Recreational Value of Whale Watching Safaris, A Case Study from the Andøy Region, Norway

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Abstract

Due to increased activity level along the Norwegian coast and ocean, there is an increasing need of estimating the non-market values from potentially affected marine ecosystem services. One activity that might be impacted from marine activities and regulations is whale watching. The demand of whale watching has increased rapidly the past decades, and generates remarkable economic and recreational benefits to the society. The recreational benefits are not directly obtained through the market prices, and have to be estimated using non-market valuation methods. Using the contingent valuation (CV) method to value recreational value of commercial whale watching in the Andøy region and the factors influencing it, this thesis is the first study of its kind in Norway (to my knowledge). Furthermore, the study contributes to the literature by being the first recreational valuation study of whale watching examining how varying tour specific factors and expectations of whale watchers affect recreational value.

Data was collected at the whale watch site during five weeks from July to August 2013, resulting in 285 responses. The results indicate that whale watching in the Andøy region generates significant recreational benefits (i.e. non-market values). Similar to other studies, this thesis finds a larger share of the whale watchers to have a positive recreational value (i.e. consumer surplus). However, there are also a relatively large number of those responding “zero” consumer surplus (CS), indicating that the potential of converting more of consumer surplus (CS) to producer surplus (PS) is limited. The results of this thesis argue that more studies should be conducted on non-market values of whales in order to estimate the total economic value (TEV) of these marine resources. Concerning influential factors, a number of factors were found to have a significant impact on recreational value of whale watching. The statistical relationships derived between recreational value and certain tour specific attributes are especially interesting, as codes of conducts are increasingly applied around the world.

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Summary

There are few studies on estimating the recreational value of whale watching, but they confirm that a large share of the whale watchers have positive consumer surplus from this activity. For a marketed good, like commercial whale watching, recreational value equals consumer surplus (CS). CS implies the sensitivity of demand due to an increased price, revealing the potential of converting consumer surplus (CS) to producer surplus (PS). In addition to being an interesting measure for the whale watching companies, CS of whale watching constitutes a part of the total economic value (TEV) from marine ecosystem services. CS of whale watching should therefore be accounted for when performing cost-benefit analysis on projects affecting the whales watched. A growing number of larger whale watching destinations (e.g. the U.S and Australia) have, however, also recognized that whale watching from boat, even though being a non-consumptive activity, could disturb the whales. Codes of conducts are therefore increasingly applied around the world; usually regulating distance to whales, speed and number of boats.

This thesis has two main aims; (1) To estimate the annual recreational value of commercial whale watching safaris in the Andøy region, and (2) to assess what factors influence the recreational value of the whale watchers. As to my knowledge; no studies have been conducted on the recreational value of whale watching in Norway, this thesis will contribute to the topic of valuation of Norwegian marine ecosystem services. This thesis also contributes to the literature of recreational valuation studies of wildlife safaris, by being the first study examining how tour specific factors and expectations of whale watchers influences recreational value.

The Andøy region is Norway´s most visited whale watching destination; approximately 5555 parties/households (constituting about 15 000 whale watchers) went whale watching during the summer season of 2013. During a fieldwork period of 5 weeks in July and August, 86% of the parties contacted responded to a questionnaire, resulting in 285 observations. The questionnaire employed the contingent valuation (CV) method, and used payment cards to elicit the consumer surplus of commercial whale watching. In addition to the CV questions; other questions were asked to reveal personal and travel related characteristics as well as their expectations and tour specific attributes.

The net sample, excluding “non-item” responses to the CV question in addition to outliers, was 219 observations. More than one third of these respondents had “zero” consumer surplus (CS).

Thus, regressing CS on explanatory variables, ordinary least square (OLS) models could result in biased and inconsistent estimates. Therefore, the maximum likelihood estimation (MLE) models of tobit (using the midpoint of the payment card intervals) and interval regression were used. Using the midpoint of the Payment Card (PC) intervals of the CV-question, the mean recreational value per household/family in the sample was 52 EUR per day of whale watching. If my sample is representative of all families going on whale watching safari trips in the Andøy Region during the summer season 2013, the annual recreational values equals approximately 288 860 EUR. As my sample of whale watchers is rather small, not covering the whole season, and there is some uncertainty in the estimation of mean CS of the PC interval data; this should be viewed as an order of magnitude estimate.

In terms of factors influencing recreational value, personal characteristics like income, whether the respondent is Scandinavian, and/or is willing to pay more for ecological food had a significant positive impact on the CS. Age was also found to have a significant impact on CS. With regard to tour specific characteristics; distance to whale and number of whale sightings had a significant positive impact on CS, while number of whale watching boats and bad weather had a significant negative impact on CS. An unexpected result was that increased distance to whale increases CS. The finding could, however, be explained by the fact that many of the whale watchers came closer to the whales than they expected and were therefore satisfied with distance to the whale. As expected from economic theory; the price of whale watching and number of whale watch trips in the region had a significant negative impact on CS. If the respondent planned to go bird watching in the region and/or had paid the ticket in advance, this had a significant positive impact on CS.

The results indicates the demand for whale watching is somewhat elastic to a price increase from current price level, indicating that revenues from increased price of whale watching might not cover the decreased revenues caused by reduced demand. The estimates of CS could also, under strict assumptions, be used in future CBAs analyses. However, in order to obtain more representative CS estimates, a similar study has to be conducted with a large sample drawn from the whole season of whale watching. Non-commercial recreational values of whale watching, and non-user values of whales, should also be considered in future valuation studies, as these values could constitute a considerable part of TEV. With regard to influential factors, several tour specific factors and expectations of whale watchers have a significant impact on CS, indicating that whale watchers are likely to be affected if applying codes of conducts.

Sammendrag

Etterspørselen av hvalsafariturer har økt de siste tiårene, og antas å generere betydelige økonomiske inntekter og rekreasjonsverdier for en rekke lokalsamfunn. Studier som er gjort på rekreasjonsnytten av hvalsafari indikerer at en større andel av hvalsafarideltagerne sitter igjen med ett positivt rekreasjonsverdi (konsumentoverskudd). Konsumentoverskuddet (KO) utgjør en mulig inntektskilde for hvalsafariselskapene. KO utgjør også en del av den total økonomiske verdien av hvalen, og bør derfor tas hensyn til ved nytte-kostnads analyser av prosjekter som påvirker hvaler i norske farvann. I de senere år har det også blitt belyst at selv ikke-konsumerende bruk av hvalen, kan påvirke hvalen negativt. Myndigheter ved flere større hvalsafaridestinasjoner (f. eks Australia og USA) har derfor utformet ett eget lovverk for tilnærming av hvaler fra båt. Lovverket innebærer som regel reguleringer i forhold til distanse til hvalen, fartstilpasning og antall båter tillatt innenfor en viss radius av hvalen.

To hovedmål med denne masteroppgaven er: (1) Estimere årlig rekreasjonsverdi av hvalsafaritilbudet i Andøy regionen, og (2) undersøke hvilke faktorer som påvirker rekreasjonsnytten av hvalsafari. Dette er den første verdsettingsstudiet av rekreasjonsverdiene av hvalsafaritilbudet i Norge, og kan dermed bidra med nyttig informasjon ved en senere verdsetting av hvalressursene. Masteroppgaven bidrar også med ny informasjon angående hvordan turspesifikke faktorer og hvalsafarideltageres forventninger påvirker konsumentoverskuddet, siden dette ikke har blitt forsket på tidligere.

Andøy regionen er Norges mest besøkte hvalsafari destinasjon; omtrent 5555 reisefølger/husholdninger (noe som utgjør omtrent 15 000 hvalsafariturister totalt) dro på hvalsafari sommeren 2013. Innsamling av data ble gjort gjennom en fem ukers feltarbeidsperiode, i Andenes og Stø, juli og august 2013, hvor 86% av tilnærmede reisefølger leverte tilbake utfylt spørreskjema. Dette resulterte i 285 observasjoner av husholdninger/reisefølger som hadde vært på hvalsafari. Betinget verdsettingsmetode ble benyttet, hvor betalingskort ble brukt for å finne respondentenes rekreasjonsnytte fra hvalsafari. Spørreskjemaet inkluderte også flere spørsmål angående personlige karakteristikker, samt forventninger til hvalsafarituren og opplevelse.

Etter å ha ekskludert alle “vet ikke” og ”blanke” responser på betalingsvillighetsspørsmålet i tillegg til utstikkere, utgjorde endelig utvalg 219 observasjoner. Mer enn en tredjedel av

respondentene i endelig utvalgt oppga null KO. Den mest brukte estimeringsmetoden, Ordinary Least Squares (OLS), vil derfor gi inkonsistente estimat og standardfeil. Av den grunn ble også Maximum Likelihood Estimerings- (MLE) metodene tobit og intervall regresjon benyttet. Ved å bruke midtpunktene av betalingskort intervallene i betalingsvillighetsspørsmålet, ble gjennomsnittlig KO per husholdning/reisefølge kalkulert til 52 EUR for en dag med hvalsafari. Dersom utvalget er representativt for den virkelige hvalsafaripopulasjonen sommeren 2013, ligger årlig KO (rekreasjonsnytte) av hvalsafari på 288 860 EUR. Som følge av at jeg har ett mindre utvalg av hvalsafariturister, og at studien ble utført i en kortere tidsperiode av hvalsafarisesongen, vil estimatene være noe usikre.

Angående faktorer som påvirker rekreasjonsverdien av hvalsafari, fant jeg at personlige karakteristikker som inntekt, hvorvidt respondenten var Skandinavisk og/eller var villig til å betale mer for økologisk mat hadde en signifikant positiv innvirkning på KO. Alder viste seg også å ha signifikant effekt på KO. Antall hvaler sett og nærmeste distanse til hvalen hadde en signifikant positiv på KO, mens flere båter rundt hvalen og dårlig vær førte til signifikant lavere KO. Som forventet av økonomisk teori, hadde betalt pris for hvalsafaribilletten og antall planlagte eller utførte hvalsafariturer i regionen, en signifikant negativ påvirkning på KO. Planlagt fuglesafari i regionen og betaling av hvalsafarituren på forkant hadde en signifikant positiv effekt på KO.

Studien konkluderer med at hvalsafariselskaper bør være forsiktige med å endre prisnivået, som følge av at resultatene indikerer at etterspørsel av hvalsafariproduktet er sensitive til og med for små endringer i pris. Ved godt definerte antagelser, kan aggregert KO i denne studien benyttes i fremtidige nytte-kostnads analyser. For å øke representativiteten av utvalget, er det ønskelig at studien gjentas med ett større utvalg av hvalsafarideltagere fra hele sesongen. Det bør også legges til rette for å måle rekreasjonsverdien fra folk som kan se hvalen ”gratis” fra land eller båt, samt ikke-bruksverdier av hvalen, da disse verdiene kan utgjøre en stor andel av total økonomisk verdi. Angående faktorer som påvirker konsumentoverskuddet, viste resultatet at flere turspesifikke faktorer og forventninger hadde en signifikant påvirkning på KO. Resultatet indikerer at hvalsafarituristers fornøydhet med produktet er indirekte påvirket av reguleringer knyttet opp mot tilnærming av hvalen fra båt.

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TEV	Total Economic Value
CBA	Cost Benefit Analysis
PC	Payment Card
CV	Contingent Valuation
TC	Travel Cost
CS	Consumer Surplus
KO	Konsumentoverskudd
WTP	Willingness to Pay
WTA	Willingness to Accept
CS^M	Marshallian Consumer Surplus
CS^H	Hicksian Consumer Surplus
CV´	Compensating Variation
EV	Equivalent Valuation
OLS	Ordinary Least Squares
MLE	Maximum Likelihood Estimation
USD	United States Dollars
EUR	Euros
MAREFA	Marine Research and Education Fund of Andenes

1. Introduction

1.1 Background

From the 20th century, the use of whale resources has gradually shifted from commercial exploitation to a more non-consumptive use of the whales through whale watching (Alie 2008; Orams 2000). The whale watching industry has experienced an especially high growth the past decades (Alie 2008; O´Connor et al. 2009; Orams 2000; Tisdell & Wilson 2012; Valentine et al. 2004), and generates today significant recreational and economical values worldwide (Hoyt & Hvenegaard 2002). The statement by Hoyt & Hvenegaard (2002) is confirmed by several studies, proving that whale watching activities generates substantial revenues for local communities all over the world (e.g. Hoyt & Iníguez 2008; IFAW 2004; Leeworthy & Wiley 2003; Parsons et al. 2003; Pendleton 2006). Adding the revenues from all whale watching destinations in the world, the total estimated revenues, including indirect revenues, exceeded 2000 million U.S dollars in 2008 (O´Connor et al. 2009).

The recreational value, in my thesis commonly referred to as the consumer surplus (CS), constitutes a part of the non-market economic value of commercial whale watching. The few studies conducted on recreational value (e.g. Hoagland & Meeks 2000; Hoyt & Iníguez 2008; Leeworthy & Wiley 2003; Loomis et al. 2000; Loomis & Larson 1994) reveal whale watchers on average have a positive recreational value from whale watching. Taking into account 13 million people went whale watching in 2008 (O´Connor et al. 2009), the recreational value is likely to add considerably to the economic value of whale watching.

A number of studies stresses how increased level of coastal and ocean activities leads to a continuously decrease of marine ecosystems (see, e.g. Barbier 2012; Fujita et al. 2013; Halpern et al. 2008). Defining and valuing ecosystem services makes it possible to relate changes in human welfare to changes in ecosystems (Turner et al. 2010). Recreational value from whale watching is defined as a cultural ecosystem service, and constitutes a part of the total economic value (TEV) of the watched whale resources. TEV of the watched whale resources also consists of the producer surplus, e.g. income of whale watching companies minus operational costs, recreational value of non-commercial whale watching and non-user values. TEV measure the change in welfare from changed quantity or quality of the given good (Magnussen 2010), and

can be applied in cost-benefit analyses (CBA) when the effects upon the natural resources of a project is known.

According to Valentine et al. (2004 pp.653), "Whale-watching satisfaction is a very complex measure that incorporates a range of variables". Assuming a constant recreational value across different whale watchers is therefore unrealistic. Several recreational studies have found certain personal and travel characteristics, to be important in explaining participation rate and variation in recreational value (e.g.Alvarez & Larkin 2010; Hoagland & Meeks 2000; Huhtala 2004; Loomis et al. 2000; Mmopelwa et al. 2007; Navrud & Mungatana 1994; Reynisdottir et al. 2008; Walsh 1986). An increasing number of tourist satisfaction studies (see, e.g. Catlin & Jones 2010; Mustika et al. 2013; Orams 2000; Valentine et al. 2004; Ziegler et al. 2012) also recognizes how varying tour specific attributes (e.g. weather and wave conditions, seasickness, whales sighted) and expectations of the whale watcher can explain whale watchers satisfaction.

Even though tourist satisfaction studies finds satisfaction of whale watchers to be highly dependent upon varying natural conditions, none of the reviewed studies on recreational value of whale watching has taken account of how varying tour specific factors and whale watchers expectations potentially affect recreational value. As codes of conducts are applied to an increasing degree around the world (Orams 2000), information regarding how varying tour specific factors affect recreational value would be useful in order to understand the impact on whale watchers from the suggested regulations.

1.2 Problem Statement and Hypotheses

Despite an increased level of economic activities along the Norwegian coastline and sea (see Halpern et al. 2008) and a recognized need of valuing more of the Norwegian marine ecosystem services (e.g. Magnussen 2010; Magnussen et al. 2012), no studies have been conducted on the non-market values generated by commercial and non-commercial whale watching in Norway. A main purpose of this thesis is therefore to use the contingent valuation (CV) method, more specific the payment card (PC) method, to estimate the recreational value of commercial whale watching at the largest whale watching destination in Norway; the Andøy region. The thesis contributes to the literature by being the first study in Norway estimating the recreational value of whale watching. The documented recreational value of whale watching can also be used to examine the potential of converting more of the consumer surplus (CS), into producer surplus (PS).

A second main aim of this thesis is to assess how influential factors affect recreational value of whale watching. To my knowledge, this is the first valuation study internationally examining how tour specific factors and the expectations of the whale watchers affect the recreational value of whale watching. The thesis also assesses how typical factors included within recreational valuation studies, like personal and travel characteristics, affects individual recreational value. The information gathered on the influential factors impact on recreational value can be used to develop the whale watch product itself, or to review how whale watchers are affected if applying codes of conducts to the whale watch industry.

The two problem statements derived from the main purposes of the thesis are:

1.) What is the recreational value of whale watching at the most visited Norwegian site; the Andøy Region in Vesterålen?

2.) Which factors influence the recreational value per household per day of whale watching (i.e. recreational value of an activity day of whale watching)?

Regarding research questions, the first research question (RS1) is directly derived from problem statement (1), while the complexity of problem statement (2) made it necessary to break problem statement (2) into four related research questions (RS 2-5).

Research question 1: What is the recreational value of whale watching at the most visited Norwegian site; the Andøy Region in Vesterålen?

As mentioned in the introduction section, studies on recreational value from whale watching reveal that many tourists have a positive recreational value of commercial whale watching. Two main purposes of measuring recreational value are; evaluating potential of converting consumer surplus into producer surplus, and documenting a part of the non-market user value of marine ecosystem services.

Research question 2: How do socioeconomic factors and individual preferences explain recreational value of whale watching?

Most recreational studies recognize that certain socioeconomic factors and individual preferences impact recreational value. Reviewing the socioeconomic factors impact on recreational value is useful in order to reveal internal and external validity of the study, and to generate more precise estimates. The information can also be used to understand the "typical whale watcher", which is useful information for both the whale watching companies and the tourism sector in general.

Research question 3: How does whale watching tour specific attributes affect the recreational value of whale watching?

Even though being a commercial product, whale watching safaris can never be entirely standardized as the experience depends upon varying natural factors such as weather and wave conditions, and the quality of the whale sightings on the trip. In order to interpret the recreational value generated by commercial whale watching, it is therefore important to be aware of how varying natural conditions and expectations of whale watchers affect the whale watchers recreational value. Natural conditions and other tour specific attributes are found to be important in determining whale watchers satisfaction in several studies (e.g. Catlin & Jones 2010; Mustika et al. 2013; Orams 2000; Ziegler et al. 2012). If satisfaction is closely related to recreational value of whale watching, natural conditions' are likely to explain variation in recreational value as well.

Research question 4: Are expectations of whale watchers related to recreational value of whale watching?

Valentine et al. (2004) and Ziegler et al. (2012) find expectations regarding; distance to whales, number of whales sighted and behavior of whales, to be important explanatory indicators of tourist satisfaction. How tourist expectations versus experience affects recreational value is valuable information in order to understand whether it is the varying natural conditions or the underlying expectations explaining the recreational value of whale watching. Understanding the whale watchers expectations are also useful information for the whale watching companies.

Research question 5: How does characteristics of travel affect recreational value of whale watching?

Characteristics of travel are mainly variables expected to impact recreational value from an economic point of view, e.g. size of travel budget, price of whale watching trip, number of whale watching trips in the region and time of payment. The indicators are therefore important in revealing the internal validity of the study

TABLE 1-1: Research Questions and Hypotheses

		Expected Sign
RS1	**What is the recreational value of commercial whale watching at the most visited Norwegian site; the Andøy Region in Vesterålen?**	
H11	*What is the average consumer surplus per tourists per day (i.e. activity day) of whale watching safaris in the Andøy region?*	
H12	*What is the total consumer surplus in 2013 from whale watching safaris in the Andøy region (i.e. aggregated over all tourists)?*	
RS2	**How do socioeconomic factors and individual preferences explain recreational value of whale watching?**	
H21	*Income is positively related to recreational value*	+
H22	*Higher education is positively related to recreational value*	+
H23	*Scandinavians have a lower willingness to pay for whale watching than non-Scandinavians*	-
H24	*Households with children under 9 years old have a lower perceived recreational value*	- /+
H25	*Age affects recreational value*	- / +
H26	*Gender can explain variation in recreational value*	- / +
H27	*People with a greater interest in seeing whales has a higher recreational value of whale watching*	+
H28	*Tourists willing to pay a positive amount to conserve nature have a higher recreational value*	+
H29	*Prior experience whale watching affects recreational value*	+/-
RS3	**How does whale watching tour specific attributes affect the recreational value of whale watching?**	
H31	*Increased distance to the sperm whale decreases recreational value*	-
H32	*Increased number of sperm whale sightings affects recreational value positively*	+
H33	*Bad weather has a negative impact on recreational value*	-
H34	*Seasickness affect recreational value negatively*	-
H35	*Perceived crowding from other boats affects recreational value negatively*	-
H36	*Bad encounter management affects recreational value negatively*	-
RS4	**Are expectations of whale watchers related to recreational value of whale watching?**	
H41	*Recreational value is negatively affected if the number of whale sightings is lower than expected*	+
H42	*Recreational value is positively affected if real distance is closer than expected distance.*	+
R5	**How does characteristics of travel affect recreational value?**	
H51	*Recreational value increases with increasing travel budget*	+
H52	*Number of planned or completed whale watching trips in the Andøy region decreases CS*	-
H53	*Tourists paying the whale watch tour in advance have a higher willingness to pay than those paying the whale watch tour at site*	+
H54	*Households paying more to go whale watching have a lower consumer surplus*	-
H30	*Tourists that plan to do other sea activities in the region have a lower willingness to pay due to a higher derived utility*	+

1.3 Outline of Thesis

Chapter 2 will take a closer look at the history of whale watching in Norway and the chosen whale watching site: the Andøy region. In chapter 3 I will present literature relevant to the thesis. The thesis is mainly founded upon economic theory, literature on recreational value and tourism impact studies from whale watching. The chapter thus gives the background of research questions and hypotheses given in chapter 1. In chapter 4, I will describe and discuss the chosen methods of data collection and analyzes, while chapter 5 presents the results and discuss the findings with respect to the given research question, problem statements and hypotheses. Chapter 6 concludes the findings in this thesis with regard to the problem statements in section 1.2.

