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Department of Economics

The Willingness to Pay Extra for Environmental Certificated Hotels in Stockholm

- A survey based master's thesis about consumers driving characteristics towards hotels' green work.

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Abstract

The year 2017 has been designated “the international year of sustainable tourism for development” by the United Nations 70th General Assembly [General Assembly 2016]. Hotels have the potential to decrease the environmental impacts of their guests in their facilities.

The purpose of this paper is, first, to find out if there exists a willingness to pay for staying at a “green” hotel in Stockholm and, second, to examine which hotel guests are willing to pay; which specific characteristics of a consumer seem to be the driver for both the actual decision and for the monetary amount people are willing to pay extra for environmental certificates at a hotel. The results were obtained by analysing responses from a survey using Cragg’s Tobit Model. The main findings show that there is a willingness to pay extra for ensuring that the guests are staying at an environmentally certified hotel. The driving characteristics for this willingness are age, the main purpose for the stay, and hotel guest occupation. Those travelling for business are willing to pay more than those travelling for leisure. Senior citizens are willing to pay a much lower premium compared to students and those employed part- and full-time. Hotel guest age group will have an impact on the total amount a consumer is willing to pay for this environmental service. The results obtained can be used as guidelines for cost distribution to policy makers and companies, when implementing more environmentally friendly initiatives into different businesses.

Keywords: Willingness to pay, Cragg’s Tobit, contingency valuation, environment, hotels, Sweden, environmental impacts

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Stockholm, June 2017

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Table of content

Abstract.....	ii
Acknowledgements.....	iii
1. Introduction.....	1
1.1 International Tourism and Economy.....	1
1.2 Sweden's Tourism and Economy.....	2
1.3 Environmental Impacts from Tourism.....	2
1.4 The Problem.....	4
2. Previous Literature.....	5
2.1 Expected Results.....	9
3. Methodology.....	9
3.1 Conceptual Framework.....	9
3.1.1 Contingency Valuation Method.....	9
3.1.2 Welfare Economics.....	10
3.2 Econometric Model.....	11
3.2.1 Interpreting the Model.....	13
4. Data.....	13
4.1 Potential Threats to Validity.....	15
5. Results.....	15
5.1 Survey Data.....	15
5.2 Descriptive Statistics.....	16
5.3 Results from Cragg's Tobit.....	19
6. Analysis.....	23
7. Conclusions.....	24
References.....	26
Website References.....	28
Appendix 1 Survey.....	I
Appendix 2 Variable Description.....	V
Appendix 3 Derivation of Cragg's Tobit.....	VII
Appendix 4 Results from Cragg's Tobit.....	X

1. Introduction

The year 2017 has been designated “the international year of sustainable tourism for development” by the United Nations 70th General Assembly [General Assembly 2016]. This initiative seeks to promote the role of how the tourism industry can work to create a more sustainable sector. This is principally done in five main areas: 1) Inclusive and sustainable economic growth, 2) Social inclusiveness, employment and poverty reduction, 3) Resource efficiency, environmental protection and climate change, 4) Cultural values, diversity and heritage, and 5) Mutual understanding, peace and security [IY 2017].

This initiative is designed to work together with the 2030 agenda for Sustainable Development and the Sustainable Development Goals [General Assembly 2015]. These goals focus on actions taken by both individuals and society. The tourism industry and hotels have the possibility to change their guests’ environmental footprints by implementing different initiatives in their company that decrease the negative environmental impacts they may have. They have the chance to help minimize unnecessary water use, switch to clean energy, provide decent work conditions and pay taxes. They can help their consumers to be more responsible and take action to help the climate. All these possible actions are directly linked to the Sustainable Developments Goals [General Assembly 2015].

1.1 International Tourism and Economy

International tourism plays a huge role as a job creator and promotes economic development around the globe [WTTC 2017]. As seen in Figure 1, money that a tourist spends has an impact on both the actual sector that the money was spent in, but also indirectly increases production and job opportunities which enhance the global and local GDP [Tourism Economics 2012].



Figure 1 Economic Impacts of Tourism [Source: Tourism Economics 2012]

The number of international tourism arrivals globally is increasing [World Bank Indicator Global] and the trend of travel and tourism’s impact on the economy and employment is assumed to continue [WTTC 2017].

A tourist is defined by United Nations World Tourism Organization to be a visitor (domestic, inbound or outbound) if he stays overnight [UN 2008].

1.2 Sweden's Tourism and Economy

In Sweden the average ratio between tourism and GDP since 2000 has been between 2.6 and 2.8 percent annually. The average consumption coming from tourism increased annually of 4.4 percent [Tillväxtverket 2015]. This indicates that the tourism sector makes up a substantial part of the Swedish GDP, it grows faster and it will have a more significant impact in the future.

Since 1995 the number of guest nights by foreigners has increased by 111 percent and domestic number of guest nights has increased by 61 percent [Tillväxtverket 2015]; therefore, the international trend in increased international tourist arrivals is also true for Sweden [World Bank indicator Sweden]. Alongside this positive trend in arrivals, the tourism industry has a positive impact on the Swedish economy in terms of export value [Visit Sweden and World Bank Export]. Export value of tourism is the monetary value of consumption in the country the tourist is visiting. About 32 percent of the total consumption in 2015 was spent on accommodation and restaurant visits. The number employed in the tourism industry has increased since 2000 and the sector that has increased the most is hotels and restaurants [Tillväxtverket 2015].

In Stockholm you can find both small hotels and large hotels, and hotels that are part of a local or international hotel chain. Some of those hotel chains are Best Western, Clarion, Elite hotels, Ibis hotel, Hilton, Marriott, Nordic Choice hotels, Radisson and Scandic hotels. In the report from the Swedish Agency for Economic and Regional Growth, they state that travellers have become more accustomed to travelling, handling most of the reservations and planning themselves. Also they place higher demand on service, comfort, sustainability and content of their trips than before [Tillväxtverket 2015].

1.3 Environmental Impacts from Tourism

The positive impact on the global economy coming from the tourism industry comes with the drawback of a negative impact on the environment [UNEP]. There is a close relationship between the tourism sector and the environment which make it a highly climate-sensitive economic sector. Specifically, there are four broad categories of climate related impacts that will affect the competitiveness and sustainability for tourist regions. 1) *Direct climatic impacts* is the first, since climate is a seasonal driver for tourism demand; for example, the destinations are sensitive for extreme weather, such as when there is snow and sun. 2) *Indirect environmental change impacts*, where changes in climate will affect tourism in terms of changes in water availability, natural hazards, loss of biodiversity, etc. 3) *Impacts of mitigation policies on tourist mobility*, where the travelling component of tourism is in focus due to greenhouse gas emissions. 4) *Indirect societal change*

impacts, where climate change is considered to pose a international and national risk due to less economic benefit coming from fewer tourists [Simpson et al. 2008].

In an attempt to protect the environment, the United Nation World Tourism Organization has set up a framework for responsible and sustainable tourism called the Global Code of Ethics for Tourism. It was adopted in 1999 by the General Assembly of the Word Tourism Organization [UNWTO 2001]. Article three in the Global Code of Ethics for Tourism [UNWTO 2001] states that *“all forms of tourism development that are conducive to saving rare and precious resources, in particular water and energy, as well as avoiding so far as possible waste production, should be given priority and encouraged by national, regional and local public authorities.”* This can be seen as fundamental for several different environmental initiatives that hotels can choose to participate in. All of them contain different goals and standards that need to be met by the hotels, which, if done right, lead to a certificate for their work. The two largest initiatives that help hotels in Sweden to be more aware of their impact on the environment are Green Key and the Nordic Swan Ecolabel.

Green Key is an environmental initiative that is used by most hotels and hostels in Sweden. Green Key International cooperates with some of the larger actors in the international tourism industry. This environmental label has been in existence in some parts of Sweden since the mid 1990's but became nationally known in 2003 [Green Key About]. In order to be certified by Green Key the hotel must be compliance with 13 different areas of mandatory commitment, development and participation [Green Key Sweden 2016]. Some criteria include measuring their CO₂ emissions, saving water and energy, using environmentally friendly cleaning supplies, recycling and separating at the source and many more. The areas where sustainable development goals are set are not only for the actual business of the hotel and accommodations, but also for the whole building. This includes the offices, restaurants, outdoor areas and their corporate social responsibility regarding work environment, environment, health and security [Green Key Sweden 2016].

Nordic Swan Ecolabel is a European ecolabel used for many goods and services. The Nordic Swan Ecolabel began 25 years ago when the Nordic council of ministers founded "the Swan" to help consumers choose environmentally conscious products. It all started with labelling copying paper and batteries, but today you can choose from over 10 000 products and services carrying the Nordic Swan Ecolabel [Nordic Swan, about]. A Nordic Swan Ecolabelled hotel is a hotel that has adopted a plan to work for a better environment while meeting the requirements of Nordic Ecolabelling. The hotel works to reduce water, waste, and energy while minimizing the use of chemical products [Nordic Swan Ecolabelling 2016].

