KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

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DEPARTMENT OF ECONOMICS

ASSESSING THE WELFARE VALUE OF THE ELMINA BEACH

BY

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DECLARATION

I hereby declare that this Master's Thesis has been completed by me under the supervision of Mr. J. D. Quartey. All the data and cases are authentic, which have been collected through site survey, or included indirectly from official books, newspapers, articles, other kinds of papers and documents. All private opinions introduced directly or indirectly in this thesis are quoted and the sources provided at the end of each quotation.

Signature ………………… Date………………..

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(STUDENT)

I declare that I have supervised the student in undertaking the study submitted herein. The student has been consistent in interacting with me for guidance and direction.

Signature ………………… Date………………..

MR. J. D. QUARTEY

(SUPERVISOR)

DEDICATION

I dedicate this work to my family and my colleagues who encouraged me in diverse ways to bringing this work to completion.

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Abstract

Beaches worldwide offer a broad range of goods and services to coastal communities and economies. One of such services which provide considerable benefit to Ghanaians is beach recreation. This work represents a Ghanaian attempt to estimate the welfare value a recreational visitor places on the Elmina beach, in the Central Region of Ghana, using the individual Travel Cost Method. The main objective of this research was to find the welfare value of the Elmina beach. Specifically, the factors affecting the recreational visits made to the Elmina beach were analyzed, the visitor's consumer surplus gained for visiting the beach was established and lastly, an entrance fee that would maximize entrance fee income to local managers of the Elmina beach was computed. The trip generating function was estimated by using Negative Binomial Count Model and survey data collected on-site. The average number of visits made to the beach was 7, with an average distance traveled to the beach at 10.51km and an average trip cost of GH¢ 5.24. Travel cost, age, educational level and multi-destination and multi-purpose trips were the significant factors that helped to explain recreational trips made to the beach. The consumer surpluses per visitor for local, non-local and all visitors were GH¢ 39.43, GH¢64.47 and GH¢ 37.17 respectively. The hypotheses tests revealed there was a significant difference between local and non-local visitors; and multi-destination and multi-purpose trips affect number of trips made to the beach. The maximum entrance fee that would maximize income was GH¢ 0.21 per day. It is recommended that efforts should be made by the government and private sector to improve monitoring at the Elmina beach so that there would be efficiency in collecting entrance fees in the future. Furthermore, similar research should be undertaken in other beaches in Ghana to help get the economic value of all beaches in Ghana.

Key words: Welfare, Travel Cost Model, Trip Generating Function, Consumer Surplus and Negative Binomial Maximum Likelihood.

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CHAPTER ONE

INTRODUCTION

1.0 Background

Beaches are important recreational and leisure areas, attracting an increasingly large number of users worldwide. Their importance as an economic driver is highly significant for many countries. The entities responsible for managing these areas are therefore urged to further raise their commitment to quality seaside tourism, by promoting the specific beach features in the light of their users' current and future requirements, a goal that cannot be met without understanding the users' preferences and expectations (Vaz et al, 2009).

The global coastal zone according to Vaz et al (2009), occupies less than fifteen percent (15%) of the Earth's land surface, yet accommodates more than 50% of the world population. In Ghana, the coastal zone represents 6.5% of the land area and is home to 25% of the nation's total population (Armah and Amlalo, 1998). The coast of Ghana has been subdivided into three major zones. The Eastern coast is about 149 kilometres and stretches from Aflao to Prampram. It is a high energy beach with wave heights often exceeding one metre in the surf zone (Ly, 1980). The central coast consists of 321 kilometres of shoreline extending from Laloi Lagoon, west of Prampram, to the estuary River Ankobra near Axim. It has medium energy beaches. The Western coast covers 94 kilometers of shoreline and it has relatively low energy beaches. It stretches from estuary of the Ankobra River to the border of Ivory Coast (Armah and Amlalo, 1998). According to Ghana Tourist Board, tourism was the fourth largest source of foreign exchange in the year 2004.

It was estimated that Ghana's tourist earnings totaled US$ 650 million in 2004, and contributed approximately 5% to the country's GDP. Tourist arrivals in Ghana have steadily increased over the past 15 years from approximately 145,000 in 1990 to 600,000 in 2004 (Ghana Tourist Board, 2005). Most tourists spend a considerable time at various beaches in the country. Beach litter, on the other hand, has increased over the years due to urbanization. This tends to devalue the aesthetic value of the beach, where most tourists visit to relax and can serve as a deterrent to future visitors(Ghana Tourist Board, 2005).

The recent discovery of oil in the Western region of Ghana is definitely going to attract various visitors on the shores of Ghana as drilling exercises and related commerce begin. Ghana has been described as the 'gateway to Africa' and also in her 'Golden Age of business'. This calls for greater attention on various tourist and recreational sites as the country advertises itself more and more (author).

Elmina has played a very important role in the history of Ghana. The town has a number of historical monuments which include the St. George's Castle and the Fort Coenraadsburg, Dutch Cemetery, Asafo posts and many more. All these monuments are found on and around the beach area. (Komenda/Edina/Eguafo/AbiremMunicipal Assembly, 2006). To know the welfare value of Elmina beach now will be of great importance to various interested groups such as local government, funders, investors, academia and the local community.

1.1 Problem statement

A scientific investigation in the state of pollution of the Elmina coast in 1991 by Annan-Prah and Ameyaw-Akumfin(1991) cited by Komenda-Edina-Eguafo-Abrem Municipal Assembly (2006), found the coast to be under serious environmental threat. Their research found major solid waste pollutants along the beach.Evidence of coastal erosion from increased sea level rise also poses a threat to the existing monuments which are all along the beach (Armah and Amlalo, 1998). Consequently, the Komenda-Edina-Eguafo-Abrem Municipal Assembly believes that with improved sanitation and infrastructure, the revitalization of the existing monuments and the development of other important cultural sites, tourism can become a major economic activity in Elmina and serve to improve the general standard of living in the town (KEEA Municipal Assembly, 2006). It was not until the year 2000 that a programme by the Komenda-Edina-Eguafo-Abrem Municipal Assembly was instituted, popularly known as the Elmina 2015 strategy. This was a long-term programme with the intention of marketing Elmina both nationally and internationally. Of great importance to authorities was marketing the history and resources in Elmina.

In terms of resources, Elmina is blessed with a cozy and sandy beach. Beaches all over the world have become recreational areas for a number of people, including tourists. If the Elmina beach is kept clean and certain infrastructure provided, it would attract increasing number of recreational visitors annually. Authorities need to be well informed in their decision-making process and for this matter, the importance that direct users attach to the Elmina beach should be taken notice of. Recreational visitors are part of direct users of the beach and the satisfaction they get from visiting the Elmina beach should be explicitly shown and considered, which is currently non-existent.

1.2 Objectives of the Study

The general objective of this research is to assess the welfare value of the Elmina beach. This research will specifically:

I. To analyze the factors affecting recreational visits to Elmina beach.

II. To estimate visitor’s consumer surplus for making recreational trip to the Elmina beach.

III. To compute an entrance fee that would maximize the entrance fee income for local authorities managing the beach.

1.3 Rationale for Study

Results from this survey will be useful to private investors who are in the tourism industry to assess their profitability should they invest their capital into beach tourism. It will also inform local government in their quest to manage other beaches which can be of great importance to tourism potential.

The estimate of total annual welfare value of the Elmina beach will help authorities when doing forecasting. The trip generating function can help authorities to know which factors significantly affect the number of visitors who visit the site annually and this could help them in planning for the future.

To local government and authorities, the average consumer surplus per trip estimated and computed maximum entrance fee could be used as a guide on the fee structure to gain enough funding to allocate to the development of the beach and make better improvement to the recreational environment of the beach. When local authorities have information on entrance fee that maximizes income it will go a long way to increase their revenue base.

This work is the first attempt to use the travel cost method to find the welfare value of a beach in Ghana. Resultsfrom this survey will therefore be a guide to interested researchers who would want to research into other related beach sites by knowing what factors to consider.

Funders may also be interested in the welfare value and importance of the Elmina beach to various users before deciding to fund any conservation and preservation programs.

Information on visitors' expenditure to and on site and spending habit on site can provide signals to engage in some kind of production of good s and services to meet visitors' needs. This can help local community improve their standard of living.

1.4 Hypotheses

i) Ho: multi-purpose and multi-destination trips do not affect the decision to visit the Elmina beach

H_1: multi-purpose and multi-destination trips affect the decision to visit the Elmina beach

ii) Ho: consumer surplus for local visitors is the same as consumer surplus for non-locals visitors who visit the Elmina beach.

H_1: consumer surplus for local visitors is not the same as consumer surplus for non-locals visitors who visit the Elmina beach.

There are other locations that tourists can visit aside the beach. Visitors may also be visiting the beach for many reasons aside recreation. How do the issues of multi-destination and multi-purpose trip therefore affect the decision to visit the Elmina beach?

It is also important to note that there may be differences in consumer surpluses between local and non-local visitors. It is the interest of the researcher to find out whether these differences are significant.

1.5 Method of Study

The data relevant for assessing the welfare value of the Elmina beach in this study included the following: number of trips made to the Elmina beach in the past year, trip cost to the beach and alternate sites, demographic factors (age and level of education), income of visitors, perceived level of quality from visitors and multi-destination and multi-purpose trips. Primary data was collected directly from visitors to the Elmina beach during the survey period whilst secondary data was needed to do further analysis. The secondary data sources were from journals, publications, books and the internet, where necessary.

The data was collected at the premises of the Elmina beach. Structured questionnaires were used and completed through a face-to-face interview. The face-to-face interview was chosen to reduce missing data and improve completeness of data collected. To quantify the welfare value of Elmina beach the Travel Cost Method (TCM) was applied whilst the negative binomial count model was used to estimate the TCM.

1.6 The Study Area

Elmina (means "the mine" in Portuguese) is twelve (12) kilometres west of Cape Coast, the capital of the Central Region. Elmina's strategic location and proximity to goldfields made the city the heart of the West African gold trade. Elmina beach forms part of the central coast and has a very large sandy beach of medium tidal energy. The beach has very cozy environment that attracts thousands of visitors annually. The beach harbors' two international heritage monuments namely the St. Georges's castle and Fort Coenraadsburg. The impressive castle of St. George was erected by the Portuguese as far back as 1482 and yet holds the status of Africa's oldest European building. The St. George's Castle and the Fort Coenraadsburg on St. Jago Hill, attracts over 100,000 tourists annually including many foreigners who spend almost 2, 660,000 Euros on visits KEEA Municipal Assembly, 2006).