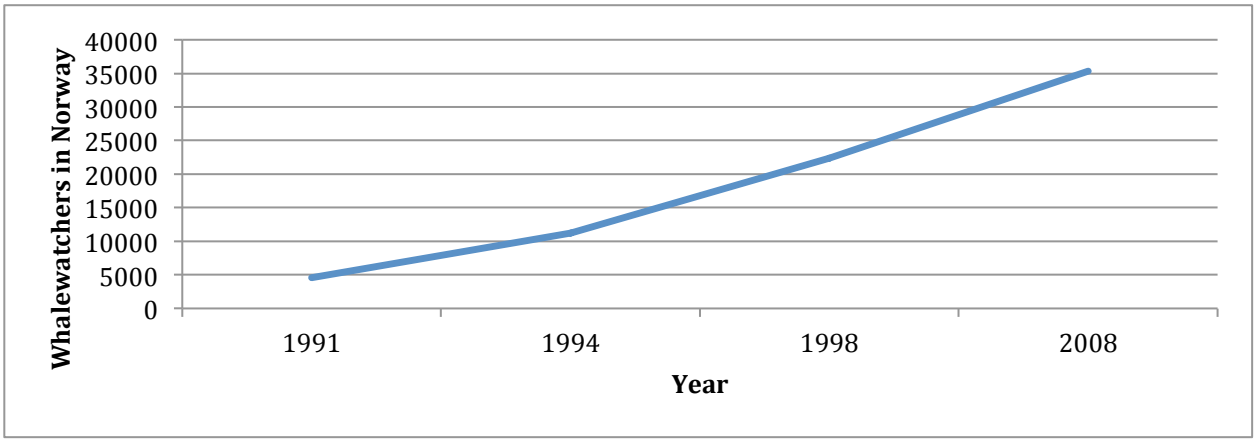
Three appendixes are included at the end of the thesis. Appendix A includes the English questionnaire from the study with distribution of responses in percentage for each question. Appendix B gives an overview of the econometric analysis and tests performed to find the results given in chapter 5. At the very end, Appendix C includes a Norwegian report with the topic “Hvalsafariturister i Andøy regionen”. The report is written on behalf of Andøy Municipality, which will use the data on whale watchers in the region to further analyze the dependency of commercial whale watching.

2. Site of Study

2.1 Whale Watching in Norway

Whale watching has become a popular attraction in Norway as well as in the rest of the world. Numbers of whale watchers went from 5000 whale watchers in 1991 to 35 000 in 2008 (O´Connor et al. 2009). According to O´Connor et al. (2008), the associated economic revenues from whale watching in Norway were 10 million U.S dollars in 2008, including indirect revenues exceeding 6 million U.S dollars. O´Connor et al. define indirect revenues as expenditures used by the whale watcher on other goods and services in the region on the same day as the whale watching activity (e.g. accommodation, food and other activities). Thus, surrounding services are also likely to benefit from the existence of the whale safari industry.

Figure 2-1: Development of Whale Watching in Norway1



Andenes, Svolvær, Narvik, Stø and Tromsø are the traditional whale watching destinations in Norway (ibid). Environmental conditions have influenced the attributes of the whale products sold. In Andenes and Stø, the midseason ranges from May to September, and the main attraction is the sperm whale. The main product at other Norwegian whale watching destinations has traditionally been orcas at wintertime. However, the movements in the herring schools has reduced the number of visiting orca groups in this area, which has lead to closure of many whale safari companies in Tysfjord (Narvik and Svolvær) (O´Connor et al. 2009). The Andøy region is hence the main whale watching destination in Norway today.

[1] Based upon reported statistics presented by O´Connor et al. (2008)

2.2 The Andøy Region

In my master thesis, the Andøy region is defined as Andøy municipality including the surrounding ocean. The municipality is located in Northern Norway with a geographical area including the total area of the Andøy Island (490 km^2) and a smaller part of Hinnøya (165,5 km^2). Approximately 5023 people lives in Andøy municipality (SSB 2013), and a larger proportion of the population lives in the main town Andenes

Figure 2-2: Geographical Location of Andøy (Andenes)[2]

Andøy municipality is located within the Vesterålen region, a region well known for its astonishing nature. However, the size of the tourism sector in Vesterålen is only half of the tourism sector in Lofoten (Midtgard et al. 2012). Even though flights operate to multiple airports in the region, 72,5% of the tourists interviewed in Normann (2012) study used either car or mobile home as a main transport mode. The typical tourist visiting the Vesterålen is European, highly educated, travels without children and visits the region for the first time (Normann 2012). Vesterålen is only one of several destinations planned within the Norway vacation (ibid). A larger share of tourists reports organized whale watching tours at Andenes or Stø as a main attraction in the region (Midtgard et al. 2012; Normann 2012).

[2] Source: http://www.traildino.de/trace/continents-Europe/countries-Norway/regions-Vesterålen_and_Hinnøya

2.3 Andøy as a Whale Watching Destination

The Andøy region is one of three whale watching destinations in the world where the male sperm whale is the main attraction (Richter et al. 2006). The sperm whale is the largest of toothed whales and the deepest diving mammal animal in the world (Cetecean Palæobiology). It migrates to the Andøy region, particularly Bleik Canyon, to feed on deep-sea living animals such as fish and squids in all sizes. The sperm whale is famous for its use of echolocation to find prey, making it especially vulnerable to noise pollution.

Figure 2-3: A Sperm Whale resting outside Andenes[3]

Between diving and feeding, the sperm whale rests on the surface for about 8-10 minutes, making it possible for whale watching boats to get close to the whale. Most of the times only one sperm whale is spotted in close perimeter to the boat, because sperm whales in the Andøy region for the most part are older males that prefer to hunt and feed alone. Other whales occasionally seen in the area are killer whales, pilot whales, humpback whales, mink whales, fin whales and white-sided dolphins.

[3] Photo: Liv Tone Robertsen

2.4 Whale Watching Companies

There are three companies in the Andøy region offering sightseeing by boat where whale watching is the main attraction: Whalesafari AS and Seasafari Andenes operating from Andenes and Arctic Whale Tours operating from Stø.

TABLE 2-1 Overview of Whale Watching Companies in the Andøy Region

Company	Whalesafari AS	Whalesafari AS	Seasafari Andenes	Arctic Whale Tours
Boat ***Type of boat*** **(Capacity)**	Maan Dolphin *Catamaran* (100)	Reine *Whaling ship* (75)	Rib-boat *Rib-boat* (12(24))	Leonora *Old ferry* (90)
Location	Andenes	Andenes	Andenes	Stø
Established	1989	1989	2010	1994
Whale watchers 2013	10 757	10 757	Unknown	3290
Guiding	45 minutes museum guiding	45 minutes museum guiding	20 minutes information	30 minutes information
Time on boat	1,5-3 hours	3-5 hours	1,5-3 hours	7-8 hours
Whale guarantee	Yes	Yes	No	Partly

Note: Number of whale watchers reported for Maan Dolphin and Reine equals the total number of whale watchers reported from Whalesafari AS

Illustrated in table 2-1 are dissimilarities between the three companies. Established in 1989, Whalesafari AS is the oldest of the existing whale watching companies in the region. With a capacity exceeding 300 tourists per day during midseason, the whale watching company is the largest in Norway. Arctic Whale Tours is the second largest whale watching company, and differs from the other companies by departing from Stø, and stopping by a bird reserve on the way out to Bleik Canyon, leading to a different boat experience and a longer travel time. Seasafari Andenes on the other hand has specialized on taking out small groups of tourists on shorter rib-boat trips. Even though offering somewhat different products, the price of whale watching is approximately the same for the different whale watching companies, ranging from 107 EUR at Whalesafari AS to 120 EUR at Seasafari Andenes.

3. Theory and Literature Review

In this chapter I will present underlying theories of measuring recreational value, and review literature that examines factors influencing willingness to pay. Tourist impact studies on whale watching will also be reviewed to assess potential relationships between tourist satisfaction and varying trip specific characteristics.

3.1 Marine Ecosystem Services

The recreational value of whale watching is a marine ecosystem service, where ecosystem services are defined as "benefits human obtains from nature" by the Millennium Ecosystem Assessment (2005). As illustrated in figure 3-1, changes in ecosystem services are closely related to human welfare.

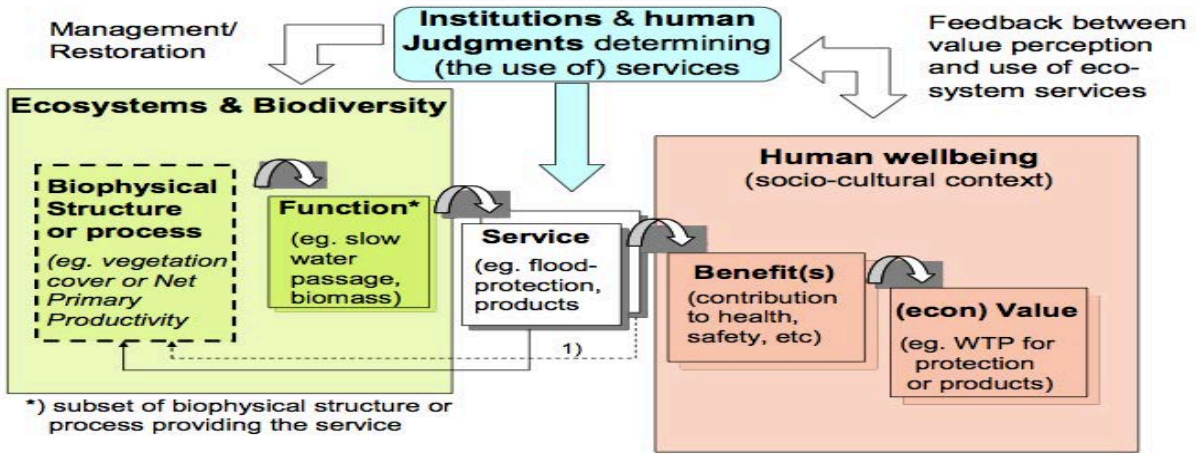


Figure 3-1: Connection between marine ecosystem services and human wellbeing[4]

The literature (e.g. Haines-Young & Potschin 2011; Liquete et al. 2013; Millenium Ecosystem Assessment 2005) proposes four categories of ecosystem services. Recreational values are defined as cultural services and can be affected by human activities both directly and indirectly. Disturbance of the whales' habitat can affect the whale watching activity negatively, as it might lead to movement of the whales to sites less accessible, or in the worst case scenario, a reduced whale population. This could affect the recreational value both indirectly and directly. Recreationists will be affected indirectly if the whales are still present but they are aware of the negative impacts from other activities, or/and directly if it is more difficult to find the whales.

[4] Source: TEEB (2010)

Total Economic Value (TEV) is one way to measure the change in human welfare from a changed accessibility of whales. Magnussen (2010) defines TEV as; the change in human welfare caused by a change in the quantity or quality of the ecosystem services provided. TEV differs from commercial economic measures, as it consists of both market and non-market values in the form of; direct and indirect user values, option values and non-use values (Magnussen 2010). Direct user values are the user value of ecosystem services contributing directly to current economical or environmental production, e.g. the harvest of provisioning services, or the experience of cultural services. Indirect user values on the other hand are ecosystem services supporting the consumption and production indirectly such as regulating and maintenance services. Even when people are not currently using the ecosystem services, they might have a non-user value from knowing that it exists (existence value) or will exist for future generations (bequest value). People might also have a value from preserving the ecosystem service for potential or planned use in the future (optional value).

As shown in table 3-1, the existence of whale resources generates several other ecosystem services to humans besides the direct economic (i.e. producer surplus) and recreational benefits (i.e. consumer surplus) obtained from commercial whale watching. Provisioning of education and knowledge about the marine ecosystem are, according to Liquete et al. (2013) and Tisdell (2003), additional user values of commercial whale watching. Increased information regarding marine ecosystem services might also increase non-use values (e.g. existence and bequest values) of whale resources (Tisdell 2003).

TABLE 3-1: User values and non-use values of Whale Resources

User values	**Non-use values**
Producer surplus from commercial whale watching	Bequest value
Recreational value from commercial whale watching	Existence value
Recreational value for private whale watchers	
Research and educational value	
Option value	
Genetic Material	

Note: Table is modified from Barbier (2013) table 1.

This thesis examines the user benefits from the whales obtained through commercial whale watching safaris, i.e. the consumer surplus of whale watchers.

3.2 Consumer Surplus of Commercial Whale Watching

Recreational value of commercial whale watching equals the consumer surplus, also called the marginal willingness to pay (WTP). It is the difference between the total willingness to pay to go whale watching (demand curve) and the price given in the market (P1 in figure 3-2). The marginal willingness to pay is defined by Silberberg & Suen (2001 pp.350) as " the amount that leaves the consumer indifferent to the new versus the old situation, i.e. on the same indifference level". Expressed in terms of whale watching, marginal willingness to pay is the amount the whale watcher would be willing to pay in addition to the current price and associated costs of whale watching in order to still go whale watching. As noted by Walsh (1986), the individual will continue to participate in activities if marginal benefits exceed costs, and avoid activities where costs exceeds marginal benefits. This economic rule also refers to an implicit assumption of non-negative consumer surplus from recreational activities. Because commercial whale watching is a marketed good, recreational value will mainly be referred to as consumer surplus (CS) throughout this thesis.

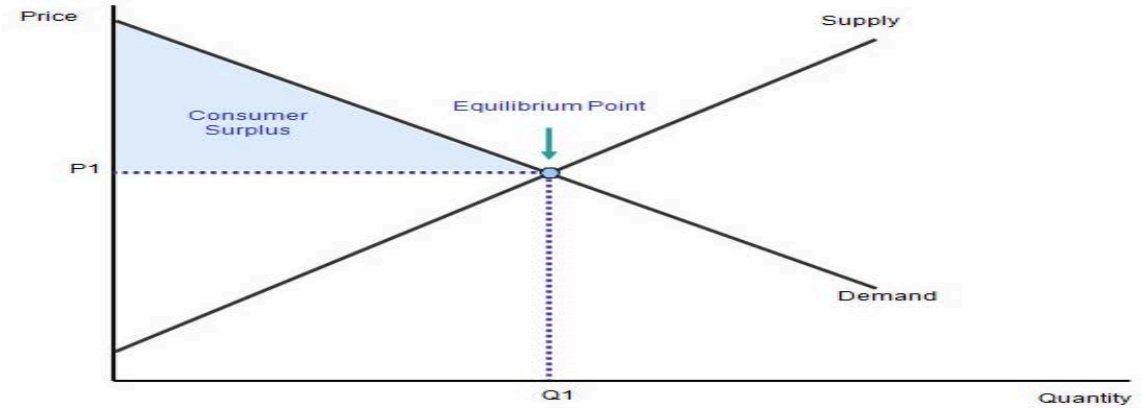


Figure 3-2: Consumer Surplus of Whale Watching

Assuming no externalities, social welfare (i.e. total surplus) is maximized when marginal cost of producing (i.e. supply curve) equals marginal benefits of consuming (i.e. demand curve) (Perman et al. 2003). Figure 3-2 illustrates the social welfare equilibrium point, at price (P1) and quantity (Q1). The area under P1 and above the supply curve equals the producer surplus (PS), i.e. the net income of whale watching operators. In imperfect markets with few producers, it is sometimes possible for the producers to convert some of the CS into PS by increasing the price level. Furthermore, if it is possible to distinguish customer groups with different WTP, the company (and the customers) can benefit from applying price discrimination. One example is how the whale watching companies offer lower prices for children, students and older people.

The price level is therefore of great significance in explaining size of total recreational value, and total surplus. A number of studies have been conducted on management of the price level with the purpose of maximizing social welfare and obtaining a "fair" price of nature tourism sites (see, e.g. Chung et al. 2011; Mmopelwa et al. 2007; Navrud & Mungatana 1994; Navrud & Vondolia 2005; Reynisdottir et al. 2008). In nature-based tourism, externalities from the use of the nature could make an argument for a higher price charged in order to cover the expenses of the externalities, and to decrease demand (Navrud & Vondolia 2005). Even though the whales can be somewhat affected from the whale watching boats, the externalities of the whale watching activity is likely to be very small in the Andøy region. I will therefore assume no externalities from the whale watching industry.

Another important factor in determining recreational value or consumer surplus is the associated demand curve. Maximizing the individual's utility with respect to the associated price levels gives the Marshallian demand.

Marshallian Demand

This section builds upon the economic theory presented in Silberberg & Suen (2001). From economic theory, consumers (whale watchers) are assumed to be rational actors, maximizing their utility from whale watching and other goods with respect to given prices and disposable income.

$$U = U(X_1, X_2) \qquad (1)$$

The individual's utility function are presented by (1), where U equals the individuals total utility, X_2 is the sum of all goods in the market the individual consume and X_1 equals the whale watching product.

$$\frac{\partial X_2}{\partial X_1} = \frac{\partial XU/\partial X_1}{\partial XU/\partial X_1} \qquad (2)$$

The left hand size of (2) is the consumer willingness to exchange one whale watching ticket for another market goods, while the right hand is the ratio of the two marginal utilities. The ratio is the marginal rate of substitution between X_1 and X_2, and is the slope of the utility function of X_1. Assuming a diminishing marginal rate of substitution, the marginal utility of X_1 decreases as the amount of X_1 increases.

Because market goods have a price, the individual also has to take into consideration the price of the products (P) and disposable income (M). The individual budget constraint is given by:

$$M = P_1X_1 + P_2X_2 \qquad (3)$$

Maximizing utility with respect to the budget constraint, the problem statement becomes (Silberberg & Suen 2001) :

Maximize (1)

$$U^0 = U(X, Y)$$

Subject to (3)

$$M = P_1X_1 + P_2X_2$$

Lagrange Function

$$\mathcal{L} = U(X_1, X_2) + \lambda\,(M - P_XX_1 + P_2X_2) \quad (4)$$

Assuming the Lagrange partial derivatives equals zero, and negative second derivatives, the Marshallian demand functions equals:

$$X_i = X_i^*(P_1, P_2, M), i = 1{,}2 \quad (5)$$

The demand of whale watching is hence given by the individual's utility of whale watching and the given budget constraint. The utility can be seen as a function of personal characteristics, household composition and trip specific characteristics, where a change in one of the mentioned factors will lead to a shift in the demand curve (Walsh 1986). A change in the budget constraint, e.g. changed price of good X or Y, or changed disposable income, is also expected to affect recreational value.

3.3 Non-Market valuation

Even though commercial whale watching and several other marine recreational activities are goods traded within a market, consumer surplus is not directly derivable from market prices and demand (Magnussen et al. 2012). It is therefore necessary to apply non-market valuation techniques. Non-market valuation techniques have developed rapidly since the 1960s (Carson et al. 2001), and is increasingly used to connect changes in ecosystem services to changes in human welfare (Turner et al. 2010). However, despite a growing body of literature on marine recreational value (see the metaanalysis by: Ghermandi & Nunes 2013), only a few studies are conducted on the recreational value from whale watching.

Table 3-2 summarizes four studies conducted on whale watchers recreational value, located in my literature search. Leeworthy & Wiley (2003) reports the recreational value estimates from a study performed in 1986 without going into explanatory variables, while Loomis & Larson

(1994) primarily measures the non-use value of whale resources. Hoagland & Meeks (2000) and Loomis et al. (2000) are hence the only studies reviewed only focusing on the user value, i.e. consumer surplus, of whale watching.