1.4 The Problem

The continuously increasing trend in international tourism industry has, as mentioned above, not only positive externalities on society in terms of increased export values; it comes with negative impacts on the environment regarding travels, way of living and management of resources. Within this context, the objective in this paper is twofold. The first aim is to explore the demand for environmental certificates in the hotel market in Stockholm Sweden. The second aim is to examine which characteristics the consumers have and how those attributes influence the monetary value, both conditionally and unconditionally, on their willingness to pay. This paper examines who is willing to pay extra to be sure that they are staying at a hotel certified by an environmental program?

Those research questions will be examined using a two stage approach where the first step is to look at if there is a willingness to pay or not. The second step is to estimate the monetary value the hotel guests are willing to pay. This will be done using Cragg's Double Hurdle as stated by Burke [2009].

Several previous studies have examined consumers' willingness to pay a premium for "green" air travels. However, not so many have been conducted about if there exists a positive willingness to pay a premium in order to know that a consumer is staying at a "green"¹ hotel. There are a few previous studies that have been done in the United States about consumers' willingness to pay a premium for green attributes at hotels [Kang et al.2012, Kuminoff et al. 2010] but as far as the author is aware, no studies have covered the Swedish market for green hotels. So, this thesis will help determine if there is a willingness to pay a premium for staying at a "green" hotel in the area of Stockholm, Sweden.

This paper makes contributions regarding both national and international tourism in Sweden by examining the impacts of individuals' characteristics on the market. It will provide information about the demand for environmental services in the Stockholm hotel market and help shed light on one important topic for the wellbeing of our planet.

The rest of the study is structured as follows. Section 2 provides an overview of previous literature and some expected results. Section 3 describes the methodology with the chosen conceptual framework and an explanation about the model used to analyze the research question. Section 4 introduces the data and section 5 describes the results. The analysis and conclusion are presented in section 6 and 7.

¹ In this current paper a "green" hotel is a hotel that is certified towards an environmental program such as Nordic Swan Ecolabel or Green Key.

2. Previous Literature

There are several studies that have investigated the consumption of “green” goods and the willingness to pay a premium for those goods. Some articles have focused on establishing the level of premium, some look at who the consumers are that are willing to pay this premium, some examine why consumers act the way they do and some on how they compare themselves to others. Presented below are some previous studies that are related to the current paper’s research question, theory and choice of method; they are summarized in Table 1 below.

One approach that can be taken to find the willingness to pay is to use a Hedonic Price model. This has been done by Kuminoff et al.[2010]. A Hedonic Price Model is a good model to use when the aim is to estimate the willingness to pay for an environmental service by looking at how it directly affects the market value. That is, one tries to value one specific characteristic by looking at how much consumers are willing to pay extra when the specific characteristics of a good changes. For the current paper, this method would have been the preferred method for analyzing existing price data from several hotels with respect to their characteristics and amenities. This would have told us the actual market values for the consumers’ willingness to pay for staying at a certified hotel. Kuminoff et al [2010] does that and their estimation builds on collected information about prices and amenities of both “green” and “brown” hotels in Virginia. They used data from online platforms and not from the hotels directly. They found that a hotel guest staying at a “green” hotel can expect to pay a price between \$8.97 USD and \$25.43 USD more for an equivalent room at a “brown” hotel. This was the intention of the current paper but due to limited accessibility of the data required for this model, the approach had to be changed. However the study by Kuminoff et al.[2010] tells us that we can assume that this price differentiation exists even outside Virginia and that it would not be unreasonable to believe that this phenomena would be seen in the Swedish hotel market, in Stockholm.

Another way to establish consumers’ willingness to pay is by a contingency valuation method which will be explained more detail in the method section. This method is used by Vondolia and Asendo-Boadi [2015] in their article where they investigate if households in Ghana want the private sector to be involved in the process of improving water distribution. They also try to establish how much households are willing to pay extra in order to take part in this project. They found out that there does exist a positive willingness to pay, but that the monetary size differed a lot depending on the household’s location, income and other characteristics.

The current paper focuses on the hotel industry in Stockholm in order to examine if there exist a willingness to pay for environmental certificated hotels. According to Kang et al [2012] there exists such willingness amongst hotel guest in United

States. They addressed consumers' willingness to pay for green initiatives of the hotel industry in an attempt to investigate the relationship between hotel types and guests' levels of willingness to pay for green practices. They did so using the Social Identity Theory and the Means-End Theory in combination with the contingent framework of Corporate Social Responsibility as their conceptual framework. To understand why consumers behave like they do in different environmental settings they used a contingency valuation together with social identity theories as frameworks. To conduct their study they used a survey combined of three major parts, 1) demographics of the respondent, 2) hotel type they stayed at most frequently and 3) if they had a willingness to pay a premium for the green initiatives of a hotel. To capture the willingness to pay they used the New Ecological Paradigm Scale that was originally proposed in 1978 by Dunlap and Van Liere but was later revised [Dunlap et al. 2000] in order to understand the respondents' attitude towards environmental concerns. The current paper has chosen another approach to try to capture the consumer's attitude towards the environment by using two statements from Gallup [Carlson 2005]. The main findings from Kang et al.[2012] are that U.S hotel guests have a positive willingness to pay and guests with a higher degree of environmental concerns are also willing to pay a higher premium. The same findings are expected to be found in the current paper since it is assumed that result will show tendencies towards a positive relationship between the individual's level of environmental concerns and their willingness to pay an extra premium for green initiatives according Kang et al's. [2012] Social Identity Theory.

Another article written by Johansson-Stenman and Martinsson [2006] propose that consumers' utility is derived from goods and their attributes as well as from their own self-image regarding their perceptions of their preferences. This study focuses more on the consumers' attitude towards their own environmental behaviour in relation to what they think others think rather than focusing on how consumers behaviour with respect to expenditures. Johansson-Stenman and Martinsson [2006] constructed a model in order to attempt to explain possible differences between perceived and actual preferences. They tested this model by doing a survey asking Swedes how much a variety of characteristics, including status, value and environmental performance would matter when they themselves buy a car. The same questions were asked regarding how much this would matter for others when they buy a car. Johansson-Stenman and Martinsson [2006] found that there are different patterns in preferences depending on who the consumer compares himself to. They also find evidence that people do consider both status value and environmental performance when they buy a car. Also people tend to care more about status and are less concerned about the environment than they would admit to themselves.

This aspect could be true regarding the hotel market since some hotel chains have a higher social status than others. Consumers might care more about number of stars and a well known hotel name than the environmental work of the said hotel. Johansson-Stenman and Martinsson [2006] also found that people's perceptions about others' preferences are biased for two reasons; first, people want to see themselves as better than others and second, people are influenced by preference falsification prior to the study. The Johansson-Stenman and Martinsson's [2006] article is relevant to the current paper since it adds an extra level of thinking about how to capture the "true" willingness to pay from hotel guests in Stockholm. It investigates if there is a disparity between the value oneself puts on the environmental service, and the value one thinks others put on the same good, and then investigate the magnitude of the disparity. One could maybe get a truer picture about the willingness to pay using this model, even though it might be biased. However this question will not be answered in the current paper but is left for future analysis. If there exists a disparity between those two groups, you will most likely find it between the age of the respondent and at what type of hotel they are staying at.

Fitting and Interpreting Cragg's Tobit Alternative Using STATA by Burke [2009] is an article which clarifies and introduces the command *craggit* that is used in STATA in order to run Cragg's Tobit alternative model. This paper provides the foundation for the model used in the current paper.

Table 1 Summary of previous literature

Author, (year)	Purpose	Theory and Method	Main Findings
<i>Studies related with subject</i>			
Kang et al. [2012]	Investigates the relationship between hotel types and guests' levels of willingness to pay for green practices in the U.S.	Social identity and means-end theory in combination with the contingent framework of corporate social responsibilities. Conducted a survey.	U.S hotel guests have positive willingness to pay. Those staying at more luxurious hotel are willing to pay a higher premium than those staying at economy hotels. Guests with higher degree of environmental concern have higher willingness to pay.
Kuminoff et al. [2010]	Analyzing data on room rates in order to see if there exists a price differentiation between "green" and "brown" hotels.	Internal meta analysis of a hedonic price model.	Hotel guests can expect to pay a higher price for a standard room if staying at a "green" hotel compared to a "brown" hotel.
Johansson-Stenman and Martinsson [2006]	Examine what explains a consumer's utility from consumption and self image when buying a new car.	Conducted survey. Used a Lancasterian model as well as Probit model.	There are different patterns in preferences depending on who the consumer compares himself to. And that status has more impact than environmental concerns.
<i>Studies related with method</i>			
Vondolia and Mensah Asendo-Boadi [2015]	Do households want and private sector to be involved in improving water delivery in Ghana and can what are they willing to pay for it.	Contingent valuation survey. Consumers utility theory analyzed my using a two-stage Tobit by Cragg.	There is a positive willingness to pay. Both the decision to pay and the amount they are willing to pay for improved water delivery is determined by the households' location, income and other factors.
Burke [2009]	Explains the set up and use of Cragg's Tobit double hurdle	Fitting Tobits corner solution model with Cragg's more flexible alternative.	They present the user-written STATA code. How to write it and how to interpret the results.