It is not surprising that all these historical monuments are found along the beach area. Investors have started to recognize the potential of Elmina and in recent years three star beach resorts and good quality restaurants have sprung up as a result of increasing tourist numbers (KEEA Municipal Assembly, 2006).

Annan-Prah and Ameyaw-Akumfi(1991) as cited by KEEA Municipal Assembly(2006), in a scientific investigation in the state of pollution of the Elmina coast found the coast to be under serious environmental threat. Their research found major solid waste pollutants along the beach such as: faeces, tar balls, bottles, plastic buckets, food wrappers, ice-cream containers, broken bottles, bottle tops and plastic bags. Evidence of coastal erosion from increased sea level rise poses a threat to the existing monuments which are all along the beach (Armah and Amlalo, 1998).The Komenda-Edina-Eguafo-Abrem Municipal Assembly believes that with improved tourist infrastructure, the revitalisation of the existing monuments and the development of other important cultural sites, tourism can become a major economic activity in Elmina and serve to improve the general standard of living in the town (KEEA Municipal Assembly, 2006).

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1.7 Organization of the Study

Chapter one as can be seen above has focused on the introduction of the study. The rest of the work followed the following structure: Chapter Two presented the theoretical framework of the travel cost method for the purposes of this study. Previous literature about travel cost valuation method was reviewed and profile of the study area was explored. The work proceeded to Chapter Three where the methodology of this work was explained. This coveredareas such as data needs, data sources, data collection, sampling design and data analysis. In Chapter Four, the data collected was presented and analyzed to accomplish the objectives of the study. Then, Chapter Five gave a summary of results, followed with a discussion and conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Consumer Welfare

Consumer welfare refers to the satisfaction that an individual gets from consuming a particular good or service. Individuals are assumed to base consumption choices on well-defined preferences about bundles of goods. Individuals have utility functions that represent their ranking over various bundles. Those bundles with the highest ranking are preferred by the consumer; they have the highest utility. Given that it is impossible to measure satisfaction directly, economists use an alternative approach to measure satisfaction and that is report a monetary measure (O'Connell, 1982).

Consumer welfare can be measured using the following: Equivalent variation (EV) measures the amount of money we would have to give (or take) to provide the representative consumer with the same level of utility as he or she would have obtained after a price change. Compensating variation (CV) measures the amount of money we would have to take (or give) to ensure that the representative consumer's utility is the same as before a price change. Put differently, EV is the money value of the change before it happens; CV is the money value of the change after it happens. It is difficult to know which of these measures to use since they represent different things. Consumer surplus (CS) refers to difference between what a consumer is willing to pay and what he/she actually pays for consuming a particular good or service (Feldman, 1987).

Consumer surplus (CS) is an approximation to the equivalent and compensating variations(Feldman, 1987). The area below the Marshallian demand curve and above the market price is called consumer surplus (CS). Thus, while the consumer surplus is the integral underneath the Marshallian demand, the equivalent and compensating variations are the integrals underneath the Hicksian demand curves. Provided that the good is a normal good, the income elasticity is positive. Consequently, the Marshallian demand is less steep than the Hicksian demand.

In practice, the CS is easy to calculate and is most commonly used and was therefore used as a measure of welfare for recreational visitors. The CS was considered in this work since the travel cost employs Marshallian demand. The CS is obtained by calculating the area under the demand curve, which is the integral of the area under the demand curve. In practice, various researchers have found other approaches of finding the CS in the travel cost. Notably, Blackwell et al. (2007) have found the consumer surplus by taking the absolute value of the inverse of the coefficient of a travel cost variable in a trip generating function to get the consumer surplus per annum per person. That is $CS/q = | 1/\beta|$. Where q is the total number of visits per annum and β is the coefficient of the travel cost variable in the trip generating function. Multiplying $| 1/\beta|$ by q gives the total CS. This work will use the approach of Blackwell et al (2007) because it is straight forward and can be used in situations where a number of CS estimates are calculated and compared. In this study, three different estimates of CS were calculated. One for local visitors, another for non-local visitors and the last for both local and non-local.

2.1.3 Types of beaches and beach recreational visit

Beach recreational visit

Conceptually, beach attendance is complex. An individual will make a trip to the beach by considering a number of factors such as: recreation opportunities are available, weather, the opportunity cost of the visit, and other factors including how many recent opportunities there have been to attend the beach. Although it is possible that a structural model of beach attendance could be constructed, it is not easy to represent the beach choice problem, particularly when there are a number of close substitutes.

Reported beach attendance may not correspond to actual beach attendance, and actual beach attendance clearly is what is needed to estimate access value (Deacon and Kolstad, 2000).

Types of beaches

We can separate beaches into two types: those with limited access and those without limited access. Limited access beaches have restricted entry points where one can observe entry and exit. Open access beaches on the other hand are freely accessible, so observing entry and exit is difficult at best. Each type of beach requires a different approach for verifying and, if necessary, correcting reported attendance (Blackwell, 2007).

For limited access beaches, parking is often monitored and ticketing is often used to generate attendance estimates. Attendance at open access beaches is more difficult for authorities to measure and more difficult for the analyst to verify. It is not easy to estimate the size of crowds. This suggests that aerial photos are one reliable way to estimate the number of people over a large area. However, aerial photos are prohibitively expensive as a way to generate regular estimates of attendance (Deacon and Kolstad, 2000).

2.1.4 Methodological Approaches for Non-Market Valuation

There are two main valuation methods for non-market goods. These are 1) revealed preferences and 2) stated preferences. Valuations based on *revealed preferences* are derived from prices paid for goods or services. That is, real monetary exchanges in a market place that reveals the preferences of buyers (Boyle, 2003a). Valuations based on *stated preferences* reflect a WTP for a good or service, or a WTA to forego it, expressed in terms of a stated choice in hypothetical scenarios presented to respondents (Brown, 2003).

Revealed preference methods include Travel Cost method (TCM) which is used to estimate the recreational benefits derived from ecosystems. The basis of the TCM is that time and travel expenses incurred by visitors is the 'price' of accessing the site (Parsons, 2003). Another revealed preference method is the Hedonic pricing Method (HPM) which is used to estimate economic values for ecosystem services that directly affect market prices. It is most often applied to variations in housing prices that reflect the value of local environmental attributes (Taylor, 2003).The basis of HPM is that the price of a marketed good is a function of its characteristics.

The main stated preference method is the Contingent Valuation Method (CVM) which is used to estimate use and non-use economic values for a wide range of non-market ecosystem and environmental goods and services (Boyle, 2003b). It is based on asking respondents how much they would be willing to pay or accept (if a loss) for a specific environmental good or service.

There is another approach which is based on cost-derived measures of value. These methods do not provide strict measures of economic value; instead, they assume that the cost of avoiding damages or of replacing ecosystem services provides a useful estimate of the value of these ecosystem services(Freeman III 2003b; Gosselink et al. 1974). They include Avoided Cost, cost that would have been incurred if the services were not available. Replacement Cost estimates cost of replacing ecosystem service with an alternative technology. Opportunity Cost, which is value of next best alternative use of resources, Production Function estimates value of ecosystem services functions as an input in production. This method is based on the assumption that a non-marketed good or service is an input into the production of a marketed good or service. Net Factor Income considers ecosystem services entrance incomes and value assigned as a function of associated products, net of cost of other input.

2.1.5 Travel Cost Method

The travel cost method, TCM is used to estimate the value of recreational benefits derived from ecosystems (Parsons, 2003). It assumes the value of the site, or its recreational services, is a function of peoples' WTP to get to the site. It uses actual behaviour (revealed choices) to infer values. The travel cost method can be used to estimate economic benefits or costs generated by changes in access costs for recreational sites, elimination of existing recreational sites, addition of new recreational sites, or changes in environmental quality at recreational sites. The travel cost method is a demand-based approach which expresses the relationship between visitation rates and price paid to visit a particular recreational site. The basis of the travel cost method is that time and travel expenses incurred by visitors is the "price" of accessing the site. Their willingness to pay (WTP) to visit the site can be estimated using the number of trips made at different travel costs, which is analogous to estimating their WTP for marketed goods based on the quantity demanded at different prices.

The first travel cost technique originated in 1947 in a letter form written by Harold Hotelling to US National Park Service. The purpose of it was to show that the benefits brought from a park exceeded the cost to the visitors (Farrow 2000,). Harold Hotelling explained in his letter that the trip costs that visitors spent to a public site could be considered as a special "price" for its recreational value. Later Clawson (1959) explicated this concept in more detail, which brought TCM in economic literature formally (Mathis, 2003). This basic approach was called Clawson-Knetsch travel-cost model, used to estimate the consumer surplus for non-priced outdoor recreations. Decades after, this technique has been applied and developed to evaluate a wide range of recreational activities and public resources.

According to Hottelling, people pay to visit a public park and the payment they make is the cost of traveling to the park. Since people come from different locations, they incur variable costs for enjoying the park. This information can be linked to the number of visits that people make to obtain a demand curve for recreation (Bolt et al, 2005).

Hotelling defined concentric zones around the park and the travel cost from each zone to the park was constant. For each zone, it is then necessary to accurately measure the cost of traveling, the number of visits to the park in a period, and the population of the zone. With this information it is possible to plot a demand curve, where the travel cost is the surrogate price and where the level of demand corresponds to the number of visits to the park. Hotelling's response was ignored by the National Parks Service since other respondents had expressed a consensus view that the problem could not be solved.

The first step involved with the TCM is the creation of a trip generating function. This involves regressing visitation rates on travel cost to a site and other factors that affect visitation rates to a site such as income, socio-economic characteristics, etc. In an actual travel cost study, this stage could not take place before a certain amount of thought and research concerning the goals and form of the study, and a significant amount of data collection work (Whitehead, 2008).

The purpose of the trip generating function is to provide a model of site use. There are two types of travel cost models: zonal model and individual model.