TABLE 3-2: Overview of Recreational Value from Whale Watching

Study	Method	Whales (Location of study)	Organized (boat /shore)	CS (USD 2013)
Leeworthy & Wiley (2003)[5]	CV & TC	Gray, blue and humpback whales (California)	Organized (boat)	$ 50,63
Hoagland & Meeks (2000)	TC	Humpbacks (New England)	Organized (boat)	$ 35,27
Loomis et al. (2000)	TC	Gray whales (California)	Unorganized (shore) & organized (boat)	$ 58,33[6]
Loomis & Larson(1994)	CV	Gray whales (California)	Organized (boat)	$39,41(50%) $46,86 (100 %)[7]

As displayed in table 3-2, studies conducted on recreational value of whale watching have mainly used the two non-market valuation techniques; the travel cost (TC) method and the contingent valuation (CV) method. The main difference between these two methods is that the TC method is a revealed preference method, while CV is a stated preference method. Using revealed preference methods one observes the respondents preferences through actual behavior, such as associated travel costs, while stated preferences elicit the respondent's preferences through asking directly or indirectly about their willingness to pay (WTP) or willingness to accept (WTA) for an environmental good or service.

Magnussen (2010) suggests using a combined travel cost and contingent valuation method to measure the recreational value of whale watching in Norway. Combining the two methods makes it possible to test the validity and reliability of the estimates (Alvarez & Larkin 2010; Hanley & Barbier 2009). Using the TC method in the Andøy region is, however, not without problems as Normann (2012) described the typical Vesterålen tourist (both whale watchers and non-whale watchers) to be non-Scandinavian planning to visit several destinations in their longer vacation in Norway. As noted by Loomis et al. (2000), the TC method tend to give

[5] The estimate is obtained from Pendleton (2006)
[6] Loomis et al. (2000) tested different TCM specifications, leading to different results, but concluded that $43(2000 dollars) was the least biased estimate.
[7] Loomis & Larson (1994) used CV to elicit total economic value of an increase in whale population of 50% and 100% from initial level. The estimates thus include both recreational values and non-user values.

overestimated WTP when applied to multi-destination or multi-purpose travels, especially if international tourists constitute a larger share of the whale watcher population.

Even though Loomis et al. (2000), Hoagland & Meeks (2000) and Navrud and Mungatana (1994) all suggests ways to control and correct for international visitors and multi-purpose travels, limited available time and resources made it desirable to focus on one of the proposed methods. The fact that 82,3% of the whale watchers tourists is on their first time visit (Normann 2012b), made the CV method desirable for my thesis. Choice experiments (CE) were also revised early in the process of designing this study. However a required large sample to perform statistical analysis, and the difficulty of measuring an existing consumer surplus (not changed CS), made the CE method undesirable for the purpose of this thesis.

3.4 Contingent Valuation Method

The CV method is used to ask a representative sample of the relevant population about their willingness to pay (WTP), or willingness to accept (WTA), to obtain or avoid a specific change in quantity or quality of a given ecosystem service. Hanley and Barbier (2009) recognizes five steps of the CV method:

1.) Setting up the hypothetical market
2.) Obtaining bids
3.) Estimating mean WTP and/or WTA
4.) Aggregating data
5.) Carrying out validity checks

Number (1) setting up a hypothetical market, is an essential benefit using the CV over the TC method. However, as discussed below, the hypothetical nature of the method is also the feature that raises a large number of potential biases. The steps are followed when designing the CV study in chapter 4.

CV Bias

Arrow et al. (1993), the NOAA panel, recognizes several problems with the CV method where most of them are a result of the hypothetical nature of the approach. Asking rather than observing behavior makes the outcome of the study vulnerable to the respondent's willingness and possibility to give an honest answer. Even if the respondent wants to give an honest answer,

misunderstanding or misinterpretation of the question can lead to an answer that differs from how the respondent would actually behaved in an actual situation.

Another recognized problem of the CV method is the "warm glow effect" (Alvarez & Larkin 2010; Arrow et al. 1993). The "warm glow effect" rises if the respondents feel good from overstating their WTP. The problem leads to overestimated WTP, or in this case overstated CS. On the other hand, understatement of true WTP is also recognized as a potential strategy in order to avoid an increase in associated costs (Mitchell & Carson 1989). As the whale watchers are not asked about their non-user values of whale resources, the strategy of understating WTP, seems more likely than the "warm glow effect".

The design of the survey; how the question are phrased and worded, can affect the respondents answers and reduce potential biases (Arrow et al. 1993). Assuming a good designing of the study, the NOAA panel led by Arrow and Solow concludes that "the CV method convey useful information" and " can produce estimate reliable enough to be the starting point of a judicial process of damage assessment" (Arrow et al. 1993 pp. 43)

3.5 Hicksian vs. Marshallian Consumer Surplus

The CV method directly derives the consumer surplus (CS) from the elicited WTP, which is a benefit compared to other non-market valuation methods. As noted by Perman et al. (2003) and Boardman et al. (2011), three different demand curves can be used to measure consumer surplus: Marshallian demand curve, Hicksian compensated variation demand curve and Hicksian equivalent variation demand curve. Figure 3-3 illustrates how the three different demand curves measure the change in CS when increasing the price of good X. While Marshallian consumer surplus (CS^M) is measured straight from the change in price and demand of good X, (CV´) and equivalent variation (EV) are two monetary income compensation measures of Hicksian consumer surplus (CS^H). CV´ equals the individual willingness to pay (WTP) in order for the individual to stay at the initial utility level (U1) after the price increase (Perman et al. 2003). EV on the other hand is the necessary income compensation, i.e. willingness to accept (WTA), in order for the individual to accept the new and lower utility level (U0)(ibid).

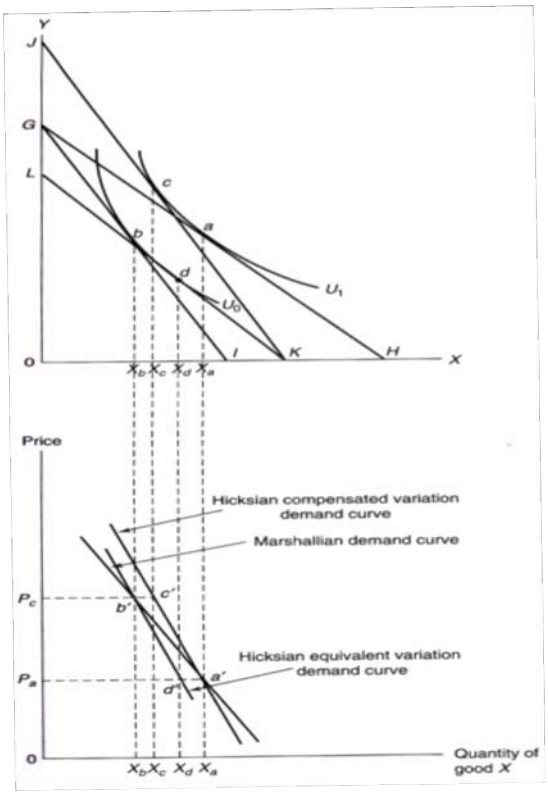


Figure 3-3: Marshallian vs. Hicksian Demand[8]

The main difference between the Marshallian and Hicksian approach is; while CS^M takes account of both the substitution and the income effect of a proposed change, CS^H only takes account of the substitution effect. The Hicksian consumer surplus thus uses CV´ or EV to measure the income compensation necessary to keep the individual at a given utility level (indifference curve) while CS^M measure the change in consumer surplus moving from the initial utility level to the new utility level. Because of this, a measure of changed WTP (WTA) using CS^M is usually biased (Wooldridge 2009). The Hicksian measures are therefore mainly used in CV studies (Hanley & Barbier 2009).

In my thesis, I will use the Marshallian consumer surplus to derive the recreational value of whale watching by eliciting maximum willingness to pay for the good. The reason for choosing an untraditional measure is the main purposes of the study, which is to measure the existing CS of commercial whale watching and not a change in CS due to a change in related prices or attributes.

According to Silberberg & Suen (2010), the marginal values in the Marshallian consumer surplus must represent points along a compensated utility held-constant Hicksian demand curve. The Hicksian demand functions are the first derivatives of the expenditure function according to the envelope theorem (Silberberg & Suen 2001). The expenditure function can be derived from the indirect utility functions, where the indirect utility functions are the Marshallian demand functions substituted into the objective function.

The indirect utility function is given by:

$$U^* = U[X_1^*(P_1, P_2, M), X_2^*(P_1, P_2, M)] \quad (6)$$

[8] Source: Boardman et al.(2011 pp.70), a similar figure is also found in Perman et al. (2003 pp.406)

Deriving Hicksian demand functions (integral of CS):

$$-\int_{p^0}^{P^1} X_i^U \partial P_i{}_j = -\int_{p^0}^{P^1} \frac{\partial M^*}{P_i} \partial P_i{}_j = M^*{}_j(P^0, U^0) - M^*{}_j(P^1, U^0); i, j = 1,2 \ldots. \quad (7)$$

Where M^* equals given expenditure, i is the good examined, in this case whale watching, and j represents the individual CS. To express the consumer surplus of the whale watching product, let $P^0{}_1$ equal the market price of the whale watching tour and $P^1{}_1$ equal individual j`s maximum willingness to pay for the whale watching tour. The integral given by the left hand side of (8) $-\int_{p^0}^{P^1} \frac{\partial M^*}{P_i} \partial P_i{}_j$, equal the consumer surplus, i.e. recreational value, of individual j.

Assuming price of other goods are held constant, the total consumer surplus generated by the whale watching industry is given by[9]:

$$\sum_{=1,2} -\int_{p^0}^{P^1} \frac{\partial M^*}{P_i} \partial P^0 = \sum_j [M^*(P^0, U^0) - M^*(P^1, U^0)] \quad (9)$$

The area marked as consumer surplus in figure 3-2, illustrates total recreational value given by (9). Usually, TEV of the natural resource is only accounted for residents of the country where the natural resource is present. In this study, however, CS of international tourists is taken into consideration, as the larger obtainable sample is necessary to derive a valid CS estimate. One could also argue that all whale watchers CS represents an optional value, in the form of the potential of converting more of international tourists CS to PS in the future. For certain whale species, it might also be argued that the whale specie is a global resource in need of global attention.

[9] Estimating total recreational value relies strictly upon having a representative sample.

3.6 Factors influencing Recreational Value

Walsh (1986) reviews a tremendous amount of data on participation rate on recreational activities in the United States and finds the following factors to determine demand of nature-based recreational activities:

(1) Socioeconomic Factors
(2) Attractiveness or quality of recreation site
(3) Availability of substitutes
(4) Travel time
(5) Congestion or crowding at recreational site
(6) Tastes and preferences

3.6.1 Socioeconomic Factors

Walsh (1986) finds a variety of socioeconomic variables to be important in explaining adult participation rate in outdoor recreation in the United States, and recent recreational value studies supports most of Walsh (1986) findings.

Income

Disposable income is the most frequently used socioeconomic factor to explain variation CS or marginal WTP, as disposable income is assumed to be the budget constraint used to elicit the demand of a particular good in economic theory (see section 3.2). There is however conflicting results on the effect of higher income on demand and recreational value in studies reviewed.

According to Walsh (1986), participation rate on recreational activities, assuming normal goods, statistically increases with increased income level in one third of 30 activities reviewed. The result from Reynisdottir et al. (2008) study, regarding visitors WTP for entrance fee to two natural attraction sites on Iceland, furthermore suggests that respondents with a higher income have a significant higher WTP. A variety of studies valuing the benefits of recreational parks, also find increased income to have a statistical significant positive impact on; demand of recreational activity (Navrud & Mungatana 1994), user and non-user values (WTP) (Alvarez & Larkin 2010) and CS (Mmopelwa et al. 2007).

Contrary to economic theory and other recreational value studies, Hoagland & Meeks (2000) and Loomis et al. (2000), find income to have a significant and negative effect on the demand of whale watching trips. Potential explanations of the negative income coefficient are; the problem often arises using the travel cost method (Loomis et al. 2000), or whale watching is more of a low-income type recreation activity, i.e. inferior good (Hoagland & Meeks 2000).

Education

Education level is commonly found to be positively correlated to participation rate in outdoor recreation activities (Libosada 2009; Walsh 1986). Hoagland & Meeks (2000) also find a significant positive relationship between higher education level, those who have completed at least a college degree, and number of whale watching safaris. Reynisdottir et.al (2008) also confirm a significant positive relationship between level of education and WTP. However, as first noted by Duffus & Dearden (1990) and later by Catlin & Jones (2010), the proportion of specialists attending nature-based tourism activities have decreased since the beginning of 1990s, which indicates a more heterogeneous population of tourists participates in nature-based activities today.

Age

Age of respondent is commonly controlled for in valuation studies. Walsh (1986) finds age to have a decreasing effect on participation rate in several outdoor recreational studies. Alvarez and Larkin (2010) find younger respondents (under 40 years) to have a higher WTP for recreational activities and nature conservation, while Reynisdottir et al. (2008) results indicates increasing age decreases WTP.

Gender

Gender can also determine participation rate in outdoor recreation (Walsh 1986). While men have a significantly higher participation rate in consumptive activities such as fishing and hunting, and physically strenuous activities like hiking, backpacking, outdoor sport etc., while women have a significantly higher participation rate in less strenuous activities like picnicking, walking or jogging, visiting zoos and amazement parks (ibid). Loomis et al. (2000) find gender being highly significant and negative in explaining number of trips to whale watching sites. A number of studies, on the other hand, find no significant impact from gender on recreational value (see, e.g. Mathieu et al. 2000; Navrud & Mungatana 1994; Reynisdottir et al. 2008).

Family Composition

Even though nature-based tourism has become more popular, in general (Catlin et al. 2011; Duffus & Dearden 1990), Tangeland & Aas (2011) suggest household composition like; whether there are kids within the family and at what age could be important in determining participation in nature-based activities. Through surveys they recognize four attributes of nature-based activities; risk, facility, learning and family friendly. For the attributes; "risk" and "family friendly", the age of the youngest child in the family is an important explanation of what activities the household prefers (Tangeland & Aas 2011). Even though whale watching is a form of wildlife watching, the risk of going on a whale watching boat is quite low, and the extent to which whale watching is family friendly is questionable. Long boat trips and long time of waiting to see the whales might impact the attribute family friendliness negatively, especially as it is difficult to entertain the children onboard. On the other hand, it is a relatively safe activity and when the whales are spotted, this could be enough to cover for the length of waiting time.

Nationality

The tourists' nationality can also be important in determining how much money the household is willing to spend on various goods and activities (Mathieu et al. 2000). When travelling in Norway, European tourists in general are willing to spend more money on accommodation, food and activities than Scandinavian tourists (Thrane & Farstad 2012a; Thrane & Farstad 2012b). As Scandinavians are less used to pay for the use of natural resources due to the common right access, Scandinavians might also report a lower perceived CS of nature-based recreational activities compared to other Europeans (Huhtala 2004).

3.6.2 Attractiveness or Qualities by Site

By attractiveness or quality by site, Walsh (1986) refers to studies including variables for air quality and visibility, water quality, water level, game and fish harvest, weather conditions, noise and congestion to explain the fixed quality of a particular recreational site. The whale watching experience is however difficult to standardize, as attractiveness and qualities of the whale watching experience is likely to vary from one trip to another. None of the TC studies reviewed on recreational value of whale watching has focused on the aspect of how trip specific factors affect demand of whale watching and CS, however, Hoagland & Meeks (2000) do revise how potential trip specific factors impact tourist satisfaction.

A growing body of literature on tourist satisfaction (e.g. Catlin & Jones 2010; Orams 2000; Ziegler et al. 2012), recognize how trip specific factors and tourist satisfaction could be related. The same studies also recognize how tourists' satisfaction level might be affected by regulations imposed to protect the whales, such as codes of conducts. Recognized impacts on whales from heavy boat traffic has lead to an increasing establishment of codes of conducts around the world (Orams 2000). Minimum distances to whales, maximum time spent with the whale, speed limit and maximum number of boats on each whale or whale group are often specified within these regulations (ibid).

In total, five tourist impact studies on features explaining tourist satisfaction of whale watching were reviewed. The site of location and whale species viewed varies greatly, from swimming with whale sharks in Australia and Mexico, to watching spinner dolphins from boat in Bali, Indonesia. Table 3-3 summarizes these studies findings.

Distance to Whale

Several of the reviewed studies find distance to marine animals to be a feature people rate as important when explaining satisfaction or dissatisfaction with the trip (e.g. Hoagland & Meeks 2000; Mustika et al. 2013; Valentine et al. 2004), where a longer distance is negatively linked to tourist satisfaction An implication from imposing strict regulations with respect to minimum distances to whales therefore seems to be decreased tourist satisfaction. Orams (2000) on the other hand finds that only 7% of the tourists rated "coming closer to the whales" as an important feature for improving their whale watching experience, suggesting other features could be more important in explaining tourist satisfaction of whale watching.

Sightings

Other important features affecting the tourist satisfaction positively is; number of whale sightings or whales seen (Hoagland & Meeks 2000; Orams 2000), time where whales are present (Valentine et al. 2004), variety of marine species seen (Catlin & Jones 2010; Hoagland & Meeks 2000; Ziegler et al. 2012) and special whale behavior (Mustika et al. 2013; Orams 2000).

Bad encounter management and "crowding"

Even though many tourists appreciate coming close to the whales, whale watchers also replied in several of the tourism impact studies that perceived bad environmental management (Catlin & Jones 2010; Mustika et al. 2013; Valentine et al. 2004; Ziegler et al. 2012) from the whale watch company and a high number of whale watching boats in the same area affected their whale watching experience negatively (Catlin & Jones 2010; Ziegler et al. 2012). Negative impact on recreational value from increased crowding of people and vehicles is also recognized in several of the outdoor recreation studies reviewed in Walsh (1986), often referred to as congestion problems.

Weather and Wave Conditions

Seasickness and bad weather also seem to have an unsurprisingly negative impact on whale watching experience (Catlin & Jones 2010; Mustika et al. 2013; Orams 2000). A larger proportion of the examined studies are however based upon whale watching destination in the southern hemisphere. When tourists travels further North they tend to adjust their expectations, and hence their satisfaction with weather, towards typical weather condition in the area (Jakobsen et al. 2011).

TABLE 3-2: Tourism Impact Studies reviewed

Study (*site)*	Dependent variable	Variable	Impact
Mustika et al. (2013)	Tourist satisfaction	Close distance	+
(Bali, Indonesia)	Ranking 1-10	Special behavior	+
Spinner dolphins		Few animals sighted	-
		Bad encounter management*	-
Ziegler et al. (2012)	Satisfaction score	Number of boats*	-
(Isla Holbox, Mexico)	IP-analyzes	Numbers of snorkelers*	-
Whale shark swimming	Expected vs. experienced	Variety of marine species viewed*	+
		Environmental consideration	+
Catlin & Jones (2010)	Quality of whale watch	Variety of marine species	+
(Western Australia)	experience	Number of boats	-
Whale shark swimming	Ranking 1-5	Seasickness	-
		Bad encounter management	-
		Bad weather	-
Valentine et al. (2004)	Tourist satisfaction	Close distance *	+
(Australia)	Ranking 1-10	Time spent with whales *	+
Dwarf mink whales swimming			
Orams (2000)	Tourist satisfaction	Number of whales	+
(Brisbane, Australia)		Distance	-
Humpback Whales		Spectacular behavior	+
		Calmer sea	+
Hoagland & Meeks (2000)	Consumer surplus from whale watching	Number of whales	+
		Variety of marine species	+
		Distance	-
		Sea sickness	-

Notes: * = Statistically significant at ($p < 0,10$)

3.6.3 Expectations

Valentine et al. (2004) and Ziegler et al. (2012) emphasize the gap between whale watchers expectations and experience to be important in determining tourist satisfaction. The expectations might impact the satisfaction of; experienced number of whales, distance and behavior of whales (Valentine et al. 2004). While Orams (2000) find whales breaching the water to be important for tourists, Mustika et.al (2013) reports playfulness of the animals to be the most important behavior feature. These finding could indicate people adjusting their expectations somewhat towards the whale specie viewed and geographical location of the whale watch site.

3.6.4 Characteristics of Travel

Price of Whale Watching

Loomis et al. (2000) and Hoagland & Meeks (2000) find travel costs to have a significant negative impact on number of whale watching trips. The finding is supported by microeconomic theory; the response of a price increase is reduced demand due to the substitution and income effect. Walsh (1989) also suggests the inclusion of travel time in estimating demand of recreational activities. Including a measure of travel time to recreational site is however much debated due to the difficulty of obtaining the value of time (Hanley & Barbier 2009).

A hypothesis proposed by Alvarez and Larkin (2010) related to the price of the recreational activity is "if the respondent perceives the price of the recreational activity as a "sunk cost", the marginal willingness to pay increases" (pp.7). Alvarez and Larkin (2010) introduced this hypothesis after discovering people travelling in tour buses had a significant higher marginal willingness to pay than people travelling in smaller groups. It is therefore possible that people paying the whale safari in advance have a higher willingness to pay than those having just recently bought/purchased a whale watch ticket.