2.1 Expected Results

The presumed results are that the findings from this paper will be in line with the results coming from Kang [2012]. They considered both high income and low income hotels and this study will consider the mid income hotel market so the results expected are that there will be a difference between the reason for the stay as well as the income level terms of type of occupation. It is also expected that there will be tendencies towards a positive relationship between the individual's level of environmental concerns and their willingness to pay an extra premium for green initiatives according to according to Kang et al's. [2012] Social Identity Theory.

3. Methodology

Instead of following the same approach as Kuminoff et al.[2010] and the Hedonic Price Model the current paper will try to establish if there exists a willingness to pay and to calculate the magnitude of that willingness in Swedish krona (SEK) per night, should it exist. The model focuses on the consumer side instead of the market side by using the contingent valuation method. This method is often used in environmental economics in order to estimate an economic value on environmental services. It has the advantage that one can ask the respondents directly how much they are willing to pay for a hypothetical service or good. The drawback is the hypothetical bias that might arise from an overestimation of the results due to the fact that respondents do not pay the stated amount when the hypothetical situation becomes reality [Blumenschein et al. 2008]. Findings from the Blumenschein et al [2008] experiment suggest that willingness to pay can be truthfully estimated if the survey is followed by questions about the certainty of responses.

3.1 Conceptual Framework

3.1.1 Contingency Valuation Method

Contingent valuation method is as mentioned in section 2, used in order to estimate an economic value on environmental services. This can be done by asking respondents how much they would be willing to pay for a specific environmental service, for example in a survey [Blumenschein et al 2008]. It is called contingent valuation because the willingness to pay is contingent on a specific hypothetical scenario and environmental service. The use of Contingency Valuation Method can be regarded as controversial, unreliable and invalid in its results since it is not clear what the respondents actually do when the hypothetical question becomes reality. However, previous literatures still show that it is a valid method to use and that all new research conducted using this method can help improve the reliability of this valuation method.

The goal of contingency valuation method is to measure the monetary amount a person is willing to pay in order to obtain the environmental benefit while keeping his utility constant, similar to compensating variation.

3.1.2 Welfare Economics

The contingency valuation method is closely associated with micro economic fundamentals and welfare economics. More precisely, it is very much linked to compensating variation and equivalent variation. The first measurement, compensating variation, is how much one would have to compensate a consumer in order to offset a change in price in order to let the consumer remain on the same utility curve. Equivalent variation on the other hand is how much one needs to take from the consumer in order to harm the consumer as much as the new price so that he will be on the new lower utility curve [Perloff 2011]. For this study this means that the consumer is asked to state how much of his income he is willing to give up in order to increase the environmental benefit. Using the compensating variation will reveal the maximum amount a consumer is willing to pay in order to have an environmental certificate at the hotel while remaining on the same utility level; in other words, the willingness to pay. Figure 2 shows the simplest form of a consumer compensating variation and equivalent variation when talking about environmental benefits. Where the research question is to find the willingness to pay, in Figure 2; which is given utility level U , what the consumer are willing to spend as a proportion of his income on increasing environmental benefits from E to E' . Under compensating variation the consumer is willing to pay extra in order to remain at the same utility U while reaching the new level of environmental benefits E' .

If the current paper would instead have been interested in finding the level of monetary value consumers would pay order to accept that a change happens, the measured equivalent variation would have been preferred. In Figure 2 that would be illustrated by the willingness to accept. That is the monetary amount a consumer would be willing to accept in order to stay at the environmental benefit level E but still have the same utility level U' as he would have had if E' was met.

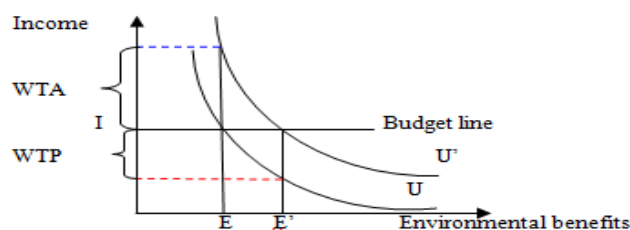


Figure 2 Trade-off for consumers in the compensating variation and the equivalent variation. [Source: analogous to Perloff 2011]. Willingness to pay (WTP) , Willingness to accept (WTA)

3.2 Econometric Model

Cragg's double hurdle model as proposed by Burke [2009] is a suitable approach because the research question with its objectives can be answered in multiple steps and the data is likely to have a high number of non users and participants that are not willing to pay any amount for the requested service. This is because it accounts for the presence of a high number of zero values, which is good when having a binary response variable [Cragg 1971]. The theoretical and econometric framework will be based on Cragg's double hurdle model which has integrated a probit model with the standard Tobit model [Burke 2009]. Cragg's double hurdle model will henceforth be referred to as Cragg's Tobit and will be conducted with the same intuition as Burke [2009]. All crucial steps of the model will be explained below and the full derivation with equation (1) to (13) described in appendix 3.

Cragg's Tobit model applies to response variables where the data piles up at some given values but are continuous for other values in situations where we have corner-solutions. A corner solution model is where the solution to a maximization problem can take the value zero. Here, this occurs due to the binary response variable willingness to pay (w). This willingness to pay can either be the optimal level of y_i^* if it is positive, or zero if the willingness to pay is equal to or less than zero.

The likelihood function that Cragg proposed was

$$f(w, y | x_1, x_2) = \{1 - \Phi(x_1\gamma)\}^{1(w=0)} \left[\frac{\Phi(x_1\gamma)(2\pi)^{-\frac{1}{2}}\sigma^{-1} \exp\left\{-\frac{(y-x_2\beta)^2}{2\sigma^2}\right\}}{\Phi\left(\frac{x_2\beta}{\sigma}\right)} \right]^{1(w=1)} \quad (5)$$

where w is a binary indicator equal to 1 if $y > 0$ and 0 otherwise. Φ is the standard normal cumulative distribution function and $1(w=0)$ and $1(w=1)$ are the exponential indicator functions. The probability of $y > 0$ and the value of y given $y > 0$ are determined by the vectors γ and β . The term x_1 includes all explanatory variables that are related to the response variable willingness to pay (w) and the term x_2 represents all explanatory variables that are related to the response variable how much are you willing to pay (y).

The probabilities for $y > 0$ from the Tobit model (1) – (4) are now defined as

$$P(y_i = 0 | x_{1i}) = 1 - \Phi(x_{1i}\gamma) \quad (6)$$

and

$$P(y_i > 0 | x_{1i}) = \Phi(x_{1i}\gamma) \quad (7).$$

The expected value of y conditional on $y > 0$ is

$$E(y_i|y_i > 0, x_{2i}) = x_{2i}\beta + \sigma\lambda\left(\frac{x_{2i}\beta}{\sigma}\right) \quad (8)$$

where the last term $\lambda\left(\frac{x_{2i}\beta}{\sigma}\right)$ is the inverse Mill ratio² which is used in regression analysis to take account of a possible selection bias.

The unconditional expected values of y are given by

$$E(y_i|x_{1i}, x_{2i}) = \Phi(x_{1i}\gamma)\{x_{2i}\beta + \sigma\lambda\left(\frac{x_{2i}\beta}{\sigma}\right)\} \quad (9)$$

and the partial effects of an independent variable x_j around the probability that y is positive is given by

$$\frac{\partial P(y>0|x_1)}{\partial x_j} = \gamma_j\phi(x_1\gamma) \quad (10)$$

where γ_j is the coefficient on x_j . Equation (6), (7) and (10) are identical to probabilities and partial effects received from a probit regression of the binary response variable on x_1 . ϕ is the standard normal probability distribution function. The partial effects on an explanatory variable x_j on the expected value on y if y is positive is

$$\frac{\partial E(y_i|y_i>0, x_{2i})}{\partial x_j} = \beta_j \left[1 - \lambda\left(\frac{x_{2i}\beta}{\sigma}\right)\left\{\frac{x_{2i}\beta}{\sigma} + \lambda\left(\frac{x_{2i}\beta}{\sigma}\right)\right\}\right] \quad (11)$$

The partial effect of x_j on the unconditional expected value of y is given by

$$\frac{\partial E(y_i|x_1, x_2)}{\partial x_j} = \gamma_j\phi(x_1\gamma)\{x_2\beta + \sigma\lambda\left(\frac{x_2\beta}{\sigma}\right)\} + \Phi(x_1\gamma)\beta_j \left[1 - \lambda(x_2\beta/\sigma)\left\{\frac{x_2\beta}{\sigma} + \lambda\left(\frac{x_2\beta}{\sigma}\right)\right\}\right] \quad (12)$$

if x_j is an element of both vectors, $x_j \in x_1, x_2$.