2.1.5.1 Zonal Travel Cost (ZTC)

This is a single-site approach and is mainly used as secondary data to value a site as a whole without characteristics of individuals as dependent variables. The data involved in the zonal travel cost is usually small. The data collected are from each zone. The travelers are categorized based on their zone of origin or the natural breakdown of the surrounding area (Karasin, 1998). This is the Clawson-Knetsch travel-cost model which takes the functional form:

Vhj/Nh = f(Phj, SOCh, SUBh). . . . . . equation 1

Where *Vhj/Nh* is the participating rate for zone *h* (visits per capita to the site *j*) as the dependent variable. The independent variables are *Phj* the cost of travel from zone *h* to site *j*, *SOCh* a vector of the socio-economic characteristics of zone *h* and *SUBh* a vector of substitute recreational site characteristics for individuals in zone *h* (Willis and Garrod, 1999).

The zonal travel cost is barely used since it has been criticized heavily on the grounds of theoretical rigour. It assumes that the behavior of individuals within a zone is homogeneous.

2.2.1.2 Socio-economic characteristics

Differences in the number of individual visits to a recreational site could also be due to socio-economic differences. The socio-economic characteristics which are considered will depend on the type of function. In the individual model, any information collected on the survey and thought relevant to recreation decisions might be included. This could include not only income, but also educational level, race, age, sex, etc. The zonal model could include these characteristics as well, but based on averages for the region collected through census data (Bin *et al*, 2005). The most common socio-economic factors in most literature reviewed included income of visitors, age, and educational level of visitor. These were the socio-economic characteristics that were considered in this work.

2.1.5.2 Individual travel cost

Individual travel cost method is now regarded as the most defensible and widely applied method which can be found in many literatures (Parson, 2003). Different from zonal model, the dependent variable in individual travel cost function is the number of trips taken by individuals but not by dwellers from different zones. The individual travel cost considers trips made by an individual to a site in the face of alternative sites. When the alternative sites are a lot the Random Utility Model (RUM) is used (Murdock, 2006). Since single individual is the object unit, this approach can collect much more information and thus provides relatively closer travel-cost approximation of true consumer surplus than zonal model (Willis and Garrod 1991). The individual travel cost model takes the form:

$Vij = f(Pij, Tij, Qi, Sj, Yi)$ . . . . *equation 2*

Where *Vij* is the number of visits made by the individual i to site *j*, *Pij* is the travel cost incurred by individual i when visiting site *j*, *Tij* is the time cost incurred by individual i when visiting site *j*, *Q* is a vector of the perceived qualities of the recreation site *i; Sj*is a vector of the characteristics of available substitute sites and *Yi* is the household income of individual *i* (Willis and Garrod, 1999).

A trip generating function (TGF), that is a model of site use, is statistically determined through multiple regression after data has been collected.

Once the trip generating function has been determined, it can be used to define a demand curve for the site. This is done by considering what impact price (entrance fee) increases would have on aggregate demand, and tracing out a curve through this process. It is assumed that individuals respond to changes in entrance fees the same way the respond to changes in travel cost to visit a site (Johansson, 1992). Once the demand curve has been established, finally, it is only a short conversion to finding an estimate of consumer surplus, which is the area below the demand curve and above the current price line. Mathematical, rather than geometric, definitions of consumer surplus can be found.

This work employed the individual travel cost to estimate the welfare value of the Elmina beach because it in the interest of the researcher to find individual characteristics recreational visitors to the Elmina beach, in the face of other recreational sites, such as, the Coconut Groove, Elmina Beach Resort, Bejar beach, the castle and the fort.

The TCM has certain advantages which are worth mentioning. The TCM replicates the empirical methods applied by economists to estimate values based on market prices since the method is based on actual behavior, as opposed to hypothetical behavior. Applying TCM is relatively inexpensive and people are usually willing to participate in on-site surveys hence sample sizes are large and representative. The results of a TCM are also relatively easy to analyze and describe (Pearse et al., 2006)

2.2.1 Treatment of independent variables in the TCM

The most basic models of the TCM include only a few explanatory variables–mostly, in keeping with the original conception of the model, involving travel cost. But an effort to more thoroughly model the individual decision process has led to the inclusion of an array of different variables. So while it may seem tempting to include a vast variety of possible factors, practical limitations on data availability must be considered. And even when it is feasible to collect data on a wide variety of factors, the modeler must choose between comprehensiveness and the risk of insignificant coefficients, particularly when the sample size is small, as it tends to be in zonal travel cost studies. In short, an elegant trip generating function retains a careful balance between thoroughness, statistical integrity, and realism in the face of data requirements. Some variables which have received attention include the following.

2.2.1.1 Costs

This is the most important variable in travel cost modeling. Differences in the number of visits made to a recreational site are due mainly to differences in individual cost of travel since individuals have come from different origins (Johansson, 1990). The cost for an individual is made up of distance cost to the site, time spent to travel to the site, time spent on site, entrance fee and on-site expenditure (Parsons, 2003). Some questions relate to how to translate distance to travel costs, time and what on-site costs to include. Note that the zonal model generally does not have the flexibility to include costs which vary between individuals; because it assumes that everyone from a given zone has approximately the same costs, based on travel from the center of the zone (Parsons, 2003)

2.2.1.3 Substitute Sites

The importance of incorporating information concerning substitute sites into the trip generating function is quite straightforward; if residents of one area have close access to a high number of substitute sites, while residents of another region do not, the demand for the site in question will be affected. Without some inclusion of cost figures for substitutes, the decision process is not likely to be accurately modeled (McConnell, 1992). But the treatment of substitute sites appears to be omitted in the most basic models. In some cases this may be warranted. For example, among some samples recreation sites may all be a comparable distance. But the omission in many studies appears to be more a function of the difficulty associated with accounting for substitute sites than the result of a decision that the figures will be insignificant (McConnell, 1992). There is no agreed way of how substitute sites might be represented. In the individual model, the survey could include questions about the distance to substitute sites. But further complications arise. Other sites may have different entry costs; people may perceive the opportunity cost of time differently, there is a question of whether to include environmental information on substitute sites as well. At some point, assumptions need to be made to limit the complexity of the treatment of substitutes.

2.2.1.4 Environmental quality

This variable encompasses a wide range of factors which might differentiate one site from another. In addition to the range of issues which might often be thought of as belonging to the environmental quality category, the various types of infrastructure related to the site and the site's congestion level could be considered part of environmental quality characteristics. It is important to include some representation of environmental quality if it plays an important role in individuals' decisions about what site to visit. But without having some comparison available for other sites, it may not be clear what role the data is playing in a single study (Tang, 2009). This, generally, is another issue which does not appear to receive a great deal of attention. In standard TCM analyses, environmental quality will be a consideration only if it influences a person's decision to visit one site over another, and therefore it would appear out of context to focus on environmental quality and not substitute sites (Tang, 2009). For beaches, the cleanliness of the water and the amount of litter on the beach are major variables.

2.2.2 Challenges in using TCM

2.2.2.1 Opportunity cost of time

The definition and measurement of the opportunity cost of time is problematic. There is no agreed way of measuring the opportunity cost of time in existing literature. The choice of a particular measurement will therefore affect the final estimate of consumer surplus. In practice, most studies estimate time cost as a fraction of the visitor's wage in some way.

The fractions range from 0 to 1 in literature, although a common convention is to use 1/3 of the wage as the value of time (Hellerstein, 1993; Englin and Cameron, 1996; Bin et al., 2005 and Cesario, 1976). Liston-Heyes and Heyes (1999) and Hagerty and Moeltner (2005) also used 1/3 of the wage. Feather and Shaw (1999) argue that for those on a fixed work week, the value of time could actually exceed the wage. Zawacki et al. (2000) and Bowker et al. (1996) used 0.25, and 0.5 as wage multipliers. Sohngen et al. (2000) and Sarker and Surry (1998) used 0.3. Ward and Beal (2000) suggest 0% as appropriate, since individuals travel for leisure and recreation mostly during holidays when they face no loss of income. Parsons et al. (2003) observe that the recreation demand literature has more or less accepted 25% as the lower bound and the full wage as the upper bound, although neither value enjoy full support (Hynes et al., 2004).

However, Cal *et al.* (2003) argue that one of the factors that should be considered in using wage rate as value indicator is the selection bias. Selection bias can be viewed as problem of missing observation. This simply denotes that wage and hours cannot be observed from non-working individuals who, had they chosen to work, have some unobservable wage potential. Two-stage Heckman correction in handling selection bias is then employed for this purpose.

Adjustment factor for the wage rate is computed by regression of the recreational demand against the decomposed travel cost (that is, transportation, opportunity and access costs) which yield parameters βt , βo and βa associated with transport, time and access costs, respectively (Earnhart, 1999). If transport and time cost are appropriately valued, the relationship βt=βo=βa should follow which also mean that the ratios between the parameters are equal to one. The ratio of the parameters is used to adjust the wage rate to be used.

Most studies impute an hourly wage by dividing the reported annual income by the number of hours worked in a year: usually a number in the range 1800 to 2080 (Sohngen et al., 2000; Bin et al., 2004). This work will use 1/3 of wage rate as proposed by Hellerstein, 1993; Englin and Cameron, 1996; Bin et al., 2005 and Cesario, 1976.

2.2.2.2 Multi-purpose and Multi-destination trips

The travel cost method follows a custom whereby meanderers are distinguished from purposeful visitors (Hanley and Spash, 1993). The former refers to individuals for whom the site visit is only part of the reason for their trip or one of many trips, whereas the latter refers to those individuals for whom a site visit is the only reason for their trip. The existence of meanderers give rise to the question: what percentage of their travel costs may be apportioned to their visit to the site in question? In many cases the meanderer problem is simply ignored by either omitting multi-destination or multi-purpose trips from the analysis or employing aggregate travel cost without adjustment to cater for the existence of meanderers.

Studies by Loomis et al. (2000) and Mendelsohn et al. (1992) show that the omission of meanderers from the travel cost model may lead to an underestimation of recreational value by 50% or more (the omission influences the shape of the demand curve and, thus, the estimate of consumer surplus). The omission may also lead to a decreased sample size – which is a problem in the case of the zonal method as it may be onerous to locate enough purposeful (single destination) visitors from far-off zones, but not so much in the case of the individual method (where much more information is usually gathered).

A solution to the meanderer or multi-destination problem according to Loomis et al. (2000) and Mendelsohn et al. (1992) is to ask respondents to rate the importance they attach to a site visit, relative to their satisfaction with the entire trip or other destinations visited, and this rating, expressed as a number between one and zero, can be used to weight their total travel cost (Hanley and Spash, 1993). Parsons (2003) addressed this issue by introducing a dummy variable into his trip generating function.