Substitute Sites

The demand of whale watching is also affected by price and attributes of potential substitutes (Walsh 1986). Loomis et al. (2000) tried to measure the substitution effect of alternative whale watching sites, but did not find any significant relationships between the cost of travelling to alternative whale watching sites and the estimated demand for the particular whale-watching site. Navrud & Mungatana (1994) was also unable to find travel costs to substitute sites to be significant explaining visitation rates in Lake Nakuru National Park, Kenya. A potential explanation for these findings is that whale watching in California and flamingo viewing in in Kenya do not have close substitutes.

Travel Budget

Disposable income is not the only factor determining the individual's budget constraint. Despite different income, people might have decided to spend approximately the same amount on their vacation. In this case, disposable income might not be the best indicator of the individual's budget constraint. Studying tourists willingness to pay park fees in a national park in Botswana, Mmopelwa et al. (2007) decided to include travel expenses as an approximate of peoples budget constraint, as they did not get a sufficient response rate on the income question. They found

travel expenses to be highly significant and positive in explaining WTP entrance fee. Thus indicating the travel budget could be an appropriate budget constraint.

3.6.5 Tastes and Preferences

Socioeconomic variables can only be an indirect measure of people`s preferences but is often applied because it is easier to measure than people`s preferences (Walsh 1986). However, in contingent valuation studies it is common to include variables indicating the individuals underlying preferences (Hanley & Barbier 2009).

Interest in seeing Whales

Both Loomis et al. (2000) and Hoagland & Meeks (2000) emphasize the importance of studying how important the whale watching activity is when selecting the specific travel destination, as it is an indirect measure of the individuals' genuine interest in seeing whales. According to Loomis et al. (2000) result, if the respondent stated that the whale watch activity was their primary reason for visiting the region this significantly increased number of trips to the whale watch site per year.

Willingness to Pay for the Use of Natural Resources

CV studies typically ask a question regarding attitudes towards paying for nature conservation (Hanley & Barbier 2009), as one would expect those with a positive attitude to have a higher WTP for the environmental good measured. According to Mathieu et al. (2000), even though a large proportion of the sample gives a positive respond towards protecting marine parks, the ones who cannot provide a reason for protecting the park are the ones less likely to state a positive WTP. The finding might be an example of a "warm glow" effect, which according to Alvarez & Larkin (2010) is when people overstate their WTP or give a perceived "correct" answer because it makes them feel good.

Asking for typical or earlier behavior instead of proposing a hypothetical scenario could reduce the "warm glow effect". Asking whether the participant has paid an entrance fee to a natural attraction before, Reynisdottir et al. (2008) is able to detect a significant positive relationship between those having paid an entrance fee to natural attractions before and stated WTP of entrance fee at the studied natural attraction.

Knowledge and Experience

The whale watchers' knowledge about whales and previous whale watching experience influences the whale watcher's expectations, which again is expected to affect tourism satisfaction (Valentine et al. 2004). Expectations are also likely to affect recreational value (Hanley & Barbier 2009). Even though conducted TC studies on whale watching takes account of number of trips to the whale watch site, experience of whale watching at other sites are not accounted for in the reviewed recreational value studies.

Estimating the non-user value of humpback whales in Canada, Lyssenko & Martinez-Espiñeira (2012) includes both prior experience whale watching at the studied site in Newfoundland and Labrador, and experience whale watching from other whale watching destinations, as independent variables of WTP. They find experience from whale watching at other whale watching destination to have a positive impact on WTP for conservation of humpback whales in Canada, while prior whale watching experience at the whale watching sites that would be affected by the conservation program (New Labrador and Newfoundland, Canada) had a negative impact on WTP. The result could be explained by a decreasing marginal utility of user and optional value at the particular site (Lyssenko & Martinez-Espiñeira 2012).

3.7 Summarize Theory and Literature Chapter

Despite a growing number of reports and studies recognizing the need of more valuation studies on coastal and ocean ecosystem services, the literature search reveals a lack of studies on the recreational value of whale watching. There are however valuation studies conducted on recreational value of national parks and other outdoor recreational activities, and most of them support Walsh (1986) results. Examining the literature linking tourist satisfaction and natural conditions, it is striking how similar relationships between tourist satisfaction and natural conditions could be derived, despite different geographical locations and whale species studied.

4. Data and Methods

In total, five weeks were spent collecting data in the Andøy region, where a pilot study was conducted during the first week. In this chapter, the final methods for collecting and analyzing data from the pilot study will be presented, accompanied by underlying theory.

4.1 Pilot Study

A pilot study was conducted one week prior to the final study in order to test the questionnaire and a variety of sampling strategies as proposed by Mitchell & Carson (1989). During the pilot study, I asked tourists to complete a pilot questionnaire in either Norwegian or English at the following locations; the reception of Whalesafari AS, the whale watching boats, the tourist information and at the ferry connecting Andenes and Senja. This resulted in 27 completed pilot-questionnaires.

A major alteration from the pilot study to the final one was that I went from defining summer tourists in the Andøy region as the population of study, to solely include whale watchers. Obtaining observations from non-whale watchers could also have been interesting in order to compare differences between whale watchers and non-whale watchers, but the subpopulation was excluded from the sample in order to get a proper sample size with the limited time and resources at hand.

Another important conclusion drawn from the pilot study was that a high proportion of the tourists came from non-Scandinavian countries, and many had problems understanding the questions in English. To reduce the complexity of the questionnaire, I translated the questionnaire into German, Dutch and Italian with help from native speakers, as these were the languages spoken by the majority of whale watchers unable to complete the survey properly in English.

In addition to translating the questionnaire to other languages, other minor changes were made in the questionnaire to reduce its complexity and to adjust the questionnaire towards the target population. I followed the advice by Johannessen et al. (2004), regarding reducing the use of matrixes and rephrasing loaded questions or statements. In addition, adding or redrawing categories to some questions, removing questions partly answered in another question and removing questions to complex to analyze within this thesis, was done.

One mistake not corrected before printing the final study, was including both whale watchers and non-whale watchers in the questionnaire's instructions. This lead to some respondents becoming unnecessary confused, which likely lead to decreased response rate on whale watchers experience and CV question. The problem was discovered early in the process, but a low budget frame made it undesirable to throw all the printed questionnaires. To reduce the problem, I spent extra time explaining the necessity of completing the entire survey when introducing the questionnaire.

4.2 Sampling Strategy

The population was defined as households/travel parties going whale watching in the Andøy region during the summer season (May to September). Approximately 14 000 people, according to received data from Whalesafari AS and Arctic Whale Tours, went whale watching during the summer season 2013. It is further assumed that approximately 1000 people went whale watching with Seasafari Andenes. The average number of people per booking (household) according to data from Whalesafari AS is 2,7 people, suggest approximately 5555 households went whale watching during the summer season 2013.

Of the four weeks, three weeks were spent collecting data in Andenes and Stø. The main sampling strategy emerging from the pilot study was to distribute as many surveys as possible in the reception area[10] and on the whale watching boats returning from the whale field. Three weeks out of four was spent in Andenes and one week was spent in Stø. I received in total 285 completed questionnaires, 230 from Andenes and 55 from Stø. The response rate of the survey was 86%, which could be considered as a high response rate according to Johannessen et al. (2004). The main reason for refusing to participate in the study was language problems, but a few also refused the study due to lack of interest or a perceived time constraint. Ten observations was thrown out of the sample even before recording the data as less than half of the questionnaire was completed.

The conditions made it difficult to draw a random sample from the population, a key criteria for statistical inference (Wooldridge 2009). Even though lists of participants and contact information existed, I was not given access to these lists. In any case it would be difficult to find the time to contact and interview the objects because many of the tourists only stayed in

[10] Where tourists waited for the scheduled museum tour/ information session after check-in.

Andenes for a few days. The high response rate and a low decline rate of my study reduces the potential of other biases arising in statistical analyzes such as selection- and attrition bias.

Sample vs. Population

Johannessen et al. (2004) suggest that when information regarding characteristics of the population is available, the characteristics of the sample can be compared to the characteristics of the population in order to review whether the sample is representative despite a non-random sampling strategy. From Whalesafari AS, I was able to get some data regarding nationality of each booking number, making it possible to compare sample vs. population with respect to nationality (see table 4-1).

TABLE 4-1: Population vs. Sample Nationalities

Nationality	Population	Sample
Norway	13%	8%
Sweden	7%	8%
Denmark	3%	3%
Finland	3%	3%
Germany	26%	25%
Netherland	9%	12%
Switzerland	7%	8%
Italy	6%	9%
France	6%	5%
Spain	5%	6%
Austria	3%	3%
Russia	3%	0%
The UK	2%	3%
Belgium	2%	1%
Czech Republic	1%	1%
Poland	1%	2%
Other countries[11]:	4%	3 %

As shown in table 4-1, besides the sample distribution of Norway, Russia, Netherland and Italy, the sample seems to be quite representative with respect to nationalities. There are neither found any statistically significant differences in characteristics between the sample collected at Stø and Andenes (see Appendix B). One possible explanation for the higher response rate from Dutch and Italian respondents is the language of the questionnaire. As for the Norwegian population, I observed the Norwegians tended to arrive later for the check-in compared to tourists from other countries, making it difficult to distribute the survey before they went to the information session. The sample statistics exclusively from the boat shows that Norwegians represented 14% of the sample, while Norwegian represented only 6% of the sample collected at the reception area. This finding therefore supports this explanation, as more observations were collected in the

[11] Other countries = 34 nations that are not included in table 4-1 as they represent less than 1% of the total population.

reception area. When compared to the population, there were fewer responses from Russians, which could be explained by language problems. As none of the nations are heavily over/under represented there is no need to use finite population correction in the econometric analysis.

4.3 Questionnaire

Longer questionnaires filled out by the respondents were used to collect data. All questionnaires were handed face to face to the respondents, which might reduce the problem of non-reliable answers (Arrow et al. 1993) and motivate the respondents to answer the survey properly (Mitchell & Carson 1989). As I was the only person handing out the survey, the approach made it difficult to test for the "interviewer effect", as proposed by the NOAA panel.

The final questionnaire consisted of 48 questions and was separated into section A, B, C, D and E. When the respondents were approached in the reception, they were asked to fill out section: A, B and E before the whale safari trip, and section C & D upon the return. Despite complex instructions, 205 respondents completed the questionnaire sufficiently to be included in the sample. The respondents on the boat were asked to fill out the whole survey on the boat trip back to the harbor and 80 surveys were collected on the boat.

Information regarding individual characteristics and preferences were collected both in section A and E. More sensitive personal information such as income and education was asked for in section E to avoid people dropping out of the survey early. In section A, I also collected information regarding travel, environmental concern of the respondent, and how important whale watching safari was for visiting the region.

Expectations of the whale watching trip was filled out in section B, including questions regarding whether the participant had seen whales before, how close the participant expected to come to the whale, how many whales the participant expected to see, and what part or behavior of the whale did the participant expect to see.

Section C included questions regarding the whale watching experience itself, such as perceived distance, number of whale sightings, other marine animals sighted, part or behavior of the whale seen, weather and wave conditions and satisfaction regarding the whale watch trip itself, number of boats, and perceived environmental concern conducted by the company. The instruction before part C, "if you have not attended a whale watch tour yet, please skip section C", was

misunderstood by several of the whale watchers, as they interpreted this as whale watching experience prior to attending the whale safari. I discovered the problem early, and I tried to reduce the problem by explaining explicitly to the participants that they had now been on the whale safari trip, and could therefore fill out all the sections.

Section D included few, but important questions, regarding satisfaction level of the Andøy region, travel budget and the contingent valuation question as discussed further in chapter 4.4 below.

4.4 Contingent Valuation Question

The design of the contingent valuation study is critical in order to obtain valid responses (Hoyos & Mariel 2010).

Definition of Study

Arrow et al. (1993) emphasizes that if people are to give a reliable CV response, they must be well informed about the proposed change in attributes. As I am studying the willingness to pay for status quo, all respondents will have first hand experience of the measured product, reducing the need of detailed information.

Hypothetical Scenario

In order to conduct a valid CV study, it is necessary to generate a hypothetical scenario perceived as real by the respondent (Boardman et al. 2011; Mitchell & Carson 1989). To establish a realistic scenario, I asked the respondent to imagine a situation where the cost of operating the whale watching company increased, leading to increased ticket prices for whale watching. As respondents typically travelled in family groups, I decided to ask for total recreational value of the "household" rather than recreational value for the "individual".

As suggested by Lindhjem & Navrud (2009), I designed the questionnaire, the scenario and the payment vehicle, in order to make the respondent perceive the CV question as a family decision. After the pilot study, I decided to use the word "family" rather than "household", as I observed respondents had different definitions and understandings of the word household. SSB`s definition of household; "people sharing the same fridge", did not apply to what I wanted to

measure, as younger adults living outside of their parents house often travelled with their parents and shared the costs of the trip.

Payment Vehicle

The payment vehicle is an important component of the hypothetical scenario, giving a description of how the individual will pay or receive the amount measured using CV method. It is important that the respondent recognize the payment vehicles used (Mitchell & Carson 1989). Examples of payment vehicles are changes in taxes, changes in entrance fees, lump sum fee or changed costs. Some payment vehicles might generate unnecessary high rate of protest responses due to the fact that the respondent might protests against the payment vehicle itself (e.g. higher tax) (Alvarez & Larkin 2010; Huhtala 2004; Mitchell & Carson 1989), and not necessarily the suggested change in the provided ecosystem services.

For the payment vehicle, I asked the respondent to state the highest increase in the costs of the family going whale watching the respondent would certainly accept from the stated payment cards. One drawback with the chosen payment vehicle is that participants typically answer their perceived "common level" of the price rather than their derived utility (Chung et al. 2011; Mitchell & Carson 1989; Navrud & Vondolia 2005). In addition, this payment vehicle might provoke protest responses towards the "policy" itself, as noted by Mitchell & Carson (1989). In this study, the understandability was, however, regarded as being more important than plausibility, and the chosen payment vehicle scores well on understandability by being easy to understand and providing a realistic hypothetical scenario. Another benefit is that the chosen payment vehicle does not allow for "free riding" or the "warm glow" effect, two recognized problems within CV studies on environmental services (Mitchell & Carson 1989). The whole contingent valuation question with the payment card options is presented in figure 4-1 below.

Obtaining Bids

Even though several methods of performing the contingent valuation has been proposed and developed throughout the years, there are basically two methods used today; the dichotomous choice and the payment card (PC) method (Hanley & Barbier 2009). The payment card method displays several possible payment card options to the respondent, and lets the respondent choose the payment option best representing their highest willingness to pay (Mitchell & Carson 1989; Rowe et al. 1996), while dichotomous choice asks the participant if he is willing to pay one or multiple stated amounts.

Examining the characteristics of the whale watcher population and the whale watch product in the Andøy region, I found the payment card method to be a more appropriate method than dichotomous choice. The payment card method is less complex, requires a lower sample for statistical inference and can easily be integrated into a longer questionnaire. To avoid anchoring bias, which according to Mitchell & Carson (1989) and Arrow et al. (1993) might appear from ranges used within the payment card and the benchmark value, I used a decent number of payment cards that were exponentially distributed as suggested by Rowe et al. (1996).

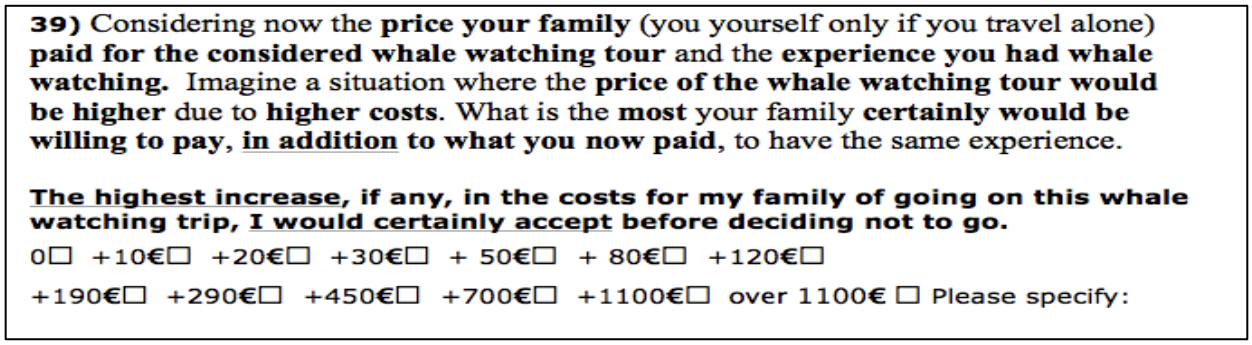


Figure 4-1: Contingent Valuation Question

Follow up Question

A follow up question was included in the questionnaire after the contingent valuation question, as suggested by Arrow et al. (1993) for respondents answering "zero" or "don´t know", to eliminate some of the observations that should not be included in the analysis when their response is not a true zero willingness to pay (Boardman et al. 2011).

4.5 Dependent Variable

The dependent variable in my study is the recreational value, i.e. consumer surplus, of whale watching, obtained from the stated payment card measured in euros[12]. A problem when using the payment card method is; maximum willingness to pay is not directly derivable from the stated payment card (Huhtala 2004). To calculate average and total recreational value of whale watching, it is therefore necessary to make certain assumptions regarding respondent's underlying maximum willingness to pay within the Payment Card (PC) interval, where the PC interval is defined as the interval between the stated payment card and the next (higher) payment card. Three different assumptions are:

I) The stated payment card is the respondent's maximum WTP
II) The midpoint of the PC interval card is the respondent's maximum WTP
III) The average respondent`s maximum willingness to pay is given by a probability distribution in the PC interval

It is difficult to know for sure which assumption gives the most precise CS estimates, but earlier studies suggests the respondent chooses the payment card that lies closer to the maximum willingness to pay (Huhtala 2004). In the result chapter, all three assumptions are derived using different methods and specification of models to compare the results.

[12] Currency exchange rate was set at: 1 EURO= 8 NOK based upon existing exchange rates in the end of June 2013 and beginning of July 2013. Same currency exchange rate was used for TRAVELBUDGET and DISPINCOME.

4.6 Influential Factors of Recreational Value

The independent variables displayed in table 4-2, serve as indicators for the underlying research questions and hypotheses derived in chapter 1.3.

TABLE 4-2: Description of Independent Variables

Variable	Description	Expected
	Socioeconomic Factors and Individual Preferences	
Dispincome	Midpoint of household disposable interval categories	+
Education	1 if respondent's highest education level is master degree or higher	+
Scandinavia	1 if being Scandinavian	-
Children	Number of children under 9 years old	- / +
Age	Age	+
Age2	Age squared	-
Gender	1 if respondent is a female	- / +
Ecological	1 if respondent is willing to pay more to buy ecological food	+
Decision	1 if respondent decided to go whale watching at home before the vacation started	+
Prevtrip	1 if respondent have been on one or more whale watch trips prior to the whale watching trip in the Andøy region	-/+
	Tour Specific Attributes	
Dist	Midpoint of given distance categories	-
Number	Number of whale sightings	+
Badweather	1 if weather condition rated as bad or very bad	-
Crowding	Number of surrounding boats on one whale	-
Badenviron	1 if respondent answer "disagree" or "strongly disagree" to question 33c.)	-
Seasickness	1 if respondent was seasick	-
	Expectations	
Expectdist	1 if expected distance>perceived distance to closest whale 0 if expected distance< perceived distance to closest whale	+
Expectnumb	1 if expected number> number of whale sightings 0 if expected number< number of whale sightings	-
	Characteristics of Travel	
Travelbudget	Midpoint of given household travel budget categories	+
Birdsafari	1 if respondent plan to or have been on a bird safari, 0 otherwise	+
Prepaid	1 if respondent has paid for the whale watching trip, 2 weeks or more ago	+
Price	Total price of whale watching for the family	-
Whaletour	1 if plan to do go on more than one whale watching trip in the region	-

Socioeconomic variables are chosen based upon reviewed literature and economic theory. In order to allow for an inverted u-shape of age of respondent and CS, two variables for age was included in the econometric analysis, where *age2* is the quadratic form of *age*. In addition to socioeconomic variables, the variables *Ecological*, *decision* and *prevtrip* were included with the purpose of deriving how unobservable characteristics of the respondents (preferences and tastes) affect CS. *Ecological* is meant to be a factor explaining the respondents' WTP for nature and environmental concern. *Decision* was chosen as a variable meant to measure the interest of seeing whales. *Prevtrip* was also included as an independent variable meant to measure whether prior experience whale watching affects CS, due to potentially more realistic expectations.

When it comes to tour specific attributes, most of the variables found to be important in explaining tourist satisfaction in the literature are quantified. This includes; number of whales (*numb*), perceived distance to whales (*dist*), experienced bad weather conditions (*badweather*), feeling seasick (*seasickness*), number of boats surrounding one whale or whale group (*crowding*) and perceived environmental concern of the whale watching company (*environmental*), are all included as independent variables in the initial econometric model. Finding decent quantitative variables for expectations vs. experience, on the other hand, were difficult. I ended up using two variables *expectdist* and *expectnumb*, meant to measure the impact on whale watchers recreational value if whale watch experience differentiated from expectations.