Equation (6) to (9) will calculate the predicted values and equations (10) to (12) will calculate the partial effects. Since the marginal effects depend on x the crucial part is to decide which x to use. This study will use the mean values to calculate the average partial effects. The conditional marginal effects reflect the change in the probability of $y > 0$ given a 1 unit change in the independent variable x_j .

$$\frac{\partial p}{\partial x_j} = F'(x'\beta)\beta_j = \Phi(x'\beta)\beta_j \quad (13)$$

Note however that the marginal effects do not need to have the same sign as the coefficient in Cragg's Tobit [Burke 2009].

² Mills Ratio is the ratio of the probability density function to the cumulative distribution function of a distribution.

In order to make any statistically significant conclusions those average partial effects need to be bootstrapped. Bootstrapping is a method where one re-estimates the whole model and generates new average partial effects from a random subsample in order to compare those variations with the variation received in the first estimation. I re-estimated each variable in this model 100 times in this study in accordance with Burke [2009].

3.2.1 Interpreting the Model

Interpreting the results from Cragg's Tobit starts with the two Tier of Cragg's Tobit resulting from equation (5). Tier 1 is a probit maximum likelihood estimate model which means that the coefficients show that an increase in x increases (or decreases) the likelihood that $w=1$ for Tier 1 and $y>0$ in Tier 2. Those results only tell the sign of the effect not the magnitude. Results from Tier 1 tell if that characteristic is more or less likely to influence the decision to pay compared to the omitted group. Tier 2 is the truncated normal function, and it tells if that characteristic is more or less likely to generate a higher or lower monetary amount compared to the omitted group.

The interpretation of the unconditional and conditional average partial effects, derived from equations (10) to (12), is the change in monetary amount that the specific group is willing to pay in comparison to the omitted group.

4. Data

Data used was collected using a survey based on the contingent valuation method. This survey was answered by guests staying at eight different hotels in the central part of Stockholm city (Norrmalm) and is found in Appendix 1. They were randomly selected from a number of a total of 46 hotels³. However even though the hotels were randomly selected to begin with, they all had the choice whether or not to participate so the final sample cannot be considered random, but is instead considered to be a selected sample [Wooldridge 2002]. All collected data will be presented by descriptive statistics before being analysed using Cragg's Tobit, as presented above.

The time frame of the survey was selected to cover two normal work weeks⁴ in Sweden and three weekends in order to ensure the respondents are both business, leisure, frequent and occasional travellers. This survey was carried out during the time period of March 10 to March 27, 2017.

The survey carried out was constructed to follow the essential structure according to the Contingent Valuation Method and it contains various questions to be

³ Hostels, boats and apartments have been excluded.

⁴ No national holidays or main school vacations.

answered by the hotels guests. Some questions will be about their background, numerous questions about their stay at the hotel and their perceptions of the hotel's environmental work. This will be followed by questions about the guests' willingness to pay an extra premium for knowing that they are staying at a green hotel.

The population for this survey was considered to be all hotel guests in Stockholm City center (Norrmalm), so the sample population will be the hotel guests staying at the eight participating hotels. The results coming from this analysis might not be a perfect representative of the Stockholm hotel market as a whole. This is due to the fact that hotel guests were answering the survey themselves, instead of in an interview as preferred by the contingent valuation method. During the time period of conducting the survey there might have been an over or under representation of a certain type of respondents due to group travellers, conferences, exhibitions etc. Even if the respondents did not know what this survey was about, they could have wanted to answer the survey "correctly" which might give an over representation of people's positive attitude towards environmental friendly options, as well as an underestimation of their negative attitude towards environmental friendly options.

The main question of interest is question number eleven in the survey, "For your next stay at a hotel, would you be willing to pay an extra premium to ensure that you are staying at a hotel that is certified by an environmental program or ecolabel?" where the respondent can answer yes or no. Following this question the respondent is asked to answer how much more they would be willing to pay in order to establish a monetary value to the willingness to pay an extra premium.

This is followed by a question about what they think other hotel guests would think in order to try and capture a next level for future analysis; testing to see if there is a disparity between the value one puts on the environmental service and the value one thinks others put on the same good in accordance with Johansson-Stenman and Martinsson [2006]. However this question will not be answered in the current paper and is left for future analysis. If there is a disparity between those two groups this will most likely differ between the age of the respondent and at what type of hotel they are staying at.

All variables used in the analysis for this paper are presented in detail in Table 3 of section 5.1. Out of 481 survey responses, 204 respondents answered that they are willing to pay an extra premium while 193 respondents stated a monetary value which means that eleven respondents that answered yes on question 11 did not answer question 11.a.

The respondent variable for the first stage in Cragg's Tobit is the hotel guests' willingness to pay. That is a binary variable that takes the value one if the answer

was yes and zero if the answer was no, which can be seen in Table 3. The response variable for the second stage in Cragg's Tobit is the continuous variable monetary amount that a person is willing to pay. It has an average amount stated as 148.82 SEK a night with a standard deviation of 161.58 SEK a night. Note that the group 36 to 45 and 46 to 55 may be under or over represented due to an error in the survey construction where the age group option 41 to 45 was missing. This should not have any larger impact on the final results but it is worth noting.

4.1 Potential Threats to Validity

The use of contingency valuation method might not be optimal due to potential hypothetical bias and overestimated results [Blumenschein et al. 2008]. Also the survey design was under a time constraint to answer a thoroughly posed hypothetical situation. The decision falls on minimizing the time needed to answer the survey. This decision could have led to answers not being as precise as desired.

The sample is considered to be a selected sample as discussed in section 4. This paper's main interest is estimating a willingness to pay for all hotel guests in Stockholm but it was only possible to ask those staying at the participating hotels which are all mid income hotels. So there is a risk of the sample selected was biased towards the mid income hotel guests. This potential selection bias should not be a concern according to Wooldridge [2002] due to the use of the *craggit* command in STATA when conducting the econometric analysis. If the survey would have contained a question that captured the income level of the respondent this threat could have been controlled for. Now we can assume that since the participating hotels are all hotels with almost the same standard and that they all have both business and leisure guests, the results from this study will give responses that are mainly from mid income respondents but also from those belonging to both upper and lower income levels. One way to minimize the problem with selection bias is to include Mills Ratio into the equation which is done in Cragg's Tobit [Burke 2009].

Another potential threat to the validity of the estimated results is the absence of the age group 41 to 45 in the distributed survey. This should not be a problem since the response groups are clustered together into larger groups than what was posted on the survey.

5. Results

5.1 Survey Data

Of the twenty randomly selected hotels, ten hotels chose to participate and distributed the survey to their hotel guests. After one week one hotel decided to end their participation due to no responses from their hotel guests. Six of the hotels

allowed the author to stand in their lobby and in their hotel during breakfast asking hotel guests to participate in the survey. Three hotels handled all the distribution of the survey without assistance. One hotel had no valid surveys handed in to them so the final analysis contains responses from eight participating hotels. The results from the surveys are presented in Table 3 and further in section 5.2.

In total 481 surveys were returned⁵. Of those, the number of surveys from each hotel is presented in Table 2 below.

Table 2 Summary over survey answers for each hotel.

Hotel number	Number of answered surveys	Percent	Does the hotel have environmental certificate ⁶ ?
1	39	8,11	Yes, Nordic Swan Ecolabel
2	130	27,03	Yes, Nordic Swan Ecolabel
3	64	13,31	Yes, Green Key
4	143	29,73	No
5	72	14,97	No
6	21	4,37	Yes, Green Key
7	8	1,66	No
8	4	0,83	Yes, Green Key

5.2 Descriptive Statistics

As presented in Table 3 out of the 481 respondent 45.53 percent was male, 54.47 percent female, 57.53 percent were Swedes, 42.47 percent non-Swedes. The non-Swedes came from a total of 43 different countries. On the main question for this paper “For your next stay at a hotel, would you be willing to pay an extra premium to ensure that you are staying at a hotel that is certified by an environmental program or ecolabel?” 277 (57.59 percent) had answered no while 42.41 percent of 481 respondent answered yes.

⁵ More than 481 surveys were handed in but not completed with proper information about how many nights they were staying at the hotel or did not answer the research question about willingness to pay. This information is crucial for estimating the rate of willingness to pay and for calculating a monetary value on willingness to pay. Only surveys that contained both an answer for willingness to pay and both a check-in and check-out date have been registered.

⁶ Note: just because a hotel does not have a certificate does not necessarily mean that they do not function environmentally friendly in some aspects.

Table 3 Descriptive statistics over the response and explanatory variables used in the regression.