2.2.2.3 Model Specification and Estimation.

There are a number of functional forms that are consistent with economic theory. The linear form is most commonly estimated (Ward and Beal, 2000), however there are many examples of other functional forms being used. Choosing the linear form implies that as travel costs increase visits per year decrease by a constant amount. Other forms often used include the quadratic, reciprocal, linear-log, log-linear and the double log forms. The double log form is commonly used as it accounts for extreme values (Ward and Beal, 2000). Beal (1995) chose to use the double log form in her TCM of Carnarvon Gorge. In the double log functional relationship as travel costs increase from zero, visits fall (assuming the coefficient on travel costs is negative) at a decreasing rate. The coefficient on the travel costs variable measures the elasticity of visits with respect to travel costs.

The Kakadu study (Ward and Beal, 2000) used reciprocal form and rejected double log. As travel costs increase indefinitely, their inverse approaches zero and visits approach an asymptotic or limiting value given by the constant in the regression equation. This implies that visits per year will never fall below this limiting value, which if above zero may not be a realistic outcome. Allen, Stevens and Barrett (1981) adopt the linear log form for their TCM. The linear log functional form is useful where there is an interest in studying an absolute change in visits for a percentage change in travel costs. Christiansen, 1997 tested a linear and a double log functional form and preferred the double log.

This work adopted the TCM model as instructed by Othman et al. (1999) in assessing economic value of sports fishing recreation at the Matang Mangrove Forest Reserve, Malaysia and the Ordinary Least Square (OLS) method and Negative Binomial Count Model (NBCM) estimation method as used by Tang (2009). Othman et al. (1999) used both the linear and semi-log functional forms for the additive form of the function:

vij = v(tcij, mi, seci, dij, qj). . . . . .equqtion 3

Where

tcij = the travel cost of individual i to site j

mi = the income of individual i

seci = other socio-economic characteristics

dij = dummy variables (1,0) describing various factors including whether or not the trip by individual i to site j is the sole purpose.

qj = the environmental quality at the site j

Specifically the linear form will be used as

$v = \alpha + \beta_1 tc + \beta_2 Y + \beta_3 ps + \beta_4 A + \beta_5 E + \in$. *equation4*

Where

v = the total number of trips the respondent has taken in the last year.

tc = the travel cost of the individual to the site

Y = income of the individual

ps = travel cost to a substitute site

A = age of the individual (years)

E = education level of the individual (years)

In their study, the more important socio-economic variables such as income, age and educational level were included as they were readily measurable. Site attributes that include the flow of environmental, infrastructure and service amenities available at the park were not considered but were considered in this work. Here, Othman et al. (1999) assumed that all visitors face the same level of attributes (and value them the same). The linear model of Othman et al. (1999) was adopted because the semi-log form cannot be estimated with the NBCM since the dependent variable, the number of visits made to the Elmina beach in the past year until now, when logged, becomes fractions and not integers. Othman et al. (1999) model gives room for comparison and check for consistency of results using different estimation methods. The model is also able to capture other determinants aside travel cost that affects individual visits to a particular site.

2.2.3 Count models

Count models are employed when the dependent variable takes integer values that represent the number of events that occur. The number of visitors that visit the Elmina beach in a given year is an example of integer values (count data). The standard count models are the Poisson and Negative-Binomial maximum Likelihood (ML) specifications.

The Poisson model is used where the dependent variable is a non-negative integer random variable. It depends on correct specification of the conditional mean function and the dependent variable follows a Poisson distribution. The Negative-Binomial is often used where there is over dispersion in the data. The method estimates parameters of the model by using maximum likelihood of a negative binomial specification (Whitehead et al., 2008). For the purpose of this study, the Negative-Binomial model will be used since the dependent variable which is number of visits is a count and also it has already been said that the TCM is a demand-based approach. It is expected that as the travel cost increases, the number of visits will decrease, thereby, increasing the spread in the data.

2.3 Empirical Literature

Empirically, the travel cost method has been applied extensively to recreational sites. The empirical literature here concentrated on beach recreational visits. It is noteworthy to mention that there have been a number of researches done to estimate the value of beaches worldwide but few used the travel cost model. Most of the literature on beach recreational visit used the contingent valuation method. Few of the travel cost models used in beach valuation have been reviewed below.

One of the few true travel cost analyses of beach recreation was done by Moncur (1975) for beaches on Oahu, Hawaii. He focused on recreation on the island by local residents. According to him, all residents were within 40 miles of all of the beaches. His approach was to conduct a mail survey (in 1972) of a sample of the Oahu population. Although his sample size was large (several thousand), his response rate was modest (31%). Using ZIP code to identify each respondent's location he calculated the travel distance and travel cost to each beach for each respondent. Unfortunately, he does not provide much information on exactly how travel costs were computed.

Moncur (1975) estimated a model that specified the per person visitation rate as a function of the travel cost to each of eleven beach areas. He then calculated a population demand function for each beach and measured the surplus associated with each beach, holding the price of other beaches constant. Moncur (1975) was then able to calculate the surplus per person-beach-day for nine of the beaches examined. Those figures are on the order of $1 per beach day (1972 dollars). Significantly, this is one of the few studies that looked at the cost of visiting substitute beaches when calculating the value of a specific beach.

McConnell (1992) participated in a telephone survey of beach use in New Bedford, Massachusetts. The issue of interest was damages from PCB contamination of the area's beaches, so the sites studied may be less desirable than a typical beach. The survey was conducted in March 1986 of 545 New Bedford area households. Respondents were asked about their residence location and the annual number of visits they take to each of two beaches in the area. They were also asked how frequently they would visit if the PCBs were cleaned up. Thus, the contingent valuation question pertains to how many visits they would make if the pollution were eliminated. The author estimated a travel cost model for each beach, and included the travel cost to substitute beaches as a factor affecting use.

From this, consumer surplus per beach visit per person were calculated, both with PCBs and without. The resulting values for a beach day were very low; using the median number of visits (instead of the mean), yields values per beach day without PCBs of $0.58 to $0.94 (1986 dollars).

Blackwell (2007) applied the individual travel cost to find the recreational value of Moonloolaba beach in Australia and compared the value with other outdoor recreational sites. The sample size for the study was 250 with a mean number of visits as 48 per year. The independent variables used are travel cost, income, size of respondent’s party, employment status, quantity of visits to alternative sites and whether respondent was a visitor or not. Travel cost was measured as the sum of fuel cost, money expenditure of travel only, travel time cost as 40% of wage rate, on-site money expenditure and on-site time cost.

Three model specifications were considered. They include the Ordinary Least Square (OLS), truncated Poisson (TP) and the truncated negative binomial (TNB) models. In all models (except OLS) travel cost was significant and negative which was expected. The consumer surplus (CS) for TNB was calculated as CS/q = absolute value of 1/β, where β is the coefficient of the travel cost to the beach in question. The values are $119.95 for total, $107.75 for visitor and $17.41 for resident. OLS and TP CS measures are lower as consistent with international literature (CerdaUrrutia et al. 1997). Perpetuity values were also calculated for various discount rates. Beaches also appeared to have higher passive-use values than national parks and forests when they were compared.

Whitehead et al. (2008) applied the individual travel cost to value beach access and width. This was a study of recreational demand of South Carolina beaches. Telephone survey was used with 52% response rate with an active sample size of 636. The average number of trips was 11. Thirty-three percent (33%) of wage rate was used to value leisure time. The average travel cost was $90, the average of travel cost to substitute site was $203, and average annual income was $59,000, all in 2003 dollars.

The Poisson regression model was used since the dependent variable (number of trips made to the beach) was a count data. The natural log of the mean number of trips was assumed to be a linear function of travel cost, trip cost to substitute site, income, dummies: access and width scenarios and test for hypothetical bias. The consumer surplus (CS) per trip was calculated as 1/-β1 where is the coefficient of the travel cost to a particular beach. The travel cost was significant and negative as expected with a consumer surplus of $90 per trip. Increase in CS per trip with improvement in beach access was about \$25 and increase in CS in beach width was about \$7. Combining CS per trip yielded an annual CS of \$869.

Othman et al., 1999 applied the TCM to assess the economic value of sport fishing recreation at the Matang Mangrove Forest Reserves in Malaysia. They used the linear and semi-log functional form for their trip generating function as follows:

Linear form: $v=\beta 0+\beta 1TC+\beta 2Y+\beta 3Ps+\beta 4A+\beta 5E+\varepsilon$……(4)

Semi-log form: $logv=\beta 0+\beta 1TC+\beta 2Y+\beta 3Ps+\beta 4A+\beta 5E+\varepsilon$……(5)

where

v = the total number of trips the respondent has taken in the last year to the beach.

TC = the travel cost of the individual to the site

Y = income of the individual

Ps= travel cost to a substitute site

A = age of the individual (years)

E = education level of the individual

ε= error term

βs are the parameters of the regression.

The Ordinary Least Square (OLS) was used to estimate the model of a total sample size of 189. Most importantly both linear equations and semi-log equations had coefficients for travel cost that were negative and statistically significant at least up to 90% confidence level. The consumer's surplus was calculated by integrating the demand function that have statistical significant travel cost coefficients, with respect to the travel cost variable and valuing the integrals between the choke travel cost and the mean travel cost. Within each functional form, the consumer's surplus estimates are quite close. In linear functional form, the range in the consumer’s surplus estimates is from RM23.42/trip to RM27.74/trip. While for the semi-log functional form the range in consumer’s surplus estimates is from RM15.69/trip to RM18.93/trip. There is a consistency in the results obtained.

The work of Othman et al. (1999) is relevant in the literature because it provides the basis for the choice of operational econometric model for this study. It throws more light on other factors to consider aside the travel cost as independent variables of the individual TCM. It also shows how the consumer surplus was estimated from the demand function.

Bandab et al (2007) applied the travel cost method (TCM) to estimate the value that rural households in the Steelpoort sub-basin of South Africa place on river and collective tap water. While the TCM calculations were based on the opportunity cost of the time household members spend on water collection, the resulting welfare values were close in magnitude to the estimates obtained using a contingent valuation method (CVM) on the same sample. Their paper is relevant in this study because it showed that in the absence of price data, the TCM provided satisfactory estimates of benefits where direct estimation of demand elasticity would otherwise be impossible. According to both methods, households consuming river water attributed higher value to the resource than collective tap users. The income elasticity of the trip generating function was much higher than that of the opportunity cost of time (price), implying that household's water use behaviour would be more responsive to factors affecting household income than to price incentives. Comparing the estimated values with actual operating and maintenance cost of water provision in the study area suggests that policies promoting cost-covering water tariffs have a potential to succeed.