I have also introduced a range of travel specific factors thought to influence CS of whale watching. From economic theory; Cost of whale watching (*price*) and budget constraint (*travelbudget* or *income*) are expected to impact recreational value. A finding by Alvarez & Larkin (2010) also suggests time of payment (*prepaid*) to be important in explaining reported WTP (i.e. CS). In addition, a variable for those planning to go or have been on more than one whale safari during their vacation in the Andøy region (*whaletour*) was included, as Lyssenko & Martinez-Espiñeira (2012) proposes a decreasing WTP for those who have been whale watching at the particular whale watch site before. I also included a variable for those also planning to go on a bird safari while staying in the region, as an indicator of general interest in seeing nature (*birdsafari).*

Even though several studies suggests controlling for potential substitutes of the recreational activity, a substitute factor was not included within this study as it was hard to derive a potential substitute of whale watching in the Andøy region.

4.7 Econometric Methods

4.7.1 OLS Method

The OLS model is widely applied as it provides easy interpretable parameters and gives the best linear unbiased estimators (BLUE) when the Gauss-Markovs assumptions are fulfilled (Wooldridge 2009). When characterized as a large sample, the underlying Gauss-Markovs assumptions are as follow:

1.) Linear in parameters
2.) Random sampling
3.) No perfect collinearity
4.) Zero mean and zero correlation
5.) Homoscedasticity

As discussed in section 4.2 it is already clear that there might be a problem a problem with assumption 2 regarding non-random sampling. However, for now the sample is assumed to be a random sample, as I find the sample to be quite representative for the population (see table 4-1). As will be discussed in the result chapter, a non-random sample bias can still arise if the respondents failing to provide answers to certain questions have significantly different characteristics than the respondents answering the questions properly(Wooldridge 2009).

A problem appearing using the payment card method, as mentioned in section 4.5, is interpreting the real maximum willingness to pay which lies somewhere in the interval between the chosen payment card and the next payment card (Huhtala 2004). A solution is to assume maximum willingness to pay to be on average the midpoint between the stated payment card amount and the next payment card amount. However, the impossibility of answering a negative CS in the contingent valuation method could also affect the reliability of the OLS method. According to Wooldridge (2009), if the dependent variable takes upon the value zero only in a few observations, OLS might still provide unbiased estimators. However, as the proportion of zero answers relative to positive answers increase, so does the problem of biased OLS, which affect the coefficients and the standard errors of the estimated independent variables.

4.7.2 Maximum Likelihood Methods

Maximum likelihood estimation (MLE) methods are preferred to OLS methods when it comes to estimating discrete and non-negative variables (Navrud et al. 2008; Verbeek 2012). A variety of MLE methods exist, but tobit models are often applied when using data from the payment card method, as it has desirable features when a large chunk of the dependent variable is censored (Huhtala 2004). Another MLE method that takes account of censored variables is the interval regression model. The interval regression method also has a desirable feature as it assumes a normally distributed maximum willingness to pay in the PC interval. Tobit on the other hand is estimated based upon the same points as OLS (stated PC or midpoint of PC interval). Both MLE methods provide models linear in the parameters and unbiased estimates when the functional form is correctly specified and the variance is homoscedastic (Verbeek 2012).

Tobit Model

A Tobit model can be specified as:

$$y_i^* = x_i'\beta + \boldsymbol{\varepsilon_i} \qquad (2)$$

$$\varepsilon|\boldsymbol{x} \sim Normal\,(0, \sigma^2)$$

$$y = y^* \text{ if } y^* > 0$$

$$y = 0 \text{ if } y^* \leq 0$$

Where y^* is an underlying latent variable of the observed WTP variable, $\boldsymbol{x}$ is a vector of all independent variables included in the model and ε is the unobserved heterogeneity (Verbeek 2012). A change in x_i has a average partial effect (APE) upon outcome y_i, given by the probability of having a positive outcome multiplied by the model's coefficient (Verbeek 2012). If probability of positive WTP is close to one, the APE of x_i is similar to β_i of the OLS model (Wooldridge 2009). However, for discrete explanatory variables, like binary variables, the calculation of APE is more complex (Wooldridge 2009). As a larger share of the independent variables in my study are dummy variables (see table 4-2), and the purpose is to examine the impact of the factor on CS, I will mainly look at the signs of the coefficients in the estimated models.

Interval Regression Model

The interval regression model can be specified as:

$$y_i^* = x_i'\beta + \boldsymbol{\varepsilon_i}, \quad \varepsilon|\boldsymbol{x} \sim Normal\,(0, \sigma^2) \qquad (3)$$

$$y_i = y^* \text{ if } y^* \geq 0$$

Where y^* is the value of the dependent variable given the normality assumption in between the interval, β_0 is the constant term and $\boldsymbol{x}$ is a vector of all independent variables included in the model. As the interval regression method is derived from the tobit estimation method (Huhtala 2004), interpretation of coefficients and signs are the same as for the tobit method.

Probit Model

In addition to the MLE methods interval regression models and Tobit models, I will also use the MLE method, the Probit model, for two purposes:

1.) To assess how the given influential factors affect probability of stating a positive CS. The dependent variable takes the value "1" if the respondent reports a positive CS and "0" if the respondent reports zero CS.

2.) To test whether those answering "don`t know" or "blank" has significant different personal characteristics than those answering "0" or "positive willingness" to pay. Here the dependent variable takes upon the value "1" if the respondent reports a "zero" or "positive" willingness to pay and "0" otherwise.

The probit model can be derived from the latent variable y^*:

$$y_i^* = x_i'\beta + \boldsymbol{\varepsilon_i}\,, \ \varepsilon|\boldsymbol{x} \sim Normal\,(0, \sigma^2) \quad (4)$$

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

$$y_i = 0 \text{ if } y_i^* \leq 0$$

Where y^* is the latent variable defining Y, β_0 is the constant term, $\boldsymbol{x}$ is a vector of all independent variables included in the model and e is the error term from the estimated model. If the explanatory variable is significant and positive, increasing this explanatory variable increases the probability of Y=1.

5. Results and Discussion

In this chapter I will start out by discussing the sample properties with regard to statistical inference. Statistics regarding the whale watchers expectations and experience will also be presented briefly in this section. The main part of the chapter will however be dedicated to presenting and analyzing the statistics of the independent and dependent variable, performing econometric analysis, and discussing the results with respect to the research questions and hypotheses given in chapter 1.2. The latter part of the chapter will discuss limitation and validity of study.

5.1 Sample Characteristics

A proper sample size is necessary in order to interpret the responses. However, if the true population is a homogenous group, the sample size can be smaller (Johannessen et al. 2004).

TABLE 5-1: Descriptive Statistics of Sample Characteristics

Variable	Distribution
Disposable income	
0-20 000 euros	8%
21 000 - 40 000 euros	25%
41 000 – 60 000 euros	23%
61 000 – 80 000 euros	18%
81 000 – 100 000 euros	8%
101 000 – 120 000 euros	8%
Over 120 000 euros	8%
Age groups	
18 – 27 years old	16%
28 - 37 years old	25%
38 - 47 years old	21%
48 - 57 years old	22%
58 - 67 years old	13%
68 - 77 years old	3%
Education	
1 = Elementary school	2 %
2 = High school	22%
3 = Bachelor degree	32%
4 = Master degree	34%
5 = PhD	11%
Children <10 years old	
0 kids	92%
1 kids	7%
2 kids	1%
Children 10-17 years old	
0 kids	79%
1 kids	13%
2 kids	7%
3 kids	1%

The median household disposable income in the European union was 14 833 euros in 2011 (Eurostat 2013). Viewing table 5-1, whale watchers in Norway seem to have a high income

compared to the general European household. Travelling in Norway is expensive, which might explain why the majority of whale watchers have a decent income.

While the age variable suggests that whale watchers are a heterogeneous population, most of the personal characteristics, such as nationality income, education level and number of kids indicate a homogenous population. According to the results from the limited time period of study assuming a representative sample of the population, the typical whale watcher in the Andøy region is a highly educated European with a relatively high income travelling without children.

5.2 Whale Watching Experience and Expectations

Even though 96 % of the respondents reported "agreed somewhat" or "strongly agreed" to the statement, "I am satisfied with the whale watch tour", only 60 % of the tourists reported their whale watching experience was exceeding their expectations. This result could indicate unrealistic assumptions among the tourists. More experienced whale watchers were expected to have more realistic expectations than less experienced whale watchers. As displayed under question 13) in Appendix A, about 40% of the tourists have been on at least one whale watching trip prior to their vacation in the Andøy region. Table 5-2 summarizes the differences between first time whale watchers and tourists that have been whale watching at least one time prior to the vacation in the Andøy region.

TABLE 5-2: Expectations non-experienced vs. experienced whale watchers

	Non-experienced	Experienced
Whale sightings	3,43	3,37
Distance to whales	69 m	80 m
Tail	77%	79%
Head	34%	26%
Back*	62%	72%
Whole whale	19%	19%
Jump	25%	19%

Notes: the difference is significant at * p<0,1, ** p<0,05 and *** p<0.01

As illustrated in table 5-2, expectations seem to be somewhat affected by whale watching experience. However, except from expectations regarding seeing the back of the whale, there are no significant differences in expectations between non-experienced whale watchers and experienced whale watchers. One possible explanation is the variety of whale species watched throughout the world at different locations. A respondent with whale watch experience from Hawaii during the humpback season is likely to have different expectations, compared to a whale watcher having seen sperm whales in New Zealand. Also, the experience from swimming with whales and dolphins is quite different from watching sperm whales from large boats in the

Andøy region. It is therefore interesting to compare the average whale watching experience with the expectations of the average whale watcher.

TABLE 5-3: Experience vs. Expectations[13]

	Experience	Expected
Whale sightings*	3,08	3,36
Distance to whales***	56 m	72 m
Tail***	94%	79%
Head***	47%	32%
Back***	93%	64%
Whole whale*	10%	18%
Jump***	3%	23%
Hours on boat	4,5	
Tourists seeing other whales	7,8%	
Number of boats	2	
Weather condition	4,2	
Waves condition	4	
Sea sickness	16%	

Notes: the difference is significant at * p<0,1, ** p<0,05 and *** p<0.01

The results in table 5-3 reveal significant differences between whale watchers' expectations and perceived whale watch experience. The average tourist expects to experience a higher number of whale sightings and staying further away from the closest whale compared to the average whale watching experience. Fewer tourists get to see the whole whale and the whale jumping than what was expected by the tourists themselves, while a higher proportion of tourists get to see the back, head and tail of the whale than expected.

Especially noteworthy, 24% of the tourists expected to see the sperm whale jump (19% of the "experienced" whale watchers), indicating that both experienced and less experienced whale watchers lack information about typical sperm whale behavior. 3% report seeing a sperm whale jump even though no jumps where recorded by guides and researchers during my data collection period. One possible explanation for this finding is seeing other whale species jumping during the boat trip. In addition to sperm whales, the whale watching boats occasionally[14] spotted several playful orcas and porpoises on the tour, while only one humpback and one fin whale was spotted in a very long distance on two separate boat trips throughout the whole field study period. In total this lead to 7,8% of the respondents seeing other whale species beside the sperm whale. At one trip, only orcas were spotted, explaining why some reported "0" whale sightings for the sperm whale. Except from that one trip, sperm whales were located and observed at every single tour during the field study.

[13] Average of expectations differs slightly from table 5-2 because more observations are dropped in the paired t-test when using two variables instead of one.

[14] Orcas and porpoises were spotted on two boat trips each during the field study period.

An interesting finding is that tourists in general seem to be satisfied with weather and wave conditions despite experiencing several days with low temperature and heavy sea. The median value for weather condition is 5 (very good), and 4 (good) for wave conditions. This peculiar finding can be explained by tourists adjusting their weather expectations to typical local weather conditions (Jakobsen et al. 2011). It is also interesting to note that 16% of the tourists reported feeling somewhat seasick during the tour. Whether seasickness affect the recreational value or not will be explored more in the econometric analysis.

Number of boats is a measure (reported by researchers or myself) of the highest number of boats surrounding a whale or whale group at a given trip. Although the Andøy region is a relatively remote area with few whale watching companies compared to many other whale watching destinations, it is not uncommon having more than one whale watching boat watch the same whale at the same time. The average number of boats surrounding each whale or group of whales was found to be two within the period of study[15]. A variable for number of boats will therefore be included in the econometric analysis to test the hypothesis on whether or not increased number of boats decreases recreational value.

[15] A larger time period within the time of study, only one whale was found in approachable distance from the mainland, compared to more normal conditions.

5.3 Consumer Surplus

This section aims to derive and assess the sensitivity of the average consumer surplus. The distribution of the responses on the CV question is given in table 5-4.

TABLE 5-4: Distribution of perceived CS from whale watching

CS	Frequency	Percentage
No response	32	11%
Don`t know	24	8%
0	83	29%
10	17	6%
20	31	11%
30	28	10%
50	32	11%
80	15	5%
120	12	4%
190	4	1%
290	3	1%
450	3	1%
5000	1	0,4%
SUM:	285	100%

Zero Willingness to Pay

83 of the respondents answered a zero marginal willingness to pay, i.e. responded they had a zero CS from whale watching. The NOAA panel's (Arrow et al. 1993) suggestion of including a follow up question for those answering "0" or "don`t know" was implemented, and the reasons for answering "zero" willingness to pay, i.e. "zero" consumer surplus, are depicted in table 5-5.

TABLE 5-5: Reasons for Answering Zero Willingness to Pay

Reasons	Freq.	Distr.
No response	10	12%
(1) I don`t think the whale watch was worth the money	6	7%
(2) We have already paid a lot of money to go whale watching	40	48%
(3) We cannot afford spending more money in our travel budget	16	19%
(4) I find it difficult to specify an amount	9	11%
(5) Other reason, please specify	2	2%

Reason (1) can be interpreted as a true zero willingness to pay, as the whale watcher do not think the whale watching experience is worth the money. Reason (1) might even indicate a negative willingness to pay, however, this is difficult to measure and state.

Reason (2) can also be a true zero willingness to pay if the price paid for whale watching is the maximum WTP of the respondent. However, the response could also be a result of a protest

against the payment vehicle (Alvarez & Larkin 2010; Huhtala 2004) or a protest against what the respondent perceive as a "fair" or "common" price (Chung et al. 2011; Navrud & Vondolia 2005). If considered a protest response, 48% of the "zero" WTP responses should be excluded from the analysis. However, the difficulty of deriving whether it is a protest or a true zero willingness to pay makes it impossible to eliminate the protest answers from reason (2). This is a failure of the design of the questionnaire. To simplify and to avoid overestimation of CS, reason (2) is assumed to be a true zero WTP. However, a sensitivity analysis will be performed later in this section in order to review how much recreational value changes if excluding the zero responses answering reason (2).

Reason (3) suggests a true zero WTP, as the household do not want to stretch their travel budget. Those answering reason (4) on the other hand, seems to be willing to pay more to go whale watching, but find it too difficult to specify an amount. Reason (4) is therefore interpreted as being a positive willingness to pay. Observations with a zero willingness to pay answering reason (4) in the follow up question are therefore excluded from all statistical models, as it is likely to underestimate mean CS from the sample. If some of the respondents answering reason (4) in reality has a zero WTP, this it not likely to have a major impact on my conclusion, as only 11% of the respondents answering a zero WTP answered reason (4).

Non- Item Responses

Of the 285 responses, 32 did not answer the CV question and 24 answered "don`t know" (see table 6-4). These responses will be referred to as non-item responses, as the respondents fail to answer the CV question properly. From non-item responses, it is difficult to state whether the participant has a positive recreational value from whale watching or not, and the observations will therefore be excluded from all statistical models on recreational value, regardless of their reported reason. Excluding these responses, one does however assume the distribution of CS of non-item responses to be similar to the distribution of CS derived from "true" responses. A non-random bias, in the form a self-selection bias, might therefore arise if the real distribution of CS for non-item responses is significantly different from those answering a true zero or positive CS. A self- selection bias occurs when certain characteristics of the population affects whether the respondent answer the question (survey) or not (Wooldridge 2009). E.g. those having a genuine interest in seeing whales are more likely to fill out the whole questionnaire and are also likely to have a higher CS of whale watching.

One way to test whether those giving non-item responses differ from those answering the CV question, is by defining a probit model where the dependent variable takes upon the value 1 if there is a non-item response, and the value 0 if the respondent answers the CV question. Observations answering reason (4) are excluded from the sample, as it is uncertain whether reason (4) is a "protest", "zero" or "positive" response. After excluding these observations, non-item responses add up to 43 observations, while "true" responses add up to 220 observations.

As shown in Appendix B, several probit models were estimated with a number of variables from economic theory and recreational value studies found to affect CS. The *scandinavia* variable is significant in model (2) and (3) at a 10% significance level, and in model (4) and (5) at a 5 % significance level with a negative sign. The result indicates that Scandinavians are more likely to respond a "true" CS, while non-Scandinavians are more likely to avoid the CV question. A potential explanation of these results could be that non-Scandinavians might perceive the questionnaire as being more complex due to language problems than Scandinavians. Another potential explanation is that while Scandinavians are used to Norwegian prices, non-Scandinavians might perceive the Norwegian price level as not "fair" or "common" and might therefore refuse to respond to the CV question. If Scandinavians are later found to have a lower CS from whale watching than non-Scandinavians, as expected from reviewed literature, the average CS is underestimated.

On the other hand, if those who do not answer the question properly in reality have a zero CS, or lower CS because they are less interested in seeing whales, excluding the non-item responses will lead to overestimated CS. In order to understand the consequences of excluding non-item responses if they in reality are "true" zero WTP, I will later explore how average CS is affected if non-item responses are considered zero CS in a sensitivity analysis.

Positive Willingness to Pay

A slight overweight of participants responds having a consumer surplus from whale watching (i.e. positive WTP) (51%). As suggested in section 5.3.1 there are different ways of interpreting the respondent's consumer surplus from the stated payment card. Furthermore, there are two ways to derive the respondent's average CS. If assuming either the stated amount of CS or the midpoint between the payment card interval to be the true CS of the respondent, one can calculate average CS from distribution of CS responses given in table 5-4. Using the OLS

method to estimate average CS from stated amount and midpoint of payment card interval also give the same result, as seen in appendix B.

As mentioned in section 4.5, the exact CS is not directly derivable from the payment card interval, which supports the use of estimation methods to find the average CS. The interval regression method, assuming CS to be normally distributed between the stated payment card and the next, will be used to estimate average CS under assumption III. This might not be the real distribution of CS, but the impossibility of knowing the exact distribution makes it necessary to make an assumption. The estimate of the MLE method interval regression is computed by multiplying the estimated probability of a positive CS with the expected CS when assumed to be positive (Verbeek 2012)[16].

The three methods of deriving average CS are illustrated in table 5-6. Extreme observations that highly enlarge the CV estimate should be excluded from the final sample (Arrow et al. 1993). The observation responding a willingness to pay of 5000 euros in table 5-4 is therefore excluded from the final sample as I find it unlikely to be a representative observation in my sample, and it skews the average CS upward[17].

TABLE 5-6: Consumer Surplus

	Average	Median	Min	Max	Std. Dev
Stated amount (I)	40,41 EUR	20 EUR	0	450	68,73
Midpoint of PC interval (II)	51,98 EUR	25 EUR	0	575	87,85
Interval regression (III)	54,37 EUR				

As seen in table 5-6, the different underlying assumptions leads to varying CS estimates. However, the differences are regarded as relatively small, especially between the average CS of midpoint PC interval and the estimated average CS using interval regression (less than 3 EUR). A large share of the respondents having a zero CS can explain the large standard deviations of CS in the stated amount and midpoint of PC interval. As maximum willingness to pay is likely to lie between the two payment card amounts (Huhtala 2004), the average CS obtained from using the midpoint in the PC interval is referred to as the average CS of the study. Figure 5-1 illustrates the cumulative density of CS, when excluding non-item responses and respondents stating a zero CS due to reason (4).

[16] MLE average CS: $E(Y \geq 0) = E(Y > 0) * E(Y > 0)$. See Appendix

[17] See Appendix B for a more thorough discussion regarding the outlier observation.

Sensitivity analysis

As mentioned earlier in this section, the average CS estimates are also dependent upon underlying assumptions regarding non-item responses and potentially protest answers (reason (2)). A sensitivity analysis will therefore be performed in order to review how average CS changes if changing these assumptions. The "protest" responses referred to in table 5-7, are those 40 respondents stating reason (2) to explain their zero CS.