Variable	Obs	Mean	Std. Dev	Min	Max
Response variables					
<i>Willingness to pay</i> (0=No, 1=Yes)	481	0.424	0.495	0	1
<i>Willingness to pay/day in SEK</i>	193	148.82	161.58	0	1437.63
Explanatory variables					
<i>Gender</i> (0=Male, 1=Female)	481	0.545	0.499	0	1
<i>Nationality</i> (0=Other, 1=Swedish)	478	0.575	0.495	0	1
<i>Purpose of stay</i> (1=Leisure, 2=Business, 3= Both, 4= Other)	481			1	4
<i>Occupation</i> (1=Part time employed, 2= Full time employed, 3= Senior citizen, 4= Student, 5= Unemployed, 6= Other)	481			1	6
<i>Environmental certificate</i> (1=No, 2= Nordic Swan, 3= Green Key)	481			1	3
<i>Environmental concern</i> (1=Environment, 2= Economy, 3= Equal, 4= No opinion)	476			1	4
<i>Highest level of completed education</i> (1=Up to completed high school, 2= Up to associate degree or some completed bachelor's degree, 3= up to completed master's degree, 4= up to completed Ph.D, 5= Professional degree or other)	481			1	5

The willingness to pay question sorted by gender is shown in Figure 3 reveals that 41.1 percent of all men and 43.5 percent of all women were willing to pay an extra premium. Willingness to pay with regard to nationality show 42 percent of all Swedes and 42 percent of all non-Swedes were willing to pay an extra premium.

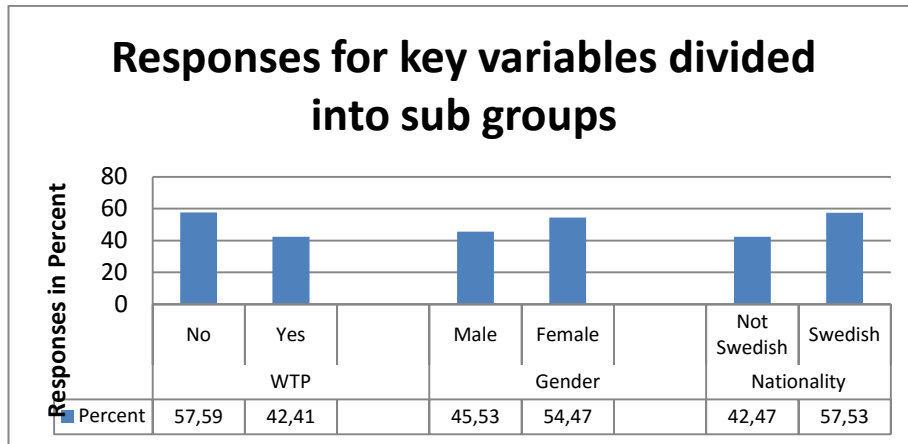


Figure 3 Responses for key variables divided into sub-groups

To make all monetary values comparable, the answer on payment for this stay and premium willing to pay on top of what they paid have been summed as an average sum and then divided by the number of days to get a daily average willingness to pay per respondent. The mean willingness to pay per day is 148.82 SEK with a standard deviation of 161.58 SEK. The lowest value answered on the surveys was zero and the highest per day was 1437.63 SEK as described in table 3.

Blumenschein et al. [2008] mention that intentions do not always mean action, and that consumers might not pay when the hypothetical situation occurs. By examine the heights of the bars in Figure 4, it shows that those who answered yes on if they were willing to pay an extra premium for certification did not state any value or any value greater than zero on the next question.

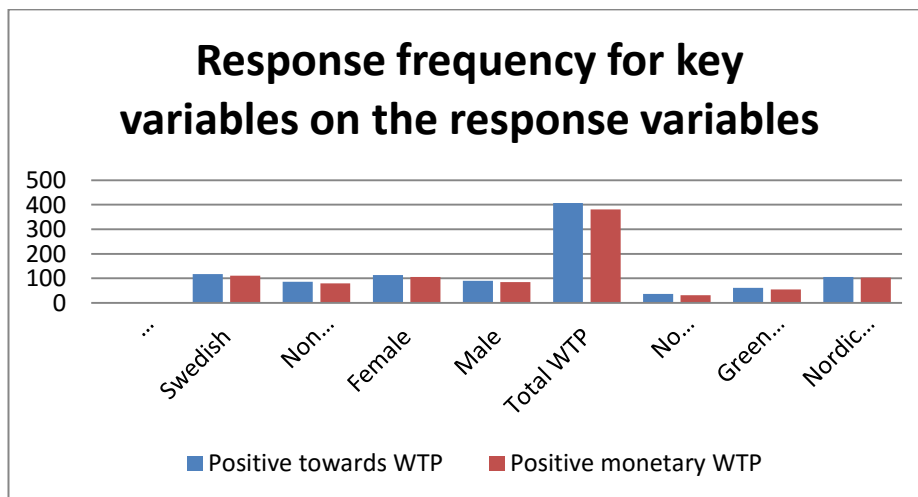


Figure 4 Frequency of responses by key variables with respect to the two explanatory variables.

Most respondents were of the age 26 to 35 and 46 to 55. Percentage of respondents staying at the hotel for leisure was 50.31 percent, 41.79 percent for business, 7 percent for both business and leisure and 1.03 percent answered other as the reason for their stay. The educational level of the respondents are divided by following, 23.08 percent have an educational level from completed some high school to completed high school, 34.62 percent have studied some at university or taken an bachelor's degree, 24.49 percent have a master's degree, 4.05 percent Ph.D and 13.77 percent of the respondents have either a professional degree or have answered other. Out of all respondents 70.27 percent are employed full time, 6.86 percent employed part time, 6.86 percent are senior citizens, 0.62 percent students and 6.86 have another occupation. Of all of those that answered yes on willingness to pay 75.25 percent considered the environment to be prioritized before economic growth when answering the statement from Gallup [Carlson 2005], 2.48 percent said they prioritize the economy, 17.33 percent thought one should prioritize the two equally and 4.95 percent had no opinion about the matter.

5.3 Results from Cragg's Tobit

From Cragg's likelihood function equation (5) the results from Tier 1 are the maximum likelihood estimates of γ , results from Tier 2 are the maximum likelihood estimates of β which are shown in table 5⁷.

All results have one omitted sub-group that should be the reference when interpreting those results, which can be seen in table 4.

⁷ Note that the full lists of results are found in Appendix 2.

Table 4 List of reference variables.

VARIABLES	No. observation	Percent
Male	219	45.53
26-35	128	26.61
Leisure	242	50.31
Master's degree	116	24.12
Full time employed	338	70.27
Non Swede	203	42.47
No certificate	89	18.50
Not a member of hotels rewards program	397	83.76
Prioritize the environment	296	62.18

There are eighteen results that are significant at one percent significance level from Tier 1. Female indicates that females are more likely saying yes on wanting to pay an extra premium than men. Hotel guests staying at hotel as part of a business trip are more likely to pay an extra premium than those staying at the hotel for leisure. Hotel guests that stayed at a hotel that already was certified by the Nordic Swan are less likely to pay for the certificate than those staying at a hotel that does not have a certificate. Swedish hotel guests are less likely to pay than non-Swedes. It is also the case if they were a member of the hotels' rewards program, had no opinion about whether environmental protection or economic growth should be equally prioritized compared to the reference group.

Regarding age, all age groups except for those of the age 56 to 65 years are more likely to pay an extra premium for the environmental certificate. Less likely to pay are those who prioritize economic growth, have a professional degree and if they are visiting the hotel neither for business or leisure.

For the second Tier none of the results are statistically significant. This may indicate that those variables do not have any substantial impact on the monetary amount that they are willing to pay. However, these results must be calculated further in order to make any conclusions about the statistical significance and the actual monetary value.

In order to interpret the magnitude of those effects, we calculate the average partial effects for each explanatory variable which influences the monetary value in SEK for the different explanatory variables. It is calculated by following Burke's [2009] STATA code in order to obtain both the average partial effects and the standard errors by bootstrapping at 100 replications. All results for average partial effects from the bootstrapping are presented in Table 5. The conditional average partial effects show the average partial effect an explanatory variable have on the expected monetary value of y given that $y > 0$ from equation (11). The unconditional average partial effects show the average partial effect that an explanatory variable have on the monetary value of y . It can be seen that none of the conditional average partial effects are significant, not even at 20 percent significance level, but they are in the same magnitude as the unconditional results. Regarding the unconditional average partial effects, five coefficients are significant between one percent to ten percent significance and two coefficients are significant at the twenty percent significance level. If the age group was up to 25 years, or of the age 56 or older the hotel guest is likely to pay more than a guest that are between 26 and 35 years old. If they were a senior citizen, they were likely to pay a smaller amount than those who work full time; the same goes for if they were a doctor.

If the hotel guest was staying at a hotel that was certified by Green Key they were more likely to pay a higher amount than those that stayed at a non certified hotel. Also those travelling for business were willing to pay a higher amount than those travelling for leisure.