Poulous et al (2000) estimated the demand for insecticide-treated nets (ITNs) in Tigray (northern Ethiopia) and KassenaNankana (northern Ghana) by using the travel cost method. The review will be based on the results for kassenaNankana. At the time of the study, bed nets were essentially unknown to households in Tigray and KassenaNankana as a method of treating malaria. The district was considering ITNs as an intervention to decrease the risk of malaria and other diseases.

Approximately 270 households were surveyed to assess the demand for malaria prevention and to compute the medical costs and productivity losses associated with the disease. The computed average cost of illness (COI) for each household (including those with no malaria), ranges from US$31 (assuming productivity losses of US$1 per day) to US$9 (assuming productivity losses of US$0.5 per day). In estimating household demand functions for bednets, count data models were used since households buy a non-negative integer quantity of bednets. The independent variables in the model used were price of bednets, houshold income, missing wage, number of teenagers, number of children, household direct cost of illness, marital status, gender, education (read easily), age and altitude. The only variables whose coefficients were significantly different from zero were price, income, and age of the respondent. The mean willingness to pay estimates for poisson, negative binomial and truncated poisson methods were US$20, US$20 and US$2 respectively.

The empirical literature reviewed provided enough information concerning the specification of the operational econometric model of the trip generating function, the various variables considered, the estimation of the consumer surplus for the beach recreational visit and how data collected was handled to meet the objectives of this study.

CHAPTER THREE

METHODOLOGY

3.1 Data Sources

This work is a survey which requires on-site data from beach visitors. The data for this study was therefore obtained from primary sources. The questionnaires were administered to individual visitors who were intercepted while on site to interview them. The questionnaire was in a structured form aimed at obtaining adequate information from the respondents. The questions on the questionnaire were organized in order to achieve its purpose of addressing the objectives of the research.

The first part of the questions sought to find general information from the respondent and introduces the intent of the study. The second part was intended to find travel characteristics of an individual visitor such as trip cost, time taken to reach site and time spent on site, expenditure on site, etc. The final part of the questionnaire was intended to find socio-economic characteristics of the respondents. This embodied the age, sex, level of education and level of income.

Data needs

The data relevant for assessing the welfare value of the Elmina beach in this study included the following: number of trips made to the Elmina beach in the past year; trip cost: made up of travel cost to site, entrance fee, accommodation fee (if any), expenditure while on site and time cost (Parsons, 2003), trip cost to alternative sites. Other data used in the study included demographic factors, made up of age, gender and level of education (Parsons, 2003); income of visitors, perceived level of quality which was a composite of variables which described the characteristics of the Elmina beach. This measured the site from the following aspects: service, cleanliness and maintenance, facilities available, beach entrance fee and access to the beach. Lastly, there was data on multi-destination and multi-purpose visitors

3.3 Elicitation

For the purpose of this study, structured questionnaires were used to interview respondents. Structured questionnaires are able to generate data in a very systematic and ordered fashion, which can be quantified, categorized and subjected to statistical analysis. Self-administered questionnaires have the advantage of having direct contact with respondent and also possible to run through completed questionnaires with respondent to ensure all questions have been answered. That is, it reduces the problem of missing data. The questionnaire was in three main parts. The first part required general information about the respondent. Second part elicited information concerning the travel cost of the respondent. The final part of the questionnaire asked questions concerning the socio–economic characteristics of the respondent and perceived quality of the respondent places on the Elmina beach.

3.4 Sampling

The population for the survey was all visitors to the Elmina beach and the number of visits they have made to the Elmina beach in the last 12 months until now. The sampling unit here was each individual visitor within the population. Each visitor was either a local visitor or a non-local visitor. It was virtually impossible to investigate each member of the population. It would have been time consuming and very costly to investigate the entire population. For that matter, it was essential to have a sample that was representative enough of the population. It is noteworthy that, the larger the sample the better.

3.4.1 Sampling method

Convenient sampling was applied as a sampling method since it was impossible to know each member of the population. The survey began every day at10:00am and ended at 2:00pm. Anybody who was intercepted within this time frame was included. Respondents were then asked to alert any other member of the surveying group of their inclusion. In this case, each sampling unit had equal chance of being selected. The respondents were grouped into the two different categories (local and non-local) based on their country of origin. This was necessary to help test for the hypothesis that there was a significant difference between consumer surpluses of local and non-local visitors.

3.4.2 Sample size

The sample size was chosen by considering the confidence level chosen and the margin of error which is tolerable by the researcher. The confidence level chosen for this research was 95% and margin of error of 10 because this was the most common in literature reviewed. Saunders et al. (2007) provide a number of formulae to be used in estimating the sample size. The one that this work used was, $n = \frac{N}{[1+N(\alpha)^2]}$ a laSaunders et al. (2007), where n is sample size; N is population size and α, maximum allowable error.

Evidence from Komenda/Edina/Eguafo/Abirem Municipal Assembly (2006) suggests that the Elmina beach attracted about 25560 visitors. The sample size therefore, according to the above formula was $\frac{25560}{[1+25560(10)^2]} = 255.6$, approximately 256. As a matter of fact, 400 questionnaires wereprinted and administered in order to reduce the problem of missing data and have higher response rate.

3.5 Operational econometric model specification

This study used the individual travel cost method to estimate the welfare value of the Elmina beach since single individual was the object unit. The individual travel cost is able to collect more information and thus provides relatively closer travel cost approximation of the true consumer surplus than zonal travel cost (Willig and Garrod, 1991). Trip generating functions were specified from the sample data collected. When specifying the trip generation function (TGF) of a TCM, the basic task is to translate the theoretical variables into appropriate data variables from the survey instrument. There are many common functional forms of the TGF in the literature including linear, semi-log (log-linear) and double log model. There is no consensus in the literature on which of these is the best functional form to employ. Various criteria can be used to choose the functional forms based on: 1) theoretical assumptions about the shape of the demand function, 2) the precision with which the travel price coefficient is measured (that is, t-statistics) and more general measures such as goodness of fit (that is, R-squared and other measures). Because many of these criteria produce contradictory rankings and because of the lack of consensus, most researchers employ several functional forms in order to see how sensitive this choice is to the final estimate of consumer surplus.

In this analysis of the Elmina beach, the linear model version was used in the additive form as used by Othman et al. (1992) and estimated using both Ordinary Least Square (OLS) method used by Othman et al. (1992) and Negative Binomial Count Model (NBCM) as used by Tang (2009).Othman et al. (1992) used five explanatory variables to explain total number of trips respondents made in the last year. These variables were travel cost to the site in question, income of individual, travel cost to alternate site, age of individual and level of education. Perceived level of quality was ignored because it was assumed this was constant for all visitors. Tang (2009) used both Ordinary Least Square (OLS) method and Negative Binomial Count Model (NBCM) so that comparisons could be made on how the consumer's surplus was affected by the choice of a particular estimation method and also checked the consistency of the travel cost method in relation to estimation method. The semi-log form was not used because in the NBCM, the log of the independent variable of the individual travel cost was no more count and therefore could not be estimated. It was therefore not be possible to compare OLS and NBCM of the semi-log form of the Othman (1992) functional form. Information criterion was used to select the model estimation that best fits the data collected. The specification has been given below as already stated in the Literature review:

Linear form: $v=\beta_0+\beta_1TC+\beta_2Y+\beta_3Ps+\beta_4A+\beta_5E+\beta_6Q+\varepsilon$……(4)

Where v = the total number of trips the respondent has taken in the last year to the beach.

TC = the travel cost of the individual to the site

Y = income of the individual

Ps= travel cost to a substitute site

A = age of the individual (years)

E = education level of the individual

Q= perceived quality of the beach

ε= error term

βs are the parameters of the regression.

The price of substitute sites (Ps) was determined first by asking the visitor to identify the set of substitute sites to the Elmina beach and the average travel cost to the Elmina beach was estimated using data on the visitor's origin and the distance to each substitute site.

The respondent's stated expenditures can be summed up directly but the travel cost and opportunity cost of time require adjustments. The cost of travel is quite standard once the rate to use is agreed upon. But the opportunity cost of time is more variable depending on the alternative activity available to the respondent had he not made the trip and whether the travel to the site provides enjoyment to him. If the travel provided enjoyment or utility to the respondent, then ascribing a zero opportunity cost for the trip time is suggested. The price of substitute sites (Ps)were determined first by asking the visitor to identify the set of substitute sites to the Elmina beach and the average travel cost to that site was estimated using data on the visitor's province of origin and the distance to each substitute site. Perceived level of quality was not treated as constant for visitors as opposed to Othman et al (1992). Hence, its introduction into the specified model.

3.6 Variables

3.6.1 Travel cost (TC)

This is made up trip cost to the beach, entrance fee charged on site, accommodation fee, expenditure while on site and time cost (Parsons, 2003). In the calculation of the trip cost, current commercial transportation fares were used. Visitors who used their private means of transport were asked their expenditure on fuel and from where they had come. Visitors who use commercial means of transport were asked their actual fares paid to reach site and also asked from where they had come. Parsons (2003) argued that the variable cost component per kilometer was more meaningful in the context of TCM than the overall operating cost of motor vehicle. The variable cost component is more likely to be treated in the same way as a new entrance or user fee for the beach. Alternatively we can use the expenditure on fuel by visitors as a measure of travel cost. Ranges for various distances at a regular interval were set and the mid-points of their ranges used for analysis. The current average cost per kilometer was used as a basis to calculate the trip cost to substitute sites. Visitors from under 1km were assumed to pay very little or no travel cost since they are very close to the site.

There is no agreed way of incorporating time cost into the travel cost. McConnell (1992) has revealed that in calculating the opportunity cost of time, it has depended either partly or solely on income, wages to be precise. It has been assumed that workers could work and earn income had they not taken the trip to visit the beach. Because there is no certainty that the individually visitor can actually earn that income, most researchers have used proportions of their income. This work used 1/3 of wage rate as proposed by Hellerstein, 1993; Englin and Cameron, 1996; Bin et al., 2005 and Cesario, 1976.