In the ordinary scenario, the average CS, calculated by the midpoint of the PC interval in table 5-6, is assumed to be the "true" average CS. In this scenario, only non-item responses are excluded from the sample. These non-item responses are therefore indirectly assumed to follow the same distribution of CS as is found in the defined sample.

In scenario (2), non-item responses are included within the sample and are assumed to have a zero CS. This is the "worst case" scenario, as it indicates the most biased CS estimator if assuming scenario (1) when scenario (2) is the reality. However, the relative size of the bias is even in the "worst case" scenario not very large (20%).

Scenario (3) assumes that non-item responses in reality has zero CS, while all those respondents responding reason (2) are protest responses, which in reality follows the same distribution of CS as the defined sample. If scenario (3) is the "real" situation, the relatively size of the CS bias would be relatively small (-7%).

Scenario (4) is the scenario regarded as the most likely scenario second after scenario (1). In this scenario, both those not responding to the CV question (non-item responses) and those answering reason (2) for responding a zero CS is assumed to consist of both zero and positive CS responses, following the distribution of the defined sample.

The result of the sensitivity analysis indicates that the average CS is quite robust to varying number of zero responses included in the analysis. From discussion earlier in this section, CS is more likely to be overstated than understated, suggesting that the real average CS lies somewhere in between scenario (1) and scenario (4) (52 EUR- 62 EUR).

Table 5-7: Sensitivity Analysis of CS

Scenario	Number of "0" responses	Average CS	Changed CS
(1) Ordinary (excluding only non-item responses)	74	51,98 EUR	0%
(2) Including both "protest" and non-item responses	130	40,95 EUR	- 20,36%
(3) Excluding only "protest" responses	90	48,45 EUR	-6,81%
(4) Excluding "protest" and non-item responses	34	62,18 EUR	+19,61%

5.4 Independent variables

The final sample consists of 219 observations after all "don't know" answers, blank responses, and "zero" responses answering reason (4) on the follow up question and the outlier were excluded from the initial sample. The summary statistics of the independent variables in the final sample depicted in table 5-8 shows that while questions regarding socioeconomic variables have a relative high response rate, questions regarding tour specific variables had a lower response rate.

TABLE 5-8: Summary statistics of independent variables

Variable	*N*[18]	Mean	SD[19]
Dispincome	219	52 879	35 667
Education	208	0,76	0,43
Scandinavian	219	0,25	0,43
Children	219	0,10	0,36
Age	212	42	13,26
Age2	212	1918	1158
Gender	213	0,49	0,50
Ecological	219	0,81	0,39
Decision	219	0,65	0,47
Prevtrip	219	0,41	0,49
Whaletour	219	0,05	0,21
Dist	191	53,53	42,04
Number	211	3,12	0,90
Crowding	210	2,04	1,13
Badenviron	197	0,13	0,33
Badweather	195	0,04	0,19
Seasickness	195	0,14	0,35
Expectnumb	183	0,39	0,49
Expectdist	180	0,34	0,48
Travelbudget	213	3032	1803
Birdsafari	218	0,22	0,41
Prepaid	212	0,10	0,30
Price	217	242,77	95,63

No problems with multicollinearity were detected between the chosen independent variables (see Appendix B). Inspecting the independent variables versus recreational value, *price* has a clear outlier as depicted in Appendix B. Looking at the outlier observation, I recognize this observation from my field study, as it was a household going to the Andøy region solely for the purpose of whale watching, and therefore included the entire costs of the trip as the "price of whale watching". I therefore decided to exclude the price outlier observation in the econometric

[18] N= Number of responses on the question related to the independent variable in final sample
[19] SD= Standard deviation

analysis of influential factors of CS, as it is likely to disturb the marginal effects of price on recreational value.

5.5 Estimating Recreational Value of Whale Watching

As 34% of the final sample responds a zero willingness to pay, OLS models are likely to give biased and inconsistent estimates and standard errors. The two MLE methods, interval regression method and tobit models, will thus be used to derive which factors influences the CS of whale watching.

Reviewed literature and economic theory does not give recommendations regarding which functional form to use when using the PC method. However, both Huthala (2004) and Navrud & Mungatana (1994) find the semi-log functional form, where the dependent variable is in log form, to fit their data best. Estimated density plots of midpoint CS and interval CS in this study also indicates the semi-log model, where the dependent variable is in log form, to be the correct functional form of my data (see Appendix B). I will therefore use semi-log models where the CS is in log form. Running several models using both the Tobit method and the interval regression method, I find the two methods to provide similar results with regard to significance level, signs and coefficients. Interval regression models will therefore be displayed to a larger degree in this chapter. Whether using OLS estimation method or using another functional forms affects the results derived from the semi-log MLE models will be briefly discussed in section 5.7.

5.5.1 Original Models

In total, 15 interval regression semi-log models and 15 Tobit semi-log models were estimated with different combinations of independent variables. These models will later be referred to as the original models. Exclusion of independent variables was based upon significance level and number of observations (see Appendix B for a more detailed explanation). The model best fit to the sample is the model that has the lowest AIC value (Gujarati & Porter 2009). The AIC criterion finds the initial model (lintreg1) to have the best fit to the observations in the model. However, 90 observations are excluded from the initial model, due to missing data on several of the independent variables, suggesting a “good fit to the sample” cannot be interpreted as a good fit to the representative sample of 218 observations.

An increasing number of observations made it necessary to exclude several of the independent variables, which on the other hand might lead to omitted variable bias. In order to increase the

number of observations and include the most important independent variables, the fifteenth model was run on all the independent variables that had been significant at least at a 10% significance level in one or several of the previous regressed models. The final model still had a relatively low number of observations (N=159).

TABLE 5-9: Original CS Model (lintreg 15)

Interval regression — Number of obs = 159
Log likelihood = -361,07704 — LR chi2(14) = 53,40 — Prob > chi2 = 0,0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
dispincome	-0,000	0,000	-0,13	0,893	-0,000	0,000
scandinavia	0,923	0,478	1,93	0,054	-0,015	1,860
age	0,142	0,109	1,30	0,194	-0,072	0,356
age2	-0,002	0,001	-1,49	0,137	-0,004	0,001
ecological	0,956	0,550	1,74	0,082	-0,123	2,035
whaletour	-2,539	1,203	-2,11	0,035	-4,897	-0,182
dist	0,011	0,006	1,94	0,052	-0,000	0,022
number	0,617	0,266	2,32	0,020	0,096	1,139
crowding	-0,346	0,190	-1,82	0,069	-0,720	0,027
badweather	-3,217	1,535	-2,10	0,036	-6,225	-0,209
expectdist	1,610	0,476	3,39	0,001	0,678	2,542
birdsafari	1,370	0,496	2,76	0,006	0,397	2,343
prepaid	2,876	0,680	4,23	0,000	1,544	4,209
price	-0,005	0,003	-1,89	0,059	-0,010	0,000
_cons	-2,954	2,670	-1,11	0,269	-8,188	2,280
/lnsigma	0,871	0,077	11,32	0,000	0,720	1,022
sigma	2,390	0,184			2,055	2,780

Notes: Except from *dispincome* and *age*, all independent variables included in lintreg 15 are significant at p<0,10.

Reviewing table 5-9, several of the influential factors included in the econometric analysis is found to have a significant impact on CS. In order to obtain the robustness of these findings, one should compare the results with the other original models derived, with varying number of observations and independent variables. The results and how they relate to reviewed literature and economic theory will be discussed in section 5.6. First, I will however focus on understanding how the influential factors impact CS, as the individual decision of stating CS can be separated into two decisions:

(1) Whether to state a positive CS or not
(2) If stating a positive CS, what is the size of the CS

The impact of an influential factor on CS will therefore be a net impact from these two "decisions". Some factors might be important in explaining the probability of answering a positive CS (1), while other factors might be important in explaining size of CS when the respondent has decided to state a positive CS (2). Two types of models will be derived to examine how influential factors affect these two decisions. First, I will derive probit models to examine which factors impact the individual decision of whether to state a positive CS or not

(1). These probit models will be referred to as the zero vs. positive CS models. I will then go on to derive interval regression models to examine which factors impact the reported size of CS among those who have already responded a positive CS (2). These interval regression models will be referred to as the positive CS models.

5.5.2 Zero vs. Positive CS

All independent variables presented in table 5-8 were initially included as explanatory variables in the probit model regressing zero vs. positive CS. As mentioned in section 4.7.2, the dependent variable takes the value "1" if the respondent state a positive CS. The uncertainty regarding which factors affect the probability of responding a positive CS, made it desirable to run several models. The models were derived from the initial model with respect to significant variables, insignificant variables and number of observations. The five probit models with the lowest p-value score (Prob>chi2) are displayed in table 5-10.

TABLE 5-10: Zero vs. Positive CS

Variable	probit1	probit2	probit4	probit5	probit8
dispincome	-0,00		0,00	0,00	0,00
education	-0,36		-0,02		
scandinavia	0,18		0,58*	0,47*	0,32
children	0,20		0,20		
age	0,06		-0,01		0,06
age2	-0,00		0,00		-0,00
gender	0,48	0,18	0,29	0,14	
ecological	0,66*	0,49*	0,59**	0,48*	0,47**
decision	0,03		-0,15		
prevtrip	-0,21		-0,18		-0,21
whaletour	-2,33**	-2,20***	-2,24***	-1,96***	-0,67
dist	0,01**	0,00			
number	0,26	0,26*	0,30**	0,23*	
crowding	-0,15	-0,14	-0,12	-0,15	
badenviron	-1,04**	-0,34			
badweather	-1,26	-0,82			
seasickness	-0,43				
expectnumb	0,00				
expectdist	1,37***	0,63**			
travelbudget	-0,00		0,00		
birdsafari	1,48***	0,72**	1,11***	0,66**	0,60**
prepaid	(omitted)	(omitted)	(omitted)	(omitted)	
price	-0,00	-0,00*	-0,00*	-0,00*	
_cons	-1,66	-0,34	-0,47	-0,34	-1,24
N	116	138	159	172	211
ll	-55,37	-77,30	-87,44	-100,31	-126,70
aic	156,75	178,59	208,87	220,63	271,40
chi2	47,26	30,14	35,89	26,43	17,46
p	0,00	0,00	0,00	0,00	0,03

Notes: the independent variable impact on recreational value is significant at * p<0,1, ** p<0,05 and *** p<0.01

The variable *prepaid* was dropped by STATA when included in the models with the message that *prepaid* predicts the dependent variable perfectly. Using the *tab* command in STATA, I found 20 out of 21 respondents having paid at least two weeks in advance to have a positive recreational value. This finding hence indicates that those paying the whale watch trip at least

two weeks in advance are more likely to state a positive CS. The rest of the findings of the zero vs. positive CS models will be presented and discussed under each hypothesis in section 5.6.

55.3 Positive CS models

In the positive CS models, only the respondents with positive CS are included in the econometric analysis. After excluding all zero CS responses, there are only 144 observations left in the sample. Insignificant statistical relationships due to insufficient variation in the variable (Walsh 1986), and an increased possibility of drawing wrong conclusions due to outliers (Johannessen et al. 2004), are two drawbacks with an even smaller sample. It is therefore especially important to be aware of the robustness of the significance and signs of the variables in the positive CS models. Table 6-11 displays five of the fifteen positive recreational value models derived having the lowest AIC with respect to different number of observations. Like the other models derived, the findings will be presented and discussed in section 5.6.

TABLE 5-11: What Factors determines the Size of Positive Recreational Value?

Variable	lintregpos1	lintregpos2	lintregpos6	lintregpos11	lintregpos15
model					
dispincome	0,00*	0,00***	0,00**	0,00**	0,00**
education	-0,27	-0,18			
scandinavia	0,01				
children	-0,01				
age	0,15***	0,15***	0,12***	0,10***	0,11***
age2	-0,00***	-0,00***	-0,00***	-0,00***	-0,00***
gender	-0,26	-0,37**			-0,27*
ecological	-0,11				
decision	0,39**	0,29*		0,23*	0,17
prevtrip	-0,28	-0,16			
whaletour	0,89	1,12**	0,99*		1,07*
dist	0,01**	0,00*	0,00		0,00*
number	0,23*	0,19*	0,11		0,15*
crowding	-0,02				
badenviron	0,22				
badweather	-0,95	-0,74			
seasickness	-0,09				
expectnumb	-0,25	-0,17			
expectdist	0,41*	0,24			0,20
travelbudget	0,00				
birdsafari	0,19				
prepaid	0,23				
price	-0,00	-0,00			
_cons	0,17	0,27	0,77	1,58**	0,74
lnsigma					
_cons	-0,40***	-0,36***	-0,30***	-0,30***	-0,31***
Statistics					
N	79	89	120	136	111
ll	-143,42	-164,45	-229,54	-260,63	-210,46
aic	336,84	360,89	475,07	533,26	442,93
chi2	44,54	38,53	22,92	17,21	28,68

Notes: the independent variable impact on recreational value is significant at * p<0,1, ** p<0,05 and *** p<0.01

5.6 Discussion of Findings

5.6.1 Estimated Recreational Value of Whale Watching Safaris in the Andøy Region

Research Question 1: What is the Recreational Value of Commercial Whale Watching at the Most Visited Norwegian site; the Andøy Region in Vesterålen?

> **H: 11) What is the average consumer surplus per household per day (i.e. activity day) of commercial whale watching safaris in the Andøy region?**

Under different assumptions regarding maximum WTP (introduced in section 4.5), the average CS from whale watching ranges from 40,41 EUR to 54,37 EUR per household per day. The average CS calculated by the midpoint of the PC intervals was 51,98 EUR, and was very close to the CS estimate given by the interval regression method. As the true maximum WTP lies between the two amounts given by the PC interval (Huhtala 2004), the midpoint average CS was regarded as being the best predictor of true maximum CS. As shown in Appendix B, the midpoint average CS ranges from 40- 64 EUR in a 95% confidence interval. This estimate is not comparable to CS estimates of whale watching from other recreational valuation studies, as price of whale watching, and the attributes of the whale watch experience, are not the same between different whale watching sites.

> **H: 12) What is the total annual consumer surplus in 2013 from commercial whale watching safaris in the Andøy region (i.e. aggregated over all tourists)?**

Comparable to other studies conducted on recreational value of whale watching (e.g. Hoagland & Meeks 2000; Leeworthy & Wiley 2003; Loomis et al. 2000; Loomis & Larson 1994), the study finds whale watching to generate significant non-market values in addition to the net economic values generated (e.g. producer surplus). Aggregating the average CS estimates to total annual consumer surplus in 2013, can however only be performed under certain assumptions regarding representativeness of the sample and the validity of the CS responses. These assumptions will be further discussed under chapter 5.9. For now, a representative sample and valid CS responses are assumed. Under these assumptions, the total annual recreational value from whale watching during the summer season 2013 in the Andøy region was estimated to 288 748 EUR[20]. CS of whale watching safaris offered during the winter season, is not included in this estimate, as natural conditions and whale watchers at winter season might not be comparable at to the summer season.

[20] Assuming 5555 households /families went whale watching in the summer season 2013.

The cumulative distribution of the CS responses can be used to derive how the demand of whale watching safaris in the Andøy region, during the summer season, is affected by a price increase. Figure 5-1, illustrates how a price increase of 15 EUR per household could decrease demand with approximately 34%. This finding indicates that even if some of the CS can be converted into PS, the effect from decreased quantity sold is likely to be higher than the higher revenues generated by increasing the price. Providing as an example; if increasing the price by 15 EUR, the decreased revenues from a 34% reduced demand must be less than 54 995 EUR[21], in order for the price increase to have a net positive impact on revenues. This implies that the average price of household per day of whale watching has to be less than 29,13 EUR[22], which is regarded as highly unlikely, as the average price per household of whale watching in this study was calculated to 243 EUR. However, from the sensitivity analysis performed in section 5.3 and earlier discussions, the demand for whale watching are likely to be less sensitive than demonstrated in this section.

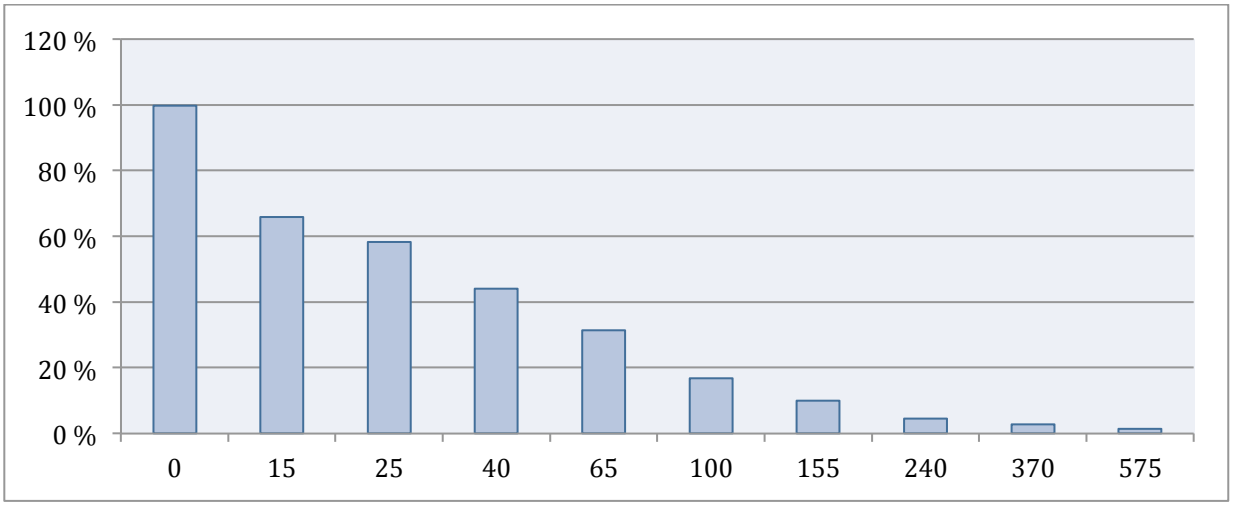


Figure 5-1: Cumulative CS responses

[21] $Price\ impact\ on\ revenues = \#households \times marginal\ price\ increase \times demand = 5555 \times 15\ EUR\ x\ 0{,}66 = 54\,994$

[22] $\frac{Price\ impact\ on\ revenues}{\#households\ X\ reduced\ demand} = \frac{54\,994\ EUR}{5555 \times\ 0{,}34} = 29{,}14\ EUR$

5.6.2 Which Factors Influences the Recreational Value of Whale Watching?

Table 5-12 summarizes results on independent variables' impact on recreational value in the three different types of models estimated: original models, zero vs. positive models and positive CS models. The original models are the models where both "zero" and "positive" CS responses are included in an interval regression econometric analysis to determine which factors influence CS. However, as mentioned earlier, the relationship between influential factors and CS are expected to derive from two underlying decisions of the individual; i.) the decision of whether to state a positive CS or not, derived in zero vs. positive models, and ii.) the decision of size of positive CS if deciding to state a positive CS, derived in positive CS models.

TABLE 5-12: Summarize - Which Factors Influences CS from Whale Watching

Hypotheses	Description	ORIGINAL	ZERO vs. POSITIVE CS	POSITIVE CS
H21	*HIGHER INCOME*	+	+	+
H22	*HIGHER EDUCATION*	0	0	0
H23	*SCANDINAVIANS* ^{u}	+	+	0
H24	*CHILDREN (<9 years old)*	0	0	0
H25	*AGE*	+ / -	+/-	+/-
H26	*GENDER*	0	0	-
H27	*INTEREST (DECISION)*	0	0	+
H28	*WTP FOR NATURE*	+	+	0
H29	*EXPERIENCE*	0	0	0
H31	*DISTANCE* ^{u}	+	+	+
H32	*NUMBER*	+	+	+
H33	*WEATHER*	-	0	0
H34	*SEASICKNESS*	0	0	0
H35	*CROWDING*	-	0	0
H36	*ENCOUNTER MANAGEMENT*	0	-	0
H41	*EXPECTED DISTANCE*	+	+	+
H42	*EXPECTED NUMBER*	+	0	0
H51	*TRAVEL BUDGET*	0	0	0
H52	*PLANNED WHALE TOURS*	-	-	+
H53	*PREPAID*	+	+	0
H54	*PRICE*	-	-	-
H55	*BIRD SAFARI*	+	+	0

Notes: 0 = Insignificant in all derived models
+ = significant (p<0,10) and positive in at least one of the derived models
- = significant (p<0,10) and negative in at least one of the derived models,
^{u}= Unexpected finding from reviewed literature.

Research Question 2: How do Socioeconomic Factors and Individual Preferences explain Recreational Value of Whale watching?

According to Walsh (1986), socioeconomic factors such as income, age, education, gender and household composition are highly significant in determining participation rate of certain recreational activities. Mathieu et al. (2000), on the other hand, finds the nationality of the respondents to be the only significant socioeconomic factor in explaining CS of marine parks in Seychelles. Other factors included in the model could thus be more important in explaining recreational value than socioeconomic factors (Mathieu et al. 2000).