Table 5 Regression results from Cragg's Tobit Tier 1, Tier 2, conditional and unconditional average partial effects (APE). Standard error within parenthesis. Significant level * p<0.10, **p<0.05, *p<0.01 and +p<0,20**

VARIABLES	Tier1		Tier2		Conditional APE		Unconditional APE	
	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err	Coef	Std.err
Female	3.026***	(0.726)	296.322	(486.790)	25.18	118.47	25.73	28.21
-25	1.134	(1.534)	873.075	(1060.154)	74.19	233.22	73.04*	42.09
36-45	1.274	(1.535)	579.732	(1123.340)	49.27	189.32	48.68	63.35
46-55	3.781***	(1.329)	215.211	(470.127)	18.29	158.25	19.25	34.68
56-65	-5.880***	(0.746)	1350.272	(1685.430)	114.75	235.80	110.25**	46.08
66-	3.743*	(2.048)	3596.208	(4802.428)	305.61	436.84	300.72***	91.09
Business	5.983***	(0.973)	731.621	(1097.104)	62.17	123.35	62.99 ⁺	44.80
Leisure and Business	3.204***	(1.146)	-652.152	(1040.137)	-55.42	241.97	-53.12	50.11
Other purpose	-3.767 ⁺	(2.427)	-6790.647	(10335.810)	-577.07	2460.96	-566.29	600.33
Up to high school	3.228***	(1.098)	0.272	(401.845)	0.02	141.95	1.17	44.55
High school to Bachelor	9.549***	(1.404)	154.703	(442.377)	13.15	114.86	16.26	28.67
Ph.D.	0.023	(1.185)	-1412.968	(1909.824)	-120.07	320.59	-117.55 ⁺	78.52
Other education	-3.374***	(1.177)	97.322	(791.743)	8.27	247.30	6.90	71.23
Part time employed	2.991***	(1.054)	136.856	(598.789)	11.63	247.01	12.45	63.73
Senior Citizen	6.421***	(1.355)	-2631.889	(3716.609)	-223.66	393.27	-216.68***	73.81
Student	4.305**	(1.927)	337.423	(541.561)	28.67	150.06	29.60	42.97
Unemployed	0.271	(1.880)	-219.662	(956.000)	-18.67	332.11	-18.18	82.51
Other occupation	2.957***	(1.088)	495.913	(720.885)	42.14	230.29	42.31	55.31
Swedish	-2.580***	(0.710)	27.003	(300.370)	2.295	130.38	1.33	30.53
Certified by Green Key	-0.588	(0.946)	667.025	(836.904)	56.68	151.10	55.28*	28.84
Certified by the Nordic Swan	-7.218***	(0.738)	185.153	(566.379)	15.73	100.24	12.84	28.16
Member of reward program	2.845***	(1.035)	-337.782	(594.502)	-28.70	126.84	-27.10	29.75
Priorities economy	-9.597***	(0.893)	931.468	(1192.723)	79.16	252.27	74.09	139.57
Priorities environment and economy equal	10.427***	(1.050)	-271.495	(573.440)	-23.07	144.49	-18.89	63.86
No opinion	10.740***	(1.052)	-32.388	(575.110)	-2.75	154.11	1.12	40.36

6. Analysis

Since 42.41 percent of all respondents answered that they had a willingness to pay for an environmental certificate this study can conclude, just like, Kang et al. [2012] that there seems to exist a willingness to pay for staying at “green” hotels. However the magnitude of this willingness seems to be dependent on the hotel guests’ characteristics which were also concluded by Vondolia and Asendo-Boadi. [2015].

The results obtained in this survey do follow what was expected to be the outcome, and will be discussed about if they are logical and what can be the reason for why the results are as they are.

It was expected to find that the magnitude of the extra premium would differ between different occupations. This was a result that showed from the regression. From Tier 1 the results showed that all occupations were more likely to pay this premium than those working full time which can seem strange. However, when looking at the magnitude of this premium it shows that even though those who are employed full time are less likely to pay this premium, when they do, they pay a higher premium. For example, the occupation senior citizens have a positive significant willingness to pay in Tier 1 but a large negative amount as an unconditional average partial effect. This might look a bit odd at first but this effect can be explained by the difference in number of respondents that did not state a monetary value for their willingness to pay.

From Tier 1 the sign shows that Swedes are less likely to be willing to pay for hotels with a certificate than the non-Swedes. This indicates that the domestic travellers are having a less positive approach towards paying this extra premium than non-Swedes, but when looking at the average partial effects the Swedes want to pay a small and insignificant amount more. In line with Kang et al. [2012] and related to the impact of occupation, the results show that individuals travelling for leisure are more concerned about the price and therefore more negative towards paying an extra premium. This result might be because those staying for leisure have a strict, planned budget while those travelling for work have a different approach towards this extra payment since the company pays the main part of their accommodation costs. The assumed tendencies towards a positive relationship between the individual’s level of environmental concerns and their willingness to pay an extra premium for green initiatives according to Kang et al. [2012] can be found here as well. Note that only the results from Tier 1 are significant and that they are significant for all alternatives.

The two groups unemployed and age 35 to 45 are the only variables that are not significant in any Tier. The strength of this two-Tier model is that it allows both for the coefficients to vary in size between the two Tiers and that it also allows them to take on opposite signs. Age group 55 to 56 years is a good example. In the first Tier the estimates were negative, indicating that they were less likely to want to pay than someone of the age 26 to 35 years old. In the second Tier the results were not statistically significant but the direction was the opposite. Then after calculating the average partial effects, both the conditional and the unconditional average partial effects were positive and the unconditional result was statistically significant. The age group 66 and older has significant positive results in both Tier 1 and unconditional average partial effects.

An interesting result is from the unconditional average partial effects; it showed that those who completed their Ph.D are willing to pay a smaller amount than those completed their master's. This result was not in line with the author's expectation, which assumed that the higher educational level groups would be more concerned about the environment and would be more willing to pay for environmental services.

Some other results worth discussing are those regarding whether or not the hotel already had a certificate or not. From the first Tier both guests staying at hotels that are already certified by Green Key and Nordic Swan are less likely to pay this extra premium than those staying at a non-certified hotel. The result from Nordic Swan is statistically significant at the one percent significance level. Whereas the unconditional average partial effects show a positive monetary value for both groups but only Green Key hotels was significant at the ten percent significance level. Those results are what could be expected from consumers' inconsistency as shown in Figure 4. There are 16 percent of hotel guests staying at hotel with no certificate stating that they are willing to pay but did not state how much they were willing to pay. Their action could be the reason for why the negative willingness to pay changes to positive payment for the two groups with certificate.

Even if few estimates are statistically significant, these results still reveal important details about the directions that the data shows regarding the two stages of the model. However, all interpretations should be interpreted with caution due to the fact that the model posed may not be optimal and that the survey answers have the possibility of being biased.

7. Conclusions

The continuously increasing trend in international tourism industry, as mentioned in the introduction, has not only positive influences on society in terms of increased knowledge, work opportunities, social and cultural exchange and export values, but

also accompanied by a negative impact on the environment regarding travels, poor decisions and inefficient resource management.

The main purpose of this paper was to investigate if there is a positive willingness to pay for staying at a “green” hotel in Stockholm and second to examine which hotel guests that are willing to pay a premium for that service. The results from conducted survey show that 42.41 percent of all respondents have a positive attitude towards wanting to pay. This positive willingness to pay is shown by the positives sign in Tier 1 and by the positive marginal effects from unconditional average partial effects. Those with both a positive significant result in the first Tier and positive and significant result in unconditional average partial effects are those of the age 66 and older, and the senior citizens.

When trying to estimate the monetary value of this willingness to pay the results show an average amount of 148.82 SEK a day with a standard deviation of 161.58 SEK per day. The characteristics of a hotel guest that seem to have largest impact on this decision are if they prioritize environmental protection more or equal to economic growth. Gender and occupation seem to have strong positive tendencies towards wanting to pay extra for this environmental service. Those results may be biased but they are in line with previous studies [Kang et al. 2012, Kuminoff et al. 2010], which makes them more credible to trust than if the results would have been in the total opposite from previous studies. The characteristics of hotel guests that seem to be the driver for this willingness to pay are gender, nationality, age group, occupation and purpose of stay at the hotel. Drivers for characteristics of the monetary value are age and purpose of stay.

The results obtained demonstrate that further analysis is needed in order to make more valid estimates for the questions in this paper. Because even if the results are significant it does not necessarily mean that they are true and vice versa. For the future it would be interesting to do a deeper analysis about the impact of different characteristics of hotel guests as well as comparing the results from a Contingency Valuation paper with a Hedonic Price paper to see if there is a difference between those two approaches.

For further studies on this subject, the survey conducted could include the income level of the respondent, as well as a deeper explanation of what it means to have an environmental certificate and administer the survey via interviews so as to follow the more strict guidelines for a proper conducted survey using the Contingency Valuation Method. Something else to consider would be to structure a menu of different options for the hotel guests to choose from. For example, what would happen if the guests could choose to round up their payment in order for that amount to be put into different environmental work (water sanitations, installing solar panels, planting a tree, compensate in CO₂ equivalents and such), how much

would they be willing to add on to their price? And would that option be preferred if set as an alternative to pay a higher price for insurance about properly administrated environmental work at their destination?

The collected data for this study can be analyzed further with regard to their own answers in comparison to what they believe the action of other hotel guest would be. A deeper analysis about the respondents' answers for why they do not want to pay extra would also add an interesting dimension to this study.