The total travel cost was therefore a sum of trip cost to the beach, entrance fee charged at the beach, accommodation fee, expenditure while on site and time cost (all in monetary terms).

3.6.2 Price of Substitute (Ps)

There are other substitutes sites an individual visitor could visit aside the Elmina beach. These substitute sites compete for visitors to the Elmina. The presence of substitute sites affects the value an individual places on a site. The presence and number of substitute sites available is expected to reduce the visitation rates to the Elmina beach. Visitors interviewed were asked which substitute sites they could have visited if they did not visit the Elmina beach (Whitehead et al, 2008). Visitors were then asked the distances from their place of abode to the substitute site. The average trip cost per kilometer, which is GH¢ 0.45 (Ghana Business News, 2010) will then be multiplied by visitors' distances to get the trip cost to substitute site. The mid-points of the distance ranges were used. The ranges were: under 1km, 1 to 5km, 6 to 10km, 11 to15km, 16-20km, 21-25km, 26-30km, 31-35km, 36-40km and above 40km.

3.6.3 Age (A)

The impact of age on the dependent variable cannot be predetermined as it depends on a number of factors. On one hand, an older individual may not be willing to pay for a visit to a recreational site as they are old and are content with their way of life. On the other hand, older individuals may be willing to pay because they have acquired enough assets and can afford the travel cost (Donis, 2004). In order to reduce hesitation from visitors, age was in ranges to make the visitor been interviewed willing give an answer which though not accurate, was appropriate. The mid-points for the ranges were then used. The ranges will be under 18, 18-25, 26-35, 36-45, 56-65 and 66 and more years.

3.6.4 Level of education (E)

The value that an individual places on an environmental asset is influenced by his or her level of education. The impact of the level of education on number of visits made to the Elmina beach cannot be pre-determined. On one hand, it is assumed that more educated people are well informed and can also appreciate the recreational function of a beach and are likely to visit the beach more often than less educated people, hence a positive relationship. On the other hand, Mendelsohn (1992) claims there is also a high correlation between level of education and labour earnings. Individuals who have higher earnings have a very high opportunity cost of time and therefore would like to earn more by working more. This also gives a positive relationship between work and earnings or income and negative relationship between income and leisure. This variable was coded from 1 to 5 as to whether a respondent had no education, had Basic/Junior High School (JHS), Senior High School (SHS), Vocational/ Technical or Tertiary education.

3.6.5 Disposable Income (Y)

The desire for a recreational visit must be backed by purchasing power in order to be able to afford the trip cost. This is highly dependent on a person's income level after tax. Income levels of respondents will determine whether an individual visitor has enough purchasing power for visiting the beach for recreation. This cannot also be pre-determined. The higher the income of an individual the more trips the individual is assumed to take because he or she can afford it. Then the beach recreational visit will be considered as a normal good. If the relationship between income and the number of visits is negative, then the beach recreational visit is considered inferior, since as individual reduces number of visits to that particular beach and visits other alternate sites the individual considers of higher value more. Income variable was in ranges just as age and the mid-points of the ranges will then be used for analysis. The ranges were: less than GH¢ 100, GH¢ 100-200, GH¢ 201-300, GH¢ 301-400, GH¢ 401-500 and more than GH¢ 500.

3.6.6 Perceived quality variable (Q)

This variable was intended to know the perceived quality of the Elmina beach from the visitor's point of view. This represents an individual's taste and preference for that particular beach. This was a composite of variables which describes the characteristics of the Elmina beach. If the perceived quality from an individual's point of view was high, the individual was expected to make more trips to the beach. This variable measured the site from the following aspects: service, cleanliness and maintenance, entrance fee, historical significance, view, access and facilities available. This variable was ranked from 1 to 5 for all aspects. Thereafter, dummies were used to categorize data on perceived quality variable, one (1) for high level of quality good and zero (0) for otherwise.

3.6.7 Multi-purpose and multi-destination variable (MnM)

There are other locations that visitors can visit which may not be far from the Elmina beach. Visitors may also be going to more than one location aside from the Elmina beach. How these issues affect the decision to visit the Elmina beach was addressed in this work by introducing a dummy variable into the TCM. The dummy variable was MnM, where MnM=1 when trip is multi-purpose or multi-destination and MnM=0 when trip is otherwise. This variable was added when doing hypothesis testing.

3.6.8 Number of visits (v)

This measured the number of visits a respondent has made in the past year to the beach. This represents quantity in a typical demand function. It is a count and dependent variable in the model. It only assumes positive integers. This was obtained by just asking respondents how many visits they had made in the past year by choosing from the following ranges: 1, 2-6, 7-11, 12-16, 17-21, 22-26 and more than 27. The mid-points of these ranges were then used.

Data collected were both truncated and censored. Truncated because the survey intercepted individuals at the beach. It did not sample the entire population. Individuals not visiting the beach were truncated from the true population. They may include those who either did not visit the beach this particular year or those who never visit. Censored because individuals who took at least one trip were allowed to respond to the questionnaires since Whitehead et al. (2008) assumed they will have experience and will appreciate the research well. Due to time constraint, survey could not be carried out throughout the whole year. Visitors who refused to be interviewed were noted.

3.7 Data Analysis.

The data collected was entered into E-views (version 5) and Statistical Package for Social Sciences, SPSS (version 16) software packages after been coded for processing. Descriptive statistics was done to summarize and describe the data collected. Specifically, tables and cross-tabulations were used. Regression analysis was used to estimate the trip generation function (TGF) for the specified function above. The coefficients of NBML were not explained directly as one would explain OLS coefficients. For a standard negative binomial model the exponential (exp) of a coefficient showed the expected change in the dependent variable as a result of a unit change in the predictor, holding all other predictors constant (Tang, 2009). This was implied for the explanation of all predictor coefficients in the NBML.

Hypothetical entrance fees were assumed and the corresponding number of visits that were made at that fee was estimated with TGF. Increasing entrance fees were assumed to the point where the number of visits to the Elmina beach went to zero. This was used to compute the entrance fee that would bring the highest level of income. The consumer surplus was then calculated, which was the area under the demand curve. The consumer surplus was calculated for local visitors, non-local visitors and then for both, a la Blackwell et al. (2007). To analyze the factors that affect the number of visits made to the Elmina beach, the parameters in the TGF was used in terms of their signs, magnitudes and significance.

A hypothesis test was done on the coefficient of Multi-purpose and Multi-destination (MnM) variable to test whether the coefficient is statistically different from zero. If the coefficient was statistically different from zero, then the hypothesis that multi-purpose and multi-destination trips affect the decision to visit the Elmina beach would be rejected in favour of alternate hypothesis.

Another hypothesis test was conducted on the consumer surpluses for local visitors and non-local visitors to check if there is a difference between the two. Following the example of UCLA Academic Technology Services, the coefficients of TC for local as against TC for non-local can be compared by first making a dummy *Local* (where 1= visitor is local and 0 = visitor is non-local). The dummy variable, *Local*, will then be interacted with the TC variable to create a new variable *Local*TC.* The two samples of both local and non-local visitors were joined and the new *Local*TC* variable was added as a predictor. It is this new variable that was used to test the second hypothesis. If the coefficient of *Local*TC* was statistically different from zero, then there was a significant difference between coefficients for TC local and TC non-local. Hence, there was a significant difference between CS local and CS non-local.

CHAPTERFOUR

DATA PRESENTATION AND ANALYSIS

4.1 Socio-economic Characteristics

The total number of questionnaires administered was 400 out of which 284 were fully answered and were used valid for further analysis. This gave a response rate of almost 71%. From Table 4.5 in the appendix, the mean age was approximately 29 years (28.87) with 31 years as the modal age. The mean age had a standard error of 0.598. The modal level of education was tertiary. The mean monthly disposable income was GH¢ 184.51 with standard error of GH¢ 9.51849. The average annual disposable income/allowance was GH¢ 2154.9 with a standard error of GH¢ 109.

In terms of gender, 174 were males (representing 61.3%) and the remaining 110 ware females (representing 38.7%).

As regards to age, the mid-points of age ranges were used. 7 % of the 284 respondents were up to 18 years, 38.4% were between 19 and 25 years, 39.4 % were between 26 and 35 years. 7.4% were between 36 and 45 years, 5.3% were between 46 and 55 years, 1.8 % (5) were between 56 and 65 years and 0.7% (2) were above 65 years. In terms of education 180 respondents (representing 63.4%) had tertiary education, the highest in this category. The next highest was shared between basic/JHS and vocational/technical education with 31 respondents each (representing 10.9 %). The next was SHS education with 23 respondents (representing 8.1%). Those without any level of formal education were 19 (representing 6.7%).

In the case of annual disposable income/allowance, in descending order, 108 of the respondents received GH¢ 600, 93 (representing 32.7%) received GH¢ 1800, 36 received GH¢ 3000, 23 received GH¢ 6600, 16 received GH¢ 5400 and 8 received GH¢ 4200. The table below is an extract from Table 4.5 in the appendix. This table only gives the mean and standard deviations of the socio-economic variables considered in the survey.

Table 4.1: Extract from Socio-economic statistics

Characteristic	mean	Standard deviation
Age (in years)	28.85	0.598
Level of education	4.1334	0.07831
Annual income (GH¢)	2154.9	109.002

Source: Author's fieldwork

4.2 Travel Characteristics

For distances travelled, in kilometers (km), from a visitor's place of abode to the Elmina beach, the highest frequency from Table 4.4 in the appendix was 13 km which was 119 out of a total of

284 (representing 41.9%). This was followed by distance in the range up to 1 km (representing 29.6%) and 3km (representing 12.3%). The remaining categories of the distances were all under 5%.

The trip cost to the Elmina beach is summarized as follows: those who paid GH¢ 7.50 topped the frequency with a total of 103 (representing 36.3%), followed by trip cost of GH¢ 3.5 who were 83 (representing 29.2 %). Those who paid under GH¢ 1.00 followed with 28.1%.The remaining trip cost categories were all under 3%.

The minimum and maximum travel time to and spent on Elmina beach per visit was 1 hour and 14 hours respectively, with a mean of almost five and half (5.5) hours . From the survey, 164 (representing nearly 60%) out of 284 respondents spent under GH¢ 10 per visit, 19.7% spent between GH¢ 10 and GH¢ 20 and the remaining 22.6% spent above GH¢ 20. The mean level of expenditure was GH¢ 12.64. As a means of travel, the majority of respondents (74.6%) used commercial transport and the remaining 25.4% percent either used private vehicle or went by foot to the Elmina beach. Perceived level of quality was generally seen as high. A total of 187 (representing 65.8%) respondents had a high perception about the level of quality as opposed to 97 who were of the perception that the level of quality was low.