H: 21) Income is positively related to recreational value

As economic theory suggests, a positive relationship between income and consumer surplus for normal goods, households with higher disposable income were expected to have a higher CS of whale watching. Comparable to several of the studies reviewed (e.g. Alvarez & Larkin 2010; Huhtala 2004; Reynisdottir et al. 2008), households with a higher disposable income had a significant higher CS of whale watching in several of original models derived. However, this result could not be considered robust in models including less than 208 observations. In models with lower number of observations, the increased disposable income of the household did not have a statistically impact on CS. One explanation is that other factors could be more important in explaining recreational value than income (Mathieu et al. 2000). Another explanation is; insufficient variation in variables in smaller samples can cause less significant or insignificant statistical relationships (Walsh 1986). I do however suspect insignificant statistical relationship between income and CS in some models to result from a homogenous sample with regard to income, potentially leading to less variation in the smaller samples.

Examining households' disposable income's impact on the two underlying decisions of stating CS, might be useful in order to understand the robustness of the relationship between income and CS. While disposable income of household does not impact the probability of responding a positive CS, among those stating a positive CS, a higher disposable income of the household significantly increases the size of CS in all positive CS models derived. This result strengthens hypothesis H: 21) Income is positively related to recreational value**.**

Income Elasticity

It is also interesting to derive the income elasticity of the CS of whale watching, as it states how sensitive the CS from and indirectly demand of whale watching is to a change in the household's disposable income. The income elasticity is defined as "the percentage change in recreational value due to one percent change in income" [23]. Both gross income elasticity and net income elasticity will be estimated. The gross income elasticity is given by regressing log of the independent variable LDISPINCOME on log of CS. The gross income elasticity gives the gross effect of one percent increase in income on CS when other independent variables are not controlled for.

TABLE 5-10: Gross Income Elasticity

Interval regression — Number of obs = 197
LR chi2(1) = 3,86
Log likelihood = −515,87259 — Prob > chi2 = 0,0495

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
ldispincome	,3760122	,1904916	1,97	0,048	,0026555	,7493689
_cons	−1,426058	2,057132	−0,69	0,488	−5,457962	2,605847
/lnsigma	,6788233	,0504671	13,45	0,000	,5799096	,7777371
sigma	1,971557	,0994988			1,785877	2,176541

According to the results shown in table 5-10, one percent increase in household disposable income increases CS with 0,38% (± 0, 37%). The result is comparable to Walsh's (1986) result, where income elasticity of demand varies in between 0,31- 0,5 for selected recreational activities in the U.S. (pp. 267).

The net income elasticity is given by the marginal effect of income elasticity when controlling for other independent variables potentially explaining CS. Three partially log functional models were estimated to derive net income elasticity[24]

TABLE 5-11: Net Income Elasticity

	Coefficient	Std. error	z	P>z	Confidence	Interval (95%)
Lgint3	0,13	0,08	1,79	0,07	-,0131	0,2831
Lgint5	0,11	0,07	1,66	0,10	-,0198	0,2367
Lgint6	0,11	0,07	1,72	0,09	-,0159	0,2400

[23] *Note:* This is not the ordinary income elasticity (for a private good) but the income elasticity of WTP (for a public good).
[24] The models were chosen from the later derived partially log functional models.

The results of the partially log models suggest that when controlling for other influential factors, a 1% increase in income leads to a 0,13% increase in CS (± 0,13%)[25]. The reason why gross income elasticity is higher than net income elasticity, is that including other influential factors makes it possible for the estimation model to attribute some of the changes in CS to other influential factors. The income elasticity is overall found to be positive but low when controlling for a number of other influential factors. A homogenous population with regard to income can explain the result. The result supports hypothesis H: 21, and indicates that consumer surplus of whale watching, and indirectly demand of whale watching, is affected by changes in household disposable income. Moreover, the result also indicates that whale watching is not an inferior good, as suggested by Hoagland & Meeks (2000), at least not in the Andøy region.

H: 22) Higher education is positively related to recreational value

None of the performed econometric models find a significant relationship between higher education and CS. Education level is neither found to impact the decision to state a positive CS, nor the variation in positive CS. This result is unexpected as a number of recreational value studies find a positive relationship between higher education and recreational value (Huhtala 2004; Navrud & Mungatana 1994; Reynisdottir et al. 2008), higher education and demand of whale watching (Hoagland & Meeks 2000) and higher education and participation rate of recreational activities (Libosada 2009; Walsh 1986).

As a high proportion of the sample has completed at least a bachelor degree (75%), the result neither correspond to Duffus & Dearden (1990) and Catlin & Jones' (2010) hypothesis; whale watching is becoming a more common activity for people in general. The finding thus indicates that even though not significant in explaining variation in recreational value from whale watching in the Andøy region, higher education is positively related to the participation rate of whale watching, as found by Libosada (2009). I therefore suspect the homogenous whale watcher population, with respect to education level, to explain the insignificance of education level in explaining CS. However, another potential explanation is an error in the questionnaire design, where education level might be overstated for some participants due to a missing category for "other education". The overall finding does however suggest that H:22) can be rejected.

[25] The true value of LOGDISPINCOME lies between a 95% confidence interval from -0,13% to 2,8% with 93% certainty (confidence level).

H: 23) Scandinavians have a lower willingness to pay for whale watching than non-Scandinavians

Scandinavians were expected to have a lower WTP than non-Scandinavians, as Scandinavian on average spend less on their vacation in Norway than other Europeans (Thrane & Farstad 2012a), and are used to the common access right to natural resources (Huhtala 2004). This might reduce their WTP for natural attractions (Reynisdottir et al. 2008). The result in the original model is therefore surprising, as Scandinavians are found to have a significant higher CS than non-Scandinavians in 10 out of 18 original models derived.

Examining the result more closely, Scandinavians have a higher probability of stating a positive recreational value (see table 5-10). However, among those willing to state a positive CS, Scandinavians do not have a significantly different CS than non-Scandinavians (see table 5-11). Moreover, it was found in section 5.3 that Scandinavians had a lower probability of giving a non-item response. The finding from the two decision models, and the derived smaller probability of Scandinavians stating a non-item response, could indicate that some of the given zero responses in reality are "protest" answers. As discussed in section 5.3, non-Scandinavians are less used to the Norwegian price level than Scandinavians, and might therefore be more likely to object to a price increase. The average CS is underestimated if this hypothesis is correct. Overall, the results indicate that H: 23) can be rejected, as the result indicates that Scandinavians have a higher CS than non-Scandinavians.

H: 24) Households with children under 9 years old have a lower perceived recreational value

There were no clear expectations regarding how number of children in the travel party affected CS, as none of the reviewed studies on recreational value have focused on this factor. The results from the number of econometric models performed indicate that number of children does not seem to affect the CS. Neither does number of children seem to impact the decision to state a positive CS, or affect the size of positive CS among those stating a positive CS. The results thus indicates that H: 24) can be rejected. Furthermore, an implicit indication of the result is that the lower price level for children at the whale watching companies seems to be appropriate.

H: 25) Age affects recreational value

Reviewing literature on how the age of the respondent impact CS and WTP, younger respondents are expected to have a higher CS than older respondents (Alvarez & Larkin 2010; Reynisdottir et al. 2008). I included two age variables in the econometric analysis; *age* and *age2*, to review whether increasing age could impact CS differently at two different stages of life. The result from several of the original models indicates a significant relationship between age and CS, which takes an inverted u-shape form. The result indicates; up to a certain age level, increased age increases CS, while after a certain age level, increased age decreases CS. Plotting CS against age can also reveal the inverted u-shape relationship, as seen in figure 5.2. From figure 5.2, it seems like those between 40-50 year olds, have the highest CS from whale watching.

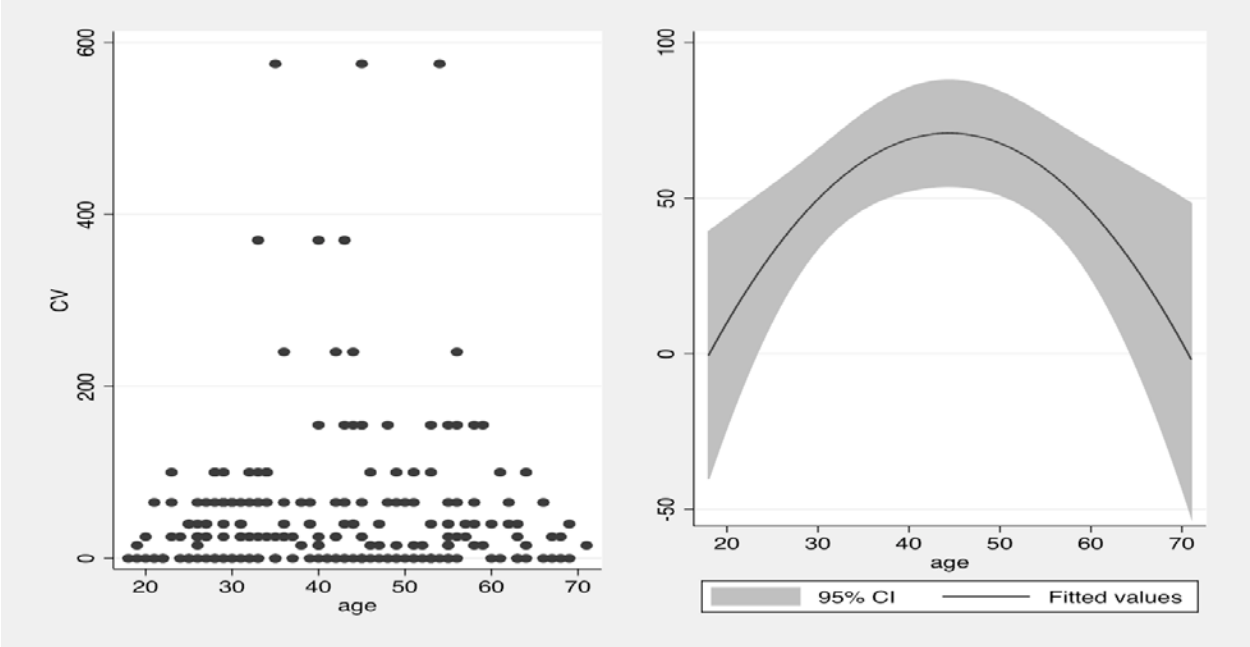


Figure 5-2: STATA print of plots of age vs. CS

The robustness of the finding is however somewhat sensitive to changes in the models with regard to number of included influential factors and observations. The age variables was only found to be significant in 4/16 MLE models estimated. Furthermore, age of respondent does not seem to impact the decision of whether to state a positive CS or not. However, among those stating a positive CS, the age of the respondent is found to have a robust and significant impact on size of CS in most of the models derived. The overall findings thus supports H: 25), age of respondent impact the recreational value of whale watching.

H: 26) Gender can explain variation in recreational value

Because the participant is supposed to take account of the total recreational value of the family/household when responding to the CV question, I did not expect the gender of the respondent to be important in explaining variation in recreational value. The results of the original models support hypothesis H: 26. The finding is both comparable and contrary to the literature, as some studies find gender to affect demand of recreational activity (Loomis et al. 2000) or the participation rate of outdoor recreation (Walsh 1986), while a large number of studies reviewed find gender to be insignificant in explaining variation in recreational value (Mathieu et al. 2000; Mmopelwa et al. 2007; Navrud & Mungatana 1994; Reynisdottir et al. 2008). As gender was not found to have a statistical impact on CS in any of the original models derived, it was surprising that gender was found to be significant in explaining size of CS of those reporting a positive CS. The result indicates that among those stating a positive CS; men have a significantly higher CS than women. Even though gender is not found to explain variation CS in original models, H: 26) cannot be rejected as gender seems to impact the size of positive CS.

H: 27) People with a greater interest in seeing whales has a higher recreational value of whale watching

Whether the respondent planned to go whale watching going on vacation or not, was meant to measure the person's interest of seeing whales, which according to Loomis et al. (2000) had a significant positive impact on number of trips to the whale watch site. However, whether the respondent has decided to go whale watching before going on vacation was not found to have a significant impact on CS in the original models derived. A potential explanation is that while the whale watching activity itself seemed to be the main draw for many of the visitors in Loomis et al. (2000) study, a larger part of the tourists going to the Andøy region is on a longer vacation in Norway, where whale watching constitutes only a small part of the vacation (Normann 2012).

However, examining the variation in CS among those reporting a positive CS, those deciding to go on a whale watch before going on vacation are found to have a significant higher CS than others in three out of ten models derived. The results indicates that hypothesis H: 27), should not be rejected, as interest in seeing whale seems to explain some of the variation in positive CS.

H: 28) Tourists willing to pay a positive amount to conserve nature, have a higher recreational value

The respondents declaring they on regularly basis buy ecological food, even when ecological food is more expensive, were expected to have a higher CS, as they were considered to be more interested in nature and have a more positive attitude towards paying for nature. The results of the original models support the hypothesis, as respondents buying ecological food are found to have a statistically higher CS than others in 23 out of 24 models derived. The result is quite robust with regard to both varying number of observations (N= 128-216), and variety of other influential factors included within the model. Reynisdottir et al. (2008) obtained a somewhat similar result. Reynisdottir et al. (2008) found those having paid an entrance fee to natural attractions prior to the visit had a significant higher WTP for entrance fee.

Furthermore, those being willing to pay extra for ecological food are also found to have a higher probability of stating a positive CS. However, among those reporting a positive CS, willingness to pay for ecological food does not impact the variation in positive CS. The results of the original models could be explained by, those being willing to pay more for ecological food have preferences increasing their probability of stating a positive CS. The overall finding thus supports H: 28).

H: 29) Prior experience whale watching affects recreational value

How prior experience of whale watching affects CS is uncertain, as it depends on a net impact from higher general interest in seeing whales (+) and a decreasing marginal utility (-). Lyssenko, N. & Martinez-Espiñeira (2012) found people having experienced whale watching from other whale watching sites to have a higher WTP for conserving the whale species in Newfoundland and Labrador, Canada. Reynisdottir et al. (2008) find number of visits to natural attractions in general to be insignificant in explaining WTP for recreational activity. This study thus support the finding by Reynisdottir et al. (2008), as none of the performed econometric models find prior experience of whale watching to impact recreational value. The result can be related to the finding in section 5.2, where more experienced whale watchers do not have significantly different expectations than less experienced whale watchers. The null hypothesis; more experienced whale watchers does not have different recreational value than less experienced whale watchers, cannot be rejected hence suggesting hypothesis H: 29) to be rejected.

Research question 3: How does tour specific attributes affect the recreational value of whale watchers?

As recognized by Walsh (1986), the demand curve of a site can be affected by site-specific qualities and attributes. Rulleau et al. (2012) finds attributes of a recreational site, for example whether or not the site is located close to a beach, or to a forest, to affect reported WTP. Reynisdottir et al. (2008), on the other hand, does not include quality attributes of site in their study. However, Reynisdottir et al. (2008) suggest the difference in WTP between two Icelandic recreational sites result from a disparity of site qualities, as the sample characteristics are similar at the two sites. However, as emphasized in chapter 3.5, the quality of a whale watch tour is, more likely to be affected by varying natural factors than site specific factors

Comparable to a number of tourist satisfaction studies, my thesis finds tour specific variables to be important in explaining variation in recreational value from whale watching. This master thesis can therefore add to the literature, as none of the reviewed studies on recreational value of whale watching have looked at how tour specific factors affect recreational value (e.g. Hoagland & Meeks 2000; Loomis et al. 2000).

H: 31) Increased distance to the sperm whale decreases recreational value

Increased distance to whale is expected to impact CS of whale watcher negatively, as almost all tourist satisfaction studies on whale watching reviewed, find distance to be negatively related to tourist satisfaction (e.g. Hoagland & Meeks 2000; Mustika et al. 2013; Valentine et al. 2004). The result of the original models derived is thus unexpected, as increased distance to whale is found to significantly increase the CS of the respondents in all models were the relationship is significant. A lower number of responses on the distance question make it impossible to derive how perceived distance impact CS in models with a higher number of observations (N>156). The variable does however seem to be important measuring the recreational value in limited samples (128-159 observations).

As seen in section 5.2, the difference between expected and experience distance to the whale is significant, suggesting that a large share of the whale watchers get to see the whale on a closer distance than expected. The finding in section 5.2 and the fact that there was only four distance categories included in the final questionnaire, might explain the finding; increased distance increases CS. A higher response rate on the question and a larger sample might therefore have generated a different result. Concluding upon hypothesis H: 31) is therefore difficult.

H: 32) Number of sperm whale sightings affects recreational value positively

Increased number of whales sighted was expected to increase CS, as several of the tourist satisfaction studies reviewed indicates number of whale sightings to be important (e.g. Hoagland & Meeks 2000; Mustika et al. 2013; Orams 2000). The result of the original models is thus comparable to the reviewed literature, as I find increased number of sperm whales sighted to significantly increase the CS of the whale watcher. As the relationship is significant in all the 20 models in which it was included, the finding is quite robust with respect to varying number of observations ($N \leq 196$), and variety of other influential factors included in the model.

Number of sperm whales sighted is found to have a significant positive impact on both the probability of stating a positive CS, and explaining variation in CS among those stating a positive CS. The overall finding suggest that number of whales is an important factor in explaining CS of whale watching in the Andøy region, as suggested by H: 32), and tourist satisfaction studies.

H: 33) Bad weather has a negative impact on recreational value

The respondents' perception of bad weather ("bad" or "very bad") was expected to affect the CS negatively. The result of the original models indicates that if the respondent perceives the weather to be bad during the whale watch trip, this significantly decreases CS. The result is robust in all the models where the *badweather* variable is included, however the lower response rate on weather condition makes it difficult to review the robustness of the finding with respect to a higher number of observations ($N > 163$). The result indicates that even though a larger share of the tourists report the weather as being "good", which could be explained by adjusted weather expectations towards typical weather conditions at destination (Jakobsen et al. 2011). Those reporting the weather as being "bad" during the whale watch trip reports a statistically lower CS. The result is comparable to the reviewed literature on tourist satisfaction (e.g. Catlin & Jones 2010; Orams 2000).

On the other hand, perceived bad weather has no significant impact on the probability of stating a positive CS, or explaining the variation in the CS of those responding a positive CS. An explanation is that few of the respondent's stated they experienced "bad weather". This suggests the conclusion regarding; how weather impact CS, might be drawn from a small sample with too little variation to explain the real relationship. However, as the finding is consistent with common sense and reviewed literature, the result will be regarded as supporting H: 33).

H: 34) Seasickness affect recreational value negatively

Seasickness is expected to impact CS negatively as it is likely to have a negative impact on the experience of whale watching. However, despite having 27 observations in the final sample feeling seasick, none of the models reviewed found a significant statistical relationship between seasickness and CS. The finding is therefore contrary to the tourist satisfaction literature, which find seasickness to be one of the most mentioned factors by the tourists explaining their reduced satisfaction from whale watching (Catlin & Jones 2010; Hoagland & Meeks 2000; Orams 2000). A potential explanation for the unexpected finding is that the respondents feeling very seasick might have a lower capability of fulfilling the whole questionnaire, leading to several non-item responses, especially on the whale watching experience, as the respondent had to fill out these questions (part C & D) on the boat trip back to the harbor. A clear conclusion regarding seasickness impact on recreational value (H: 34) can therefore not be made.

H: 35) Crowding from other boats affects recreational value negatively

Even though there are only three whale watching companies in the Andøy region, number of whale watching boats surrounding one whale were found to have a significant negative impact on CS in several of the original models. The result is consistent with reviewed literature. Walsh (1986) mentions how congestion of recreational areas can impact the demand of the particular recreational site negatively. Furthermore, the result supports the findings of a number of tourist satisfaction studies (e.g. Catlin & Jones 2010; Mustika et al. 2013; Ziegler et al. 2012).
The result is observable in original models with a higher number of observations ($N \leq 196$), Not enough variation in the variable within the larger samples might explain why the variable is not significant in the models with the lowest number of observations.

However, as several other trip specific factors are excluded from the models with the highest number of observations, it is also possible that the impact of number of boats on CS is related to other independent variables. As an example, number of boats is likely to increase when there is only one whale observed in the area, or if the weather is bad, as the whale watching boats often cooperates in finding the whale. Discovering the number of boats is insignificant in explaining probability of stating a positive CS, and in explaining size of CS in positive CS models furthermore decreases the robustness of the results. However, the consistency with previous studies, and the robustness of the result in a larger sample, suggests the number of boats reduces the CS from whale watching (H: 35).