This study has, in its attempt to answer the question of what characteristics seem to be the drivers for mid income hotels guests' willingness to pay for environmental certificates in Stockholm, laid some foundations which further studies can build on.

Even though results are not significant, hotels and policy makers can consult these results when thinking about how to distribute the additional cost that might follow making the company more environmental friendly. The results from both Tier 1 and the average partial effects can be used together as guidelines, for cost distribution to policy makers and companies, when implementing more environmentally friendly initiatives into different businesses.

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Appendix 1 Survey

Today's date	<hr/>			
Room Number	<hr/>			
Name of hotel	<hr/>			
Check in/ Check out	<hr/> / <hr/>			
Nationality	<hr/>			
Gender	Male	Female	Other	
Purpose of stay	Leisure	Business	Both	Other <hr/>

Important Notice

Dear Participant!

Thank you for agreeing to take part in this survey. The survey is being conducted for the purpose of a masters thesis carried out at the Swedish University of Agricultural Science (SLU).

It contains 15 questions and should take approximately 10 minutes to answer all questions.

The information in the questionnaire will be treated confidentially and will be used for scientific research purposes ONLY. The responses provided will not be linked to individual names or addresses.

If you have any questions, please feel welcome to contact Ms Sophie Nyström by email:
seny0002@stud.slu.se

Please answer the question below by circle one or more answers or write your answer on the given line.

Questions about your background

1. What age group do you belong to?

-25	26-30	31-35	36-40
46-50	51-55	56-60	66-70
71-75	76-80	80-	

2. Civil status

Single	Married	Widow/widower
Cohabitant	Other_____	

3. Highest completed level of educational

Completed some high school	High school graduate
Associate degree	Bachelor's degree
Master's degree	Ph.D.
Professional degree	Other _____

4. Occupation

Employed part time	Employed full time	Senior Citizen
Student	Unemployed	Other_____

Questions about your current stay at this hotel

5. Where did you make your reservation?

Hotel website	Hotel (telephone, email, front desk)	
Expedia.com	Booking.com	Travel Agency
Other _____		

6. Approximately, how much did you pay (in total) for your stay in Swedish krona (SEK)?

Write the total amount in the line or circle what is most correct. _____

-500	501-1000	1001-1500	1501-2000
2001-2500	2501-3000	3001-3500	3501-4000
4001-4500	4501-5000	5001-5500	5501-6000
6001-6500	6501-7000	7001-7500	7501-8000
8001-8500	8501-9000	9001-9500	More_____

7. **How many separate stays (not total nights) did you have at hotels last year?**
 1-4 5-8 9-12 more _____
8. **Are you a member of any hotels rewards program?**
 Yes, please specify which programs. _____
 No
9. **What are the four most important attributes of a hotel when you are making the decision where to stay?**
 1 _____ 2 _____
 3 _____ 4 _____
10. **What do you think are the four most important attributes of a hotel when others are making the decision of where to stay?**
 1 _____ 2 _____
 3 _____ 4 _____
11. **For your next stay at a hotel, would you be willing to pay an extra premium to ensure that you are staying at a hotel that is certified by an environmental program or ecolabel?**
 Yes No
- 11.1 **If yes on 11, how much more on top of what you paid for this stay would you be willing to pay extra?**
 Please answer in SEK _____
- 11.2 **If no on 11, what are the reasons for this?**

12. **For their next stay at a hotel, do you think that others staying at this hotel would be willing to pay an extra premium to ensure that they are staying at a hotel that is certified by an environmental program or ecolabel?**
 Yes No
- 12.1 **If yes on 12, how much more do you think they would pay extra on top of what you paid?**
 Please answer in SEK. _____
- 12.2 **If no on 12, what do you think their reasons for this is?**

13. Do You know if the hotel you are staying at right now is participating in any environmental program or if they are certified by to any ecolabel/environmental programs?

Yes, I knew when I made my reservation

Yes, I found out during my stay

No, I do not know

13.1 If yes on 13, what environmental program/ecolabel is it?

13.2 If yes on 13, how did you find out?

Hotel website

Hotel staff

Information in room

Hotel lobby

Booking site

Other_____

14. Please circle one or more answers that you do at home daily.

Recycle (paper, plastic, food waste, metal)

Commute by car

Commute by bike

Commute by public transportation

Buy mostly or all ecological produced food

Use low energy light bulbs

Buy mostly or all environmental friendly cleaning supplies

Electricity from renewable energy sources

Eat mostly vegetarian food

Buy mostly locally produced food

15. With which one of these statements about the environment and the economy do you most agree?

Protection of the environment should be given priority, even at the risk of curbing economic growth?

or

Economic growth should be given priority, even if the environment suffers to some extent?

First

Second

Both first and second equal

No
opinion

**Thank you very much for participating and I do hope you had a nice stay at this hotel! Best
Regard/ Sophie**

Appendix 2 Variable Description

In this appendix you will find the variable names, minimum and maximum values.

Table 6 Descriptive statistics variables used in regression

Variable	Obs	Mean	Std. Dev	Min	Max
Response variables					
Willingness to pay	481	0.424	0.495	0	1
Willingness to pay/day in SEK	193	148.82	161.58	0	1437.63
Explanatory variables					
Gender	481	0.545	0.499	0	1
Nationality	478	0.575	0.495	0	1
Purpose of stay	481	1.58	0.660	1	4
Occupation	481	2.46	1.17	1	6
Environmental certificat	481	2.28	0.756	1	3
Environmental concern	476	1.81	1.10	1	4
Hghest level of completed education	481	2.511	1.28	1	5

Table 7 Descriptive statistics and classifications of each variable used in the regression.

Value	1	2	3	4	5	6
Purpose n=481	Leisure 50.31percent	Business 41.79percent	Leisure + business 7.07percent	Other 0.83percent		
Education n=481	Up to completed high school 23.08percent	Up to associate degree or, completed bachelor's degree 34.72percent	Up to completed master's degree 24.12percent	Up to completed Ph. D. 4.16percent	Professional degree or other education 13.93percent	
Statement about environment and economy n=476	Environment over economy 62.18percent	Economy over environment 3.15percent	Equal importance 25.84percent	No opinion 8.82percent		
Occupation n=481	Part time 6.44percent	Full time 70.27percent	Senior citizen 8.94percent	Student 6.86 percent	Unemployed 0.62percent	other 6.86percent
Age n=481	Up to 25 12.47percent	26-35 26.61percent	36-45 18.09percent	46-55 21.41percent	56-65 13.72percent	66 and older 7.69percent

Appendix 3 Derivation of Cragg's Tobit

In this appendix the full derivation of Cragg's Tobit is presented by the full structure as from Burke [2009]

Cragg's Tobit model applies to response variables where the data piles up at some given values but are continuous for some in situation where we have corner-solutions. A corner solution model is where the solution to a maximization problem can take the value zero. Here this occurs due to the binary response variable willingness to pay (w). This willingness to pay can be either optimal level of y_i^* if it is positive or zero if the willingness to pay is equal to or less than zero.

$$y_i = y_i^* \quad \text{if} \quad y_i^* > 0 \quad (1)$$

$$y_i = 0 \quad \text{if} \quad y_i^* \leq 0 \quad (2)$$

and

$$y_i^* = \alpha + X_i\beta + \varepsilon_i \quad (3)$$

where equation 3 is a linear equation.

The Tobit model that was introduced by Tobin (1958) proposes a likelihood function as stated below,

$$f(y|x_1) = \left\{ 1 - \Phi\left(\frac{x_1\beta}{\sigma}\right) \right\}^{1(y=0)} \left[(2\pi)^{-1/2} \sigma^{-1} \exp\left\{-\frac{(y-x_1\beta)^2}{2\sigma^2}\right\} \right]^{1(y>0)} \quad (4)$$

In this model Φ is the standard normal cumulative distribution function and $1(y=0)$ and $1(y>0)$ are the exponential indicator functions. The term x_1 is a vector all explanatory variables that are related to the response variable y .

After fitting the Tobit model it gives four values of interest.