The table below summarizes the characteristics of a typical (average) visitor to the Elmina beach. A typical visitor to the Elmina beach was almost 29 years, with either vocational/technical or tertiary education (between 4 and 5), an annual disposable income of GH ¢ 2154.90, with a distance of 10.51 km from his/her place of abode to the Elmina beach. A typical visitor spends almost 3 hours to get the beach and spends almost 3 hours at the beach per visit. A typical visitor spent GH¢ 12.64 per visit while at the beach and makes 7 trips to the Elmina beach in year, using a commercial vehicle. This is summarized in Table 4.2 below:

Table 4.2: averages of respondent characteristics

Characteristic	Mean	Standard deviation
Distance to the beach	10.5106km	10.00485km
Number of visits	6.75	6.269
Trip cost	GH¢ 5.1268	GH¢ 5.23728
Length of time to site	2.57 hours	2.14 hours
Length of time on site	2.76 hours	2.03 hours
Expenditure on beach	GH¢ 12.64	GH¢ 10.57
Age in years	28.85	10.08
Education	4.1338	1.31975
Annual disposable income	GH¢ 2154.9	GH¢ 1836.94

Source: Author's fieldwork

4.3 Cross tabulations

On a whole, there was weak negative correlation (-0.393%) between trip cost and the number of visits. The correlations can be seen in Table 4.7a in the appendix. As regards to trip cost as against number of visits, the highest frequency was from those who made only 1 visit and paid GH¢ 7.5 (frequency of 44 0ut of 284), followed by those who paid a trip cost GH¢ 7.5 and made 4 visits. The cross-tabulations can be seen on Table 4.3 below.

Table 4.3: Cross-tabulations of number of visits against trip cost and socio-economic variables

		number of visits							Total
		1	4	9	14	19	24	29	
monthly income/allowance	50	23	34	29	20	1	0	3	110
	150	22	26	13	18	2	4	3	88
	250	16	12	4	1	1	0	0	34
	350	3	1	2	6	0	0	0	12
	450	7	3	0	0	0	0	0	10
	550	15	8	2	5	0	0	0	30
Total		86	84	50	50	4	4	6	284
Education	no education	0	4	5	8	0	0	2	19
	basic/JHS	2	2	3	16	3	2	3	31
	SHS	0	7	8	7	0	0	1	23
	vcational/technical	4	21	3	2	1	0	0	31
	Tertiary	80	50	31	17	0	2	0	180
Total		86	84	50	50	4	4	6	284
age in years	18	1	3	4	7	1	3	1	20
	21	12	30	30	31	2	0	4	109
	31	40	45	15	9	1	1	1	112
	41	15	5	1	0	0	0	0	21
	51	13	1	0	1	0	0	0	15
	61	3	0	0	2	0	0	0	5
	71	2	0	0	0	0	0	0	2
Total		86	84	50	50	4	4	6	284

This was followed by those who made between 14 visits with a trip cost of under GH¢ 0.50, followed by up to 4 trips with a trip cost of GH¢ 3.50.

There was a weak, but significant negative correlation (-0.183%) between disposable monthly income/allowance and number of visitors. This tends to suggest that the relationship between disposable monthly income/allowance and the number of visits is inferior. As disposable

		number of visits							Total
		1	4	9	14	19	24	29	
trip cost	0.5	0	18	17	32	3	4	6	80
	3.5	29	29	13	12	0	0	0	83
	7.5	44	34	18	6	1	0	0	103
	11.5	6	2	0	0	0	0	0	8
	14.5	1	0	0	0	0	0	0	1
	18.5	1	1	0	0	0	0	0	2
	22.5	0	0	2	0	0	0	0	2
	30.5	2	0	0	0	0	0	0	2
	34.5	3	0	0	0	0	0	0	3
Total		86	84	50	50	4	4	6	284

monthly income/allowance increases, the number of visits made to the beach reduces and switches to alternative sites the individual visitor considers normal. The highest frequency, 34, was those who made between 4 visits with a monthly disposable income/allowance of GH¢ 50.

This was followed by those who made 9 visits with a disposable income of GH¢ 50 (29), those who made 4 visits with a disposable income of GH¢ 150 (26), those who made 1 visit with GH¢ 50 (23), those who made 1 visit with GH¢ 150 (22, those who made 14 visits with disposable income of GH¢ 50 and those who made 14 visits with disposable income of GH¢ 150. The remaining frequencies in the monthly disposable income-number of visits cross-tabulations are all under 17.

There was moderate, but significant, negative correlation (-0.401) between the number of visits and age (in years). Visitors under 31 years made more visits than any other category. This relationship has been explained from the point of view that older individuals are usually more settled, either working or taking up other responsibilities that may not give them enough time for leisure. The significant cross tabulations are 31 years with up to 6 visits (85). This was followed by 21 years and between 4-9 visits (60) and 14 visits with 21 years of age.

The correlation between number of visits and education was negative at -0.504. The most significant relationship was those who made one visit in a year with tertiary level of education. They had a frequency of 80, followed by those who made 4 visits per year with tertiary education (50) and those who made 9 visits with tertiary education (31). There was also very weak, but significant, positive correlation (0.123) between the perceived level of quality and education.

4.4 Regression results

The regression result for the Negative Binomial Maximum Likelihood (NBML) estimation is presented below:

Table 4.4a: Regression result for Negative Binomial Maximum Likelihood (NBML)

variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3.994790	0.163232	24.47310	0.0000
TC	-0.026881	0.000328	-8.192396	0.0000
PS	0.001779	0.001478	1.204200	0.2285
Y	-4.73E-05	2.65E-05	-1.786032	0.0741
A	-0.023750	0.004848	-4.898629	0.0000
E	-0.228525	0.029906	-7.641499	0.0000
Q	-0.063154	0.086937	-0.726442	0.4676

Writing out the linear equation of the results above gives the following trip generating function:

$\hat{v}_{\mathrm{NBML}} = 3.99479 - 0.0269TC + 0.00178Ps - 4.73(\mathrm{E}-05)Y - 0.02375\mathrm{A} - 0.2285\mathrm{E} - 0.06315\mathrm{Q}$….eq. 4.1

$where\ E = exponential \quad R^2 = 0.461399 \qquad \text{adjusted } R^2 = 0.447739$

The result from trip generating function (TGF) estimated using the Negative Binomial Maximum Likelihood (NBML) method seen in the above table showed coefficients of travel cost, age and education were significant at the 95% confidence level. The variables that were not significant were disposable annual income, travel cost to substitute site, and perceived level of quality. At 90% all variables except perceived level of quality were significant. The overall model's fitness, as shown by the adjusted R-squared of 0.447739, was convincing since empirical evidence suggest they are usually low(Moncur, 1972; McConnell, 1992 and Whitehead et al, 2008). All variables, except the travel cost to substitute site, were negative.

The coefficients of NBML were not explained directly as one would explain OLS coefficients. For a standard negative binomial model the exponential (exp) of a coefficient shows the expected change in the dependent variable as a result of a unit change in the predictor, holding all other predictors constant (Tang, 2009). This was implied for the explanation of all predictor coefficients in the NBML. The negative coefficient of the travel cost (-0.02688) was as expected. One unit increase in travel cost results in the expected number of visits to decrease by a factor of exp (-0.02688) = 2.6914. This shows the demand relationship that as the travel cost increases by 100%, the number of visits made to the Elmina beach falls by 169.14% (269.14%-100%).

A unit increase in the level of education will reduce expected number of visits by a factor of exp$(-0.22852) = 0.796$.That is a decrease of 20.4% (100%-79.6%) The negative relationship between the level of education and the number of recreational visits means, as level of education increases the number of visits made will reduce. This is an interesting phenomenon since those with tertiary level of education were the majority respondents during the period of survey. The cross tabulation between the level of education and number of visits already explained throws more light on this. Those with higher level of education are usually employed and may not have enough leisure time. They may visit recreational sites on very few days, especially on holidays.

As age increases by one unit, expected number of visits reduces by a factor of exp (-0.023750) = 0.977. That is, a decrease by 2.3%. The negative relationship between age and the number of visits can be explained from the point of view that older individuals are usually settled, either working or taking up other responsibilities that may not give them enough time for leisure, whilst younger individuals may not be engaged in a lot of responsibilities. They are usually very active, energetic and have more time for recreation. It is therefore not surprising that the mean age was 29 years, which is youthful.

The coefficient of disposable annual income (-0.0000473), though very small, is statistically not different from zero at the 95% confidence level but statistically different from zero at the 90% confidence level. This negative relationship shows that beach recreational trip to Elmina is considered inferior. This means, a unit increase in a visitors' annual disposable income will reduce the number of visits made to the Elmina beach by a factor of exp ($-0.0000473) = 0.99995 \approx 1$. That is, almost a zero percentage decrease (100%-99.995%) The coefficient on the travel cost to alternate site (0.001779) which is statistically different from zero indicates that as the travel cost to alternate site increases by one unit, the number of trips made to other recreational sites reduces by a factor of 1.0018. That is, a percentage increase of 0.18 (100.18%-100%). Another interesting phenomenon is the negative coefficient of the perceived level of quality (-0.063154) which was not significant at both 95% and 90% confidence levels. That is, as the perceived level of quality increases, the number of visits made to the beach reduces by a factor of 0.9388. That is, a fall of 6.12% (100%-93.88%). This goes contrary to prior expectation. This could be explained from the point of view that, there are a number of substitute recreational sites that visitors may choose to visit aside the Elmina beach. Further, it has already been shown that a visit to the Elmina beach is inferior as income increases, although perceived level of quality might be increasing. The result from the OLS estimation is shown in the table below:

Table 4.4b: Regression results for ordinary Least Square (OLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.27231	1.162236	18.30292	0.0000
TC	-0.013905	0.002150	-6.468155	0.0000
PS	0.010430	0.009643	1.081587	0.2804
Y	-7.33E-05	0.000171	-0.428825	0.6684
A	-0.116364	0.032329	-3.599381	0.0004
E	-1.855901	0.224892	-8.252424	0.0000
Q	-0.801630	0.606074	-1.322660	0.1870