H: 36) Bad encounter management affects recreational value negatively

Perceived bad encounter management by the whale watching company is expected to affect recreational value negatively. However, contrary to the literature (e.g. Catlin & Jones 2010; Mustika et al. 2013), the thesis does not find a significant statistical difference in respondents not agreeing to the statement; "the whale watching company behaves environmental friendly" to have a significant statistical different CS compared to other whale watchers. However, reviewing the two underlying decisions of reported CS, those respondents perceiving the whale watching company to not act environmental friendly has a statistically lower probability of responding a positive CS in the initial zero vs. positive CS model derived at a 5 % significance level. This could indicate a relationship between CS of whale watching and perceived environmental friendliness, as suggested by reviewed literature. A small sample and small variation in the responses on the question might explain the insignificance of this variable in several of the models derived (Walsh 1986). It is therefore difficult to make a final conclusion regarding hypothesis H: 36).

Research question 4: Are expectations of whale watchers related to recreational value of whale watching?

Illustrated in table 5.3, there are significant differences in the average tourist expectations versus whale watch experience. Whale watchers thus seemed to be somewhat unaware of the attributes of the whale watch trip they bought in the Andøy region.

H: 41) Recreational value is negatively affected if the number of whale sightings is lower than expected

Reviewing literature on tourism satisfaction, numbers of whales sighted are important in explaining tourist satisfaction. Furthermore, Ziegler et al. (2012) and Valentine et al. (2004) suggest difference between expected number of whales and number of whales actually observed to impact tourist satisfaction. In this study, however, the models derived do not find those seeing more whales than expected to have a higher CS of whale watching than other whale watchers. Neither is expected number of whales versus number of observed whales important in explaining the probability of stating a positive CS, or explaining the size of CS of those responding a positive CS. As with several of the other influential factors, a low response rate made it impossible to test whether there could exist a significant relationship in models with a higher number of respondents. H:41) are therefore not supported in this thesis.

H: 42) Recreational value is positively affected if real distance is closer than expected distance.

Respondents coming closer to the whales than expected, have a significant higher CS, compared to other whale watchers. The result is comparable to studies reviewed on relationship between expectations and tourists' satisfaction with the whale watch trip (e.g. Valentine et al. 2004; Ziegler et al. 2012), confirming whale watcher's expectations can also explain variation in CS. The result is stable and thus robust for the models where *expdist* were included as a variable. However, the low response rate on the related questions made it difficult to test the robustness of the result in a larger sample ($N \geq 163$). Examining the results in zero vs. positive CS models and positive CS models, those coming closer to the whales than expected had a higher probability of stating a positive CS, and were found to have a positive impact on CS compared to others stating a positive CS in one of the positive CS models derived (lintregpos8). Overall, the finding supports H: 42).

Research question 5: How does travel related characteristics affect recreational value?

From economic theory; price, derived utility and budget constraint are factors expected to affect the demand, and consequently the consumer surplus of a marketed commodity. Several of the travel specific indicators are significant in explaining recreational value in the econometric models regressed.

H: 51) Recreational value increases with increasing travel budget

Respondents with higher travel budgets are expected to have a higher CS of whale watching, as travel budget constitutes a budget constraint for the respondent when on a vacation. The results of all models derived (original, zero vs. positive, and positive CS), do however suggest that travel budget of the respondent does not impact the CS of the respondent when a number of influential factors are controlled for. The result is contrary to the result obtained by Mmopelwa et al. (2007), finding travel expenditure to be important in explaining WTP of entrance fee to Moremi Game Reserve in Botswana. Mmopelwa et al. (2007) did however use travel expenditure as a proxy of income, while in this study, disposable income was controlled for. The finding suggest that H: 51) can be rejected.

H: 52) Number of planned or completed whale watching trips in the Andøy region decreases WTP

If the respondent plans to go on more than one whale watching trip in the Andøy region, it significantly decreases CS according to the original models derived. The result is comparable to economic theory; increased consumption of one good leads to decreased marginal utility (Walsh 1986), and other recreational studies, which find an increasing number of visits to a particular nature attraction or recreational activity to have a negative impact on stated WTP (e.g. Lyssenko & Martinez-Espiñeira 2012; Reynisdottir et al. 2008). Another possible explanation is that more eager whale watchers have a higher benefit of avoiding a price increase, and might therefore understate their true WTP as a strategic response to avoid the "proposed" policy (Mitchell & Carson 1989).

The result is robust with respect to the varying numbers of observations included in the analysis, and varying number of influential factors controlled for, strengthening the result. If the respondent plans to go on more than one whale watch trip in the region, this also significantly decreases the probability of the respondent stating a positive CS. However, because there are only a few respondents planning to do more than one whale watch trip in the region (10 respondents), the sample might not be representative for the population, and one should thus interpret the result with care.

One interesting finding is that the respondents planning to go whale watching more than once in the region are found to have a significant positive impact on size of CS, compared to others stating a positive CS. The changed sign of the variable can be explained by respondents planning to go whale watching more than once during their stay in the region have a higher interest in seeing whales, and therefore probably a greater CS of whale watching. However, one should interpret this finding with care, as only five of the respondents in the positive recreational value models plan to go on more than one whale watch trip in the region. This finding could therefore result from a non-representative sample of whale watchers planning to whale watching more than once. A final conclusion regarding H: 52), cannot be made due to a low number of respondents in this study.

H: 53) Tourists paying the whale watching trip in advance have a higher willingness to pay than those paying the whale watching trip at site

Hypothesis 53 was first formulated after arriving at the Andøy region. The manager at one of the whale watching companies were curious about whether paying the price in advance impact the perceived fairness of price of whale watching. The results indicate those paying in advance (at least two weeks prior to the trip) have significantly higher probability of stating a positive CS, as well as significantly higher CS than those paying the whale watching trip at site. Whether prepayment actually increases CS or if it results from the respondent viewing the cost of whale watching as "sunk costs", as suggested by Alvarez & Larkin (2010), is however uncertain. The finding is somewhat surprising, as none of the conducted studies on whale watching or other recreational activities have focused on how the time of payment influences the participant's willingness to pay. Overall, the result support H: 53).

H: 54) Households paying more to go whale watching have a lower consumer surplus

As expected from economic theory and travel cost studies (e.g. Lyssenko & Martinez-Espiñeira 2012; Reynisdottir et al. 2008), the cost of whale watching per household has a significant negative impact on CS in several of the original models derived. This result is however not robust with regard to the varying number of observations and influential factors included in the model. A potential explanation is that the price could also have a positive impact on CS for some households, as a price increase for those paying a higher price to go whale watching would be relatively smaller than for those paying less. Another explanation could be that the whale watching safari ticket itself does not necessary cover all the expenses related to the whale safari, as a share of travel and accommodation expenses might be directly related to the whale watching experience. Unfortunately, it is difficult to control for the related costs of whale watching, as a large share of the respondents were on a long vacation in Northern Norway, where the Andøy region is only one of multiple destinations visited. In some of the zero vs. positive CS models derived, the price of the household also has a significant negative impact on the probability of responding positive CS. Overall, the results of this study supports H: 54).

H: 55) Tourists that plan to do or have done other sea activities have a higher willingness to pay

The *birdsafari* variable was meant to measure the respondent's general interest in nature and outdoor recreation, and the respondents assumingly higher derived utility compared to other whale watchers of such activities. Those going on a bird safari in addition to a whale safari were hence expected to have a positive CS. The result confirms the expectation, as respondents planning to go on a bird safari in addition to the whale watching tour are found to have a significant higher CS, and are more likely to state a positive CS than others. On the other hand, one should also note that among those stating a positive CS, the respondents planning to go on a bird safari do not have significantly different CS. The overall result, however, supports H: 55).

5.7 Robustness of Findings

Biasedness of OLS models

OLS models were estimated on the same independent variables as the models: lintreg1, lintreg2, lintreg7, lintreg13 and lintreg15, as these were the semi-log MLE models that seemed to fit the sample best when looking at different numbers of observations.

Comparing the OLS models in Appendix B with the interval regression and tobit models, I find most of the variables to be significant in one or several of the MLE models to also be significant with the same signs in the OLS models. The biasedness of the OLS model is therefore regarded as small, despite a high proportion of the sample having "zero" CS (34%).

Robustness of MLE semi-log Models

In total, 8 linear interval regression models were estimated (see Appendix B). The greatest difference between the linear and semi-log models is the semi-log models finding the variables *ecological* and *whaletour* to have some explanation power on recreational value, while the same statistical relationship cannot be derived in the linear functional form models. On the other hand, linear functional form models find *decision* and *travelbudget* to be significant in explaining recreational value in one model each. A few of the conclusions drawn from the semi-log models are therefore wrong, if linear functional form in reality is the correct functional form.

When it comes to the partially log interval regression models, 6 models were estimated as shown in Appendix B. The log models did not alter the results from the semi-log models regarding which independent variables seemed to be important in explaining recreational value. The coefficients of the significant independent variables (besides the variables in log form) in the log models were also quite similar to the semi-log interval regression models. The finding therefore suggests that if the partially log functional form is the correct functional form, it does not alter the conclusions drawn from the semi-log interval regression model

5.8 Limitation of Study

Limited final sample, lack of responses on several of the trip specific variables and a limited study period are the main limitations of this study. A replicated study with a larger sample collected over a longer time period would be preferable in order to get more precise estimates. An improvement in the design of the study would have been to test whether different payment vehicles would affect the probability of giving a “non-item”, “protest” answer or “zero” CS response as found by Huhtala (2004). To test for effect of payment vehicle one would however need a large sample.

With respect to influential factors, an improvement would have been to examine motivations to go on the vacation and whale watching, in order to obtain better indicators for interest in seeing whales or wildlife. A variety of other factors not considered in this study could also influence CS. In a bachelor thesis at Bodø Graduate School of Business, whale watchers perceived involvement, knowledge and interaction with other whale watchers and staff, were found to be important in explaining experience of whale watchers (Johansen & Rydland 2013).

Another limitation in this thesis is that it only measures the recreational value from commercial whale watching during the summer season. More studies regarding non-commercial and commercial recreational value from whale watching throughout the year would be beneficial. Net economic benefits generated by the whale watching companies and non-user values of the sperm whale could give useful information regarding the socioeconomic impact of the sperm whale population in the Andøy region.

5.9 Validity Considerations

The validity of the study can be defined as "whether the estimator is statistically unbiased" (Hall et al. 2002 pp: 340). Hanley & Barbier (2009) proposes five "tests" of validity of a CV study; scope test, convergent validity, calibration factors, protest rates and construct validity. However, limited time and resources made it difficult to apply a convergent validity test, i.e. testing whether another non-market method (like CE) would have obtained similar results (Hoyos & Mariel 2010) and a calibration factors test, i.e. testing whether hypothetical behavior of respondents is similar to a real setting (Hanley & Barbier 2009). The scope test is not applicable within this study, as it measures whether increased quantity of the valued good also increases WTP.

Examining protest rates and construct validity can however be done to give an indication of the internal and external validity of this study. Protest rate is defined by Hanley & Barbier (2009 pp. 55) as; "the percentage of responses which are protest bids". Recognized potential protest answers in my study are those respondents choosing; "We have already paid a lot of money to go whale watching" as their reason for stating zero CS (reason 2). Non-item responses constitute 18,34% of the final sample, and could also result from a protest towards the question or the survey (e.g. being to complex or time consuming) (Hanley & Barbier 2009). Both "protest" responses and "non-item" responses could result from respondents perceiving the price as being "unfair" (Chung et al. 2011; Mitchell & Carson 1989; Navrud & Vondolia 2005), or protest of the chosen payment vehicle (Alvarez & Larkin 2010; Huhtala 2004; Mitchell & Carson 1989).

As potential "protest" responses are included in the sample, while "non-item" responses are excluded from the sample, the CS estimate will be biased if the "non-item" responses do not follow the distribution of CS responses as the final sample. The CS estimate will also be biased if several of the potential "protest" respondents in reality have both zero and positive CS values. The sensitivity analysis performed in section 5.3, revealed that the CS estimate was quite robust to different definitions of "non-item" responses and potentially "protest" responses. At the "worst case" scenario, which was regarded as very unlikely, the CS estimate was overstated by 20%. Overall, the finding supports the validity of the CS estimate. Moreover, from the discussion in section 5.3, the CS estimate is regarded to have a higher probability of being underestimated than overestimated.

Construct validity of the study, also referred to as theoretical validity by Mitchell & Carson (1989), is defined by Hanley & Barbier (2013) as whether the relationship between WTP and influential factors is similar to theoretical expectations. Most of the statistical relationships derived within this study are expected from theory, supporting the internal validity of this study. The strongest indicators of the internal validity of this study with regard to economic theory is that increased income leads to increased recreational value, and increased household cost of whale watching leads to reduced recreational value.

The results appear as internal valid from examining "protests" and construct validity of the study. Regarding external validity, similar results in studies from a variety of other whale watching destinations support the external validity of several of the derived statistical relationships. The estimates of average recreational value and the estimated impact from the reviewed independent variables on recreational value, on the other hand, are probably not applicable to other whale watch destination, even if correcting for price level and socioeconomic characteristics.

The short period of time in which the data was collected, the relatively small sample, and unequal number of responses from the different whale watching companies, also suggests one should use caution in aggregating the average CS in the Andøy region. The benefits of the collected sample is that even though being small, it is homogenous, as well as being representative of the whole season with regard to nationality distribution of participants. As shown in Appendix B, there are not any statistical differences in characteristics of subsample and reported CS collected at Andenes and Stø, also strengthening the representativeness of the sample. On the other hand, I was not able to collect a large number of responses at Seasafari Andenes, which specializes in a different experience, potentially attracting a different group of customers than the other two companies.

The fact that tour specific factors were found to have an impact on CS, suggests it is difficult to compare the representativeness of the tour specific factors in the given period to the rest of the summer season. Scientists and guides at the whale watching companies also mentioned that different types of travel parties visiting during different periods during the summer season. The sample collected from mid-July to mid-August, might therefore not be representative of the typical whale watcher, or whale watching conditions, of the whole whale watching season.

6. Conclusion

6.1 Results

There were two main aims of this thesis; i) to estimate the recreational value of commercial whale watching in the Andøy region, and ii) to identify and assess factors that could potentially influence the recreational value of whale watching. The thesis contributes to the literature by being the first study in Norway estimating the recreational value of whale watching. To my knowledge, this is also the first valuation study internationally examining how tour specific factors and the expectations of the whale watchers affect the recreational value of whale watching.

The results show that commercial whale watching safaris in the Andøy region generates considerable recreational value for the whale watchers. The recreational value is defined as their willingness-to-pay (WTP) to go on a safari trip, over and above their expenditures; i.e. their Consumers Surplus (CS). Nearly 2/3 of the respondents (66%) had a positive CS of whale watching. The average recreational value per household per day of whale watching, including both "zero" and "positive" CS responses, was of 52 EUR. This estimate is, however, regarded as an underestimate due to that almost 50% of the "zero" CS responses could be regarded as "protest" responses towards the payment vehicle. The chosen payment vehicle (increased price level), could also lead to strategically understated CS responses, as the respondents would have incentives to understate their true WTP. Under strict assumptions concerning the validity of the CS estimate, representativeness of sample and the number of households going whale watching, the total annual recreational value of whale watching in the Andøy region was estimated at 288 748 EUR.

In terms of factors influencing CS of whale watching, I found socioeconomic variables like income and being Scandinavian to have a significant positive impact. Age was also found to significantly affect CS in the form of an inverted u-shape; meaning that CS first increase with increased age up to maximum and then decreases with age. Gender of the respondent and the number of children within the travel party did not significantly impact CS. However, among those stating a *positive* CS, men had a significant higher CS than women. Concerning personal tastes and preferences, those being willing to pay more for ecological food had a significant higher CS of whale watching. Two other indicators on personal interests; whether the respondents had been on one or several whale watching trips prior to the vacation in the Andøy

region, and whether the respondent planned to go whale watching before starting the vacation, did not have a significant impact on CS. However, respondents deciding to go whale watching *before* starting the vacation had a significant higher probability of stating a positive CS. Overall, the results indicate that personal characteristics are important in explaining the recreational value of whale watching. The findings are comparable to a number of recreational valuation studies, supporting the internal and external validity of the CS estimates.

Several of the tour specific factors and expectations of whale watchers also had a significant impact on CS of whale watching. Increased distance to the whale and increased number of whale sightings were found to significantly increase CS, while increased number of surrounding boats and bad weather significantly decreased CS. Except distance to whales, which was found to have a positive impact on CS in my study, the results are comparable to findings in tourist satisfaction studies at other whale watching destinations. Regarding expectations, if the respondent came closer to the whale than expected, this significantly increased CS. However, seeing more whales than expected, did not have a significant impact on the recreational value.

With regards to research question (5), I found several travel related characteristics to impact CS of whale watching. Households paying a higher price to go whale watching or planning to go on more than one whale watch trip while visiting the region, had a significant lower CS than others. People planning to go on a bird safari in addition to the whale safari had a higher CS of whale watching. As this variable measure the level of interest in going on marine life safaris in general; this is also as expected. Those paying the price of the whale watch trip at least two weeks in advance had a significantly higher CS.

6.2 Policy Implications

These estimates of the recreational value of commercial whale watching safaris in the Andøy region, and the factors that influences it can be used several ways

The whale watching companies can use the estimates to review their current pricing policy. According to the results, the demand for whale watching is somewhat elastic to a price increase from current price level, indicating that revenues from increased price of whale watching might not cover the decreased revenues caused by reduced demand. However, the net economic impact for the companies (i.e. changed PS) of increased price also depends on the marginal costs of the whale watching company. As those planning to go several times on whale watching

in the region had significant lower CS, the demand of whale watching seem to follow the economic rule of decreased marginal utility. It could therefore exist a potential of increasing quantity of whale watching trips sold by offering a discount if buying a package with several trips (a strategy recognized by several entertainment parks). Some of the whale watching companies might already offer this discount, but it is not advertised at their websites.

Possible future economic activities in the Andøy region like increased shipping activities and petroleum exploration/seismic tests and extraction, are likely to have a negative impact on marine ecosystem services including the habitat of the sperm whale. Thus, lost recreational value and non-use values should be accounted for in cost-benefit analyses (CBAs) of such future projects As the sample of this study is rather small and not covering the whole whale watching season; the estimates from this study might not be directly applicable in CBAs. The recreational value (CS) of foreigners should not be included in a CBA, but Norwegians' recreational value should. However, the net income (PS) of the safari operators from both foreigners and Norwegians should be included. Thus, this study should be seen as a preliminary, first estimate of the cultural ecosystem service of recreational value of commercial whale watching, and should be supplemented with new valuation studies covering other ecosystem services which are framed to value the expected impacts from these future projects.

The results regarding how tour specific factors and expectations of whale watchers affect CS, can be used to understand how whale watchers could be affected if applying codes of conducts to the whale watch industry at Andøy. Codes of conducts typically regulates; minimum distance to whale, number of boats surrounding one whale, and the boat speed (Orams 2000). According to the results from this study, whale watchers would b: i) negatively affected by a minimum distance to whales if the experienced distance is longer than expected, ii) positively affected by decreased number of boats surrounding one whale (or whale group), and iii) indirectly negatively affected by speed limit if this leads to less whale sightings. According to the results, whale watching regulations could have both positive and negative impacts on the whale watchers themselves. Whale watchers could also be affected by knowing that the whale watching company cares about the whales by following certain codes of conduct.

As the whale watching experience relies on the behavior of the whales in addition to other natural conditions, like weather and wave conditions, whale watching can never become entirely standardized. This might also explain the significant gaps between tourists' expectations and

experience of whale watching. However, from my fieldwork, I perceived many of the whale tours to be quite similar with regards to: i) the number of whale sightings, ii) which parts of the whale were seen, and iii) the distance to whales. A recommendation to the whale watching companies from these findings is therefore to work towards creating more realistic expectations among tourists before they go out on the boat, as this might increase the satisfaction of whale watchers. Moreover, managing expectations could also reduce the negative impact from regulations, like increased distance to whale.

6.3 Recommendations

The results of this study, indicates that the Contingent Valuation (CV) method can be used to estimate the recreational value of whale watching in Norway. In order to obtain a more representative CS estimate that can be used by CBAs in the future, I recommend a replication of this study with a larger sample drawn randomly from all safari companies and covering the whole whale safari season. The recreational value of non-commercial whale watching (i.e. people going out in private boats to watch whales or sightings from the shores), as well as non-use value could constitute a significant part of the Total Economic Value (TEV) of whale resources and should also be estimated. The CV method can potentially measure both use and non-use values, and it could be cost-effective to perform a combined user- and non-user CV study of the whale resources in the Andøy region. If replicating the study, one should be more careful in designing the payment vehicle, the hypothetical scenario in the CV method, and in designing categories for "protest" zero answers, as this might reduce the potential protests or biases arising in this study.

Future studies on recreational value of commercial whale watching, or other wildlife safaris dependent upon varying natural conditions, could benefit from recognizing that varying tour specific factors and expectations might affect individual CS. One particular result of this study also suggests inclusion of *time of payment* of the costs of the safari in future CV studies as it might explain some of the variation in CS.

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