- 1) The probability that y is zero, $P = (y_i = 0 | x_i)$
- 2) The probability that y is positive, $P = (y_i > 0 | x_i)$
- 3) The expected value of y , conditional on y being positive, $E(y_i | y_i > 0, x_i)$
- 4) The unconditional expected value of y , $E(y_i | x_i)$

Note that for value four so are the term unconditional expectation not all true because all expectations are conditional on the explanatory variable (x)

The Tobit model have some drawbacks and Cragg came up with a model that integrates the probit model to determine the probability of $y>0$ and the truncated normal model for given values of y ,

The likelihood function that Cragg proposed was

$$f(w, y | \mathbf{x}_1, \mathbf{x}_2) = \{1 - \Phi(\mathbf{x}_1\boldsymbol{\gamma})\}^{1(w=0)} \left[\frac{\Phi(\mathbf{x}_1\boldsymbol{\gamma})(2\pi)^{-\frac{1}{2}}\sigma^{-1} \exp\left\{-\frac{(y-\mathbf{x}_2\boldsymbol{\beta})^2}{2\sigma^2}\right\}}{\Phi\left(\frac{\mathbf{x}_2\boldsymbol{\beta}}{\sigma}\right)} \right]^{1(w=1)} \quad (5)$$

where w is a binary indicator equal to 1 if $y > 0$ and 0 otherwise. Φ is the standard normal cumulative distribution function and $1(w=0)$ and $1(w=1)$ are the exponential indicator functions. The probability of $y > 0$ and the value of y given $y > 0$ are determined by the vectors $\boldsymbol{\gamma}$ and $\boldsymbol{\beta}$. The term \mathbf{x}_1 is all explanatory variables that are related to the response variable willingness to pay (w) and the term \mathbf{x}_2 is all explanatory variables that are related to the response variable how much are you willing to pay (y).

The probabilities for $y > 0$ from Tobits model (1) – (4) are now defined as

$$P(y_i = 0 | \mathbf{x}_{1i}) = 1 - \Phi(\mathbf{x}_{1i}\boldsymbol{\gamma}) \quad (6)$$

and

$$P(y_i > 0 | \mathbf{x}_{1i}) = \Phi(\mathbf{x}_{1i}\boldsymbol{\gamma}) \quad (7).$$

The expected value of y conditional on $y > 0$ is

$$E(y_i | y_i > 0, \mathbf{x}_{2i}) = \mathbf{x}_{2i}\boldsymbol{\beta} + \sigma\lambda\left(\frac{\mathbf{x}_{2i}\boldsymbol{\beta}}{\sigma}\right) \quad (8)$$

where the last term $\lambda\left(\frac{\mathbf{x}_{2i}\boldsymbol{\beta}}{\sigma}\right)$ is the inverse Mill ratio⁸ which is used in regression analysis to take account of a possible selection bias.

The unconditional expected values of y is given by

$$E(y_i | \mathbf{x}_{1i}, \mathbf{x}_{2i}) = \Phi(\mathbf{x}_{1i}\boldsymbol{\gamma})\{\mathbf{x}_{2i}\boldsymbol{\beta} + \sigma\lambda\left(\frac{\mathbf{x}_{2i}\boldsymbol{\beta}}{\sigma}\right)\} \quad (9)$$

and the partial effects of an independent variable x_j around the probability that y is positive is given by

$$\frac{\partial P(y > 0 | \mathbf{x}_1)}{\partial x_j} = \gamma_j \phi(\mathbf{x}_1\boldsymbol{\gamma}) \quad (10)$$

where γ_j is the coefficient on x_j . Equation (6), (7) and (10) are identical to probabilities and partial effects received from a probit regression of the binary response variable on \mathbf{x}_1 . ϕ is the standard normal probability distribution function. The partial effects on an explanatory variable x_j on the expected value on y if y is positive is

⁸ Mills Ratio is the ratio of the probability density function to the cumulative distribution function of a distribution.

$$\frac{\partial E(y_i|y_i>0, x_{2i})}{\partial x_j} = \beta_j \left[1 - \lambda \left(\frac{x_2 \beta}{\sigma} \right) \left\{ \frac{x_2 \beta}{\sigma} + \lambda \left(\frac{x_2 \beta}{\sigma} \right) \right\} \right] \quad (11)$$

The partial effect of x_j on the unconditional expected value of y is given by

$$\frac{\partial E(y|x_1, x_2)}{\partial x_j} = \gamma_j \phi(x_1 \gamma) \left\{ x_2 \beta + \sigma \lambda \left(\frac{x_2 \beta}{\sigma} \right) \right\} + \Phi(x_1 \gamma) \beta_j \left(1 - \lambda \left(\frac{x_2 \beta}{\sigma} \right) \left\{ \frac{x_2 \beta}{\sigma} + \lambda \left(\frac{x_2 \beta}{\sigma} \right) \right\} \right) \quad (12)$$

if x_j is an element of both vectors, $x_j \in x_1, x_2$.

Equation (6) to (9) will calculate the predicted values and equations (10) to (12) will calculate the partial effects. Since the marginal effects depend on x the crucial part is to decide which x to use. This study will use the mean values to calculate the average partial effects. The conditional marginal effects reflect the change in the probability of $y > 0$ given a 1 unit change in the independent variable x_j .

$$\frac{\partial p}{\partial x_j} = F'(x' \beta) \beta_j = \Phi(x' \beta) \beta_j \quad (13)$$

Note however that the marginal effects not need to have the same sign as the coefficient in Cragg's Tobit [Burke 2009].

In order to make any statistical significant conclusions those average partial effects need to be bootstrapped. To bootstrap is when one does a re-estimation of the whole model and generate new average partial effects from a random subsample in order to compare those variations with the variation received in the first estimation. I re-estimated each variable in this model 100 times in this study in accordance with Burke [2009].

Appendix 4 Results from Cragg's Tobit

This section contains the results from Cragg's Tobit using the commando *craggit* in STATA and the results from the bootstrapped average partial conditional and unconditional effects.

Table 8 Results from commando *craggit* in STATA. Standard error within parenthesis. Significant level * $p < 0.10$, ** $p < 0.05$, * $p < 0.01$ & + $p < 0.20$**

VARIABLES	(1) Tier1	(2) Tier2	(3) sigma
Female	3.026*** (0.726)	296.322 (486.790)	
-25	1.134 (1.534)	873.075 (1060.154)	
36-45	1.274 (1.535)	579.732 (1123.340)	
46-55	3.781*** (1.329)	215.211 (470.127)	
56-65	-5.880*** (0.746)	1350.272 (1685.430)	
66-	3.743* (2.048)	3596.208 (4802.428)	
Business	5.983*** (0.973)	731.621 (1097.104)	
Leisure & Business	3.204*** (1.146)	-652.152 (1040.137)	
Other purpose	-3.767+ (2.427)	-6790.647 (10335.810)	
Up to high school	3.228*** (1.098)	0.272 (401.845)	
High school to Bachelor	9.549*** (1.404)	154.703 (442.377)	
Ph.D.	0.023 (1.185)	-1412.968 (1909.824)	
Other education	-3.374*** (1.177)	97.322 (791.743)	
Part time employed	2.991*** (1.054)	136.856 (598.789)	
Senior Citizen	6.421*** (1.355)	-2631.889 (3716.609)	
Student	4.305** (1.927)	337.423 (541.561)	
Unemployed	0.271 (1.880)	-219.662 (956.000)	

Other occupation	2.957***	(1.088)	495.913	(720.885)	
Swedish	-2.580***	(0.710)	27.003	(300.370)	
Certified by Green Key	-0.588	(0.946)	667.025	(836.904)	
Certified by the Nordic Swan	-7.218***	(0.738)	185.153	(566.379)	
Member of reward program	2.845***	(1.035)	-337.782	(594.502)	
Priorities economy	-9.597***	(0.893)	931.468	(1192.723)	
Priorities environment & economy equal	10.427***	(1.050)	-271.495	(573.440)	
No opinion	10.740***	(1.052)	-32.388	(575.110)	
Constant	9.455***	(1.669)	-2949.455	(4540.009)	537.784 (373.392)

Table 9 Average partial effects of the monetary value in SEK. Standard error within parenthesis. Significant level * $p<0.10$, ** $p<0.05$, * $p<0.01$ & + $p<0.20$**

VARIABLES	Conditional APE		Unconditional APE	
	Coefficient	Std.err	Coefficient	Std.err
Female	25.18	118.47	25.73	28.21
-25	74.19	233.22	73.04*	42.09
36-45	49.27	189.32	48.68	63.35
46-55	18.29	158.25	19.25	34.68
56-65	114.75	235.80	110.25**	46.08
66-	305.61	436.84	300.72***	91.09
Business	62.17	123.35	62.99+	44.80
Leisure & Business	-55.42	241.97	-53.12	50.11
Other purpose	-577.07	2460.96	-566.29	600.33
Up to high school	0.02	141.95	1.17	44.55
High school to	13.15	114.86	16.26	28.67
Bachelor				
Ph.D.	-120.07	320.59	-117.55+	78.52
Other education	8.27	247.30	6.90	71.23
Part time employed	11.63	247.01	12.45	63.73
Senior Citizen	-223.66	393.27	-216.68***	73.81
Student	28.67	150.06	29.60	42.97
Unemployed	-18.67	332.11	-18.18	82.51
Other	42.14	230.29	42.31	55.31
Swedish	2.295	130.38	1.33	30.53
Certified by Green	56.68	151.10	55.28*	28.84
Key				
Certified by the	15.73	100.24	12.84	28.16
Nordic Swan				
Member of reward	-28.70	126.84	-27.10	29.75
program				
Priorities economy	79.16	252.27	74.09	139.57
Priorities	-23.07	144.49	-18.89	63.86
environment &				
economy equal				
No opinion	-2.75	154.11	1.12	40.36