the environment" is the main goal or only a side effect of a profitable business, sustainability still benefits the environment, which is a good thing for everyone.

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