The linear equation that resulted from the OLS estimation is shown in the table below

$\hat{v}_{OLS} = 21.27231 - 0.013905TC + 0.010430Ps - 0.0000733Y - 0.116364A - 1.855901E - 0.801630Q$ …eq. 4.2

$R^2 = 0.455804$ adjusted $R^2 = 0.444017$

The results from the OLS estimates are shown in the regression above. The coefficients of price to substitute site, annual disposable income and perceived level of quality were all not significant at the 95% confidence level. Even at 90% level of confidence, all these three predictor coefficients were still not significant. Coefficients of travel cost, annual income, age and level of education were significant at the 95% confidence level. There is a fall in the number of visits by 0.0139, 0.1164 and 1.8556 when there is unit change in travel cost, age and level of education, respectively, while all other predictors are held constant. When all predictor coefficients are simultaneously equal to zero, the expected number of visits is 21.27 as shown by the constant in the OLS regression result above. Although OLS and NBML results cannot be compared directly, they provide very interesting insight.The adjusted R-squared for NBML (0.447739) and that of OLS (0.444017) did not show much difference. One similarity was that all predictors in both estimations had the same signs. The F-statistic in the OLS showed that all the predicting variables were not statistically equal to zero at the same time. The LR statistic in the NBML also showed the same conclusion that all the predicting variables, except the constant, were not simultaneously equal to zero. To know which model to select, the information criterion of both estimation methods must be compared. The information criterion strikes the balance between the measure of the goodness of fit and the model specification. The estimation method with the smallest information criterion is selected. All information criteria for NBML are smaller than the corresponding OLS estimates. Hence, the NBML was the preferred estimation method.

Comparing NBML estimates for local and non-local regressions below, coefficients for travel cost, travel cost to substitute site, age and education are significant at 95% confidence level for non-local visitors. All except travel cost to substitute site have negative coefficients. NBML regression results for local visitors show that only coefficients for travel cost to the Elmina beach and education are significant at the 95% confidence level. Although the coefficient for income was not significant, it showed there was a positive relationship between income and number of visits. This means, for local visitors, recreational visit to the Elmina beach was considered as a normal good.

$\hat{v}_{\text{non-local}} = 4.149663 - 0.015511TC + 0.046020Ps - 0.0000247Y - 0.035164\text{A} - 0.307027\text{E} - 0.170671\text{Q}$…eq. 4.3

$SE = (0.239234)(0.000433)(0.019137)(0.0000307)(0.006432)(0.042776)(0.112415)$

$Z = (17.34566)(-3.581932)(2.404759)(-0.803207)(-5.467425)(-7.177503)(-1.518220)$

$R^2 = 0.466834$ adjusted $R^2 = 0.447191$

$\hat{v}_{\text{local}} = 2.673582 - 0.025361TC + 0.018679Ps + 0.0000191Y - 0.004742\text{A} - 0.207021\text{E} - 0.065788\text{Q}$…eq. 4.4

$SE = (0.171812)(0.000545)(0.039745)(0.0000386)(0.006260)(0.042776)(0.102240)$

$t = (15.56109)(-4.653107)(0.469973)(0.495255)(-0.75754)(-7.177503)(-0.643467)$

$R^2 = 0.247541$ adjusted $R^2 = 0.190392$

4.5 Consumer Surplus

This section calculates the consumer surplus from the TGF from the NBML. The procedure as instructed by Blackwell et al. (2007) was used where CS/q = |1/β| where q is the number of visits in a given year and β is the coefficient of the travel cost. This procedure is used when an assumption has been made that the price is zero. This is similar to finding the area under the demand curve when price is zero. The demand function shows the relationship between the price and quantity, holding all other factors constant. For Elmina beach recreational visits, this is obtained by making all the other variables constant from the equation: $v = \beta_0 + \beta_1 TC + \beta_2 Y + \beta_3 P_s + \beta_4 A + \beta_5 E + \beta_6 Q + \varepsilon \ldots\ldots (4)$

to obtain individual demand functions for all visitors, non-local and local visitors, respectively:

$\hat{v}_{NBML} = 3.99479 - 0.0269TC \ldots eq. 4.1a$

$v_{non-local} = 4.149663 - 0.015511TC \ldots eq. 4.3a$

$v_{local} = 2.673582 - 0.025361TC \ldots eq. 4.4a$

The Elmina beach is a public site where access is almost free. Entrance fees are only charged on special occasions or holidays in the course of the year. It is therefore reasonable to assume that the 'price' is zero. The individual consumer surpluses per annum for local, non-local and all visitors are respectively shown below:

$$\frac{cs}{q} = \frac{1}{\beta_1}$$

$$\frac{CS_{local}}{q} = \left|\frac{1}{0.025361}\right| = 39.4306 \approx \text{GH¢ } 39.43$$

$$\frac{CS_{non-local}}{q} = \left|\frac{1}{0.015511}\right| = 64.4704 \approx \text{GH¢ } 64.47$$

$$\frac{CS}{q} all = \left|\frac{1}{0.0269}\right| = 37.1747 \approx \text{GH¢ } 37.17$$

Multiplying all CS per head, per annum by the total number of visitors in the year gives the CS for all visitors per annum. The total number of visitors to the Elmina beach was 25,560 as 2006 according to Komenda/Edina/Eguafo/Abirem Municipal Assembly publication This gives a total CS of GH¢ 950,065.20per annum (25,560*GH¢ 37.17). The point of interest here was to find out whether the difference of GH¢ 25.04 per annum between local and non-local visitors (GH¢64.47- GH¢39.43)was statistically significant at the 95% confidence level? This hypothesis was tested on the assumption that if there is a significant difference between the βs that were used to estimate the CS, then there would be a significant difference between the two CS estimates for local and non-local visitors.

4.6 Hypothesis Testing

Hypothesis test 1

Ho: multi-purpose and multi-destination trips do not affect the decision to visit the Elmina beach.

H_1: multi-purpose and multi-destination trips affect the decision to visit the Elmina beach.

This test was carried firstly, by adding the variable MnM (multi-purpose and multi-destination) variable to the regressors and testing whether coefficient of MnM variable was statistically different from zero at the 95% confidence level. The null hypothesis is rejected when the absolute value of the Z-statistic calculated is greater than the 95% confidence level critical value of 1.96. The result from adding MnM variable to the regressors is shown below:

Table 4.6a: Regression results with Multi-destination and Multi-purpose trip variable

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	4.043155	0.162997	24.80509	0.0000
TC	-0.026121	0.000327	-7.981907	0.0000
PS	-0.000664	0.001748	-0.380089	0.7039
Y	-5.36E-05	2.64E-05	-2.026781	0.0427
A	-0.021942	0.004863	-4.511590	0.0000
E	-0.215726	0.029882	-7.219238	0.0000
Q	-0.049889	0.086498	-0.576767	0.5641
MNM	-0.244063	0.095726	-2.549606	0.0108

$$\hat{v}_{\text{with MnM}} = 4.043155 - 0.002612TC - 0.000664Ps - 5.36\text{E} - 05Y - 0.021942\text{A} - 0.215726\text{E} - 0.049889\text{Q} - 0.244063\text{MnM}$$

$R^2 = 0.465584$ adjusted $R^2 = 0.450037$

As can be seen from the result above, the absolute value of the Z-statistic for the coefficient of MnM (2.549606) shows it is significant at the 95% confidence level**.** Ho is therefore rejected in favour of H_1. Hence, multipurpose and multi-destination trips affect the number of trips made to the Elmina beach. This coefficient is also negative showing that as the multi-purpose trips and multi-destination trips increases, the number of recreational trips made to the Elmina beach falls. The inclusion of multipurpose and multi-destination trips variable gives an individual consumer surplus of GH¢38.28 per annum. This gives an increment of GH¢ 1.11 (GH¢38.28-GH¢**37.17).**

Hypothesis test 2

> ***Ho: consumer surplus for local visitors is the same as consumer surplus for non-locals visitors who visit the Elmina beach.***
>
> ***H_1: consumer surplus for local visitors is not the same as consumer surplus for non-locals visitors who visit the Elmina beach.***

Following the example of Tang (2009), the coefficients of TC for local as against TC for non-local were compared by first making a dummy *Local* (where 1= visitor is local and 0 = visitor is non-local). The dummy variable, *Local*, was then interacted with the TC variable to create a new variable *Local*TC*. The two samples of both local and non-local visitors were joined. The **new** *Local*TC* variable was then added as a predictor. It was this new variable that was used to test hypothesis 1. If the coefficient of *Local*TC* was statistically different from zero, then there was a significant difference between coefficients for TC local and TC non-local. Hence, there was a difference between CS local and CS non-local. The table below is the result of the regression with the inclusion of Local*TC variable:

Table 4.6b: Regression result with LocalTC variable

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3.923541	0.163142	24.04983	0.0000
TC	-0.002308	0.000359	-6.421110	0.0000
PS	0.001811	0.001455	1.244439	0.2133
Y	-0.000409	0.000263	-1.555847	0.1197
A	-0.022683	0.004823	-4.703447	0.0000
E	-0.219636	0.029727	-7.388529	0.0000
Q	-0.031730	0.086798	-0.365563	0.7147
LOCALTC	-0.025459	0.010382	-2.452283	0.0142

$$\hat{v}_{NBML} = 3.9235 - 0.0023TC + 0.0018Ps - 0.0004Y - 0.0227A - 0.2196E - 0.0317Q - 0.02546\,\text{Local*TC}$$

$R^2 = 0.476338$ adjusted $R^2 = 0.461104$

The coefficient of ***Local*TC*** (-0.02546) is statistically different from zero at 95% confidence level. There is therefore a difference between TC coefficient for local and non-local visitors**.** The null hypothesis that there is no difference between local and non-local visitor CS is therefore rejected in favour of the alternate hypothesis. Hence, there is a significant difference between the CS of local and non-local visitors.

4.7 Maximum Entrance Fee

The maximum entrance fee that can be charged depends on how responsive the trip demand function is to price changes (travel cost). This is what is referred to as price elasticity of demand. With a linear function, price elasticity coefficient is between 0 and infinity. The maximum entrance fee is that which occurs at where price elasticity is one (Tang, 2009). With the individual demand function as

$$\hat{v}_{NBML} = 3.99479 - 0.0269TC$$

The trip elasticity of trip cost (price elasticity) is given as

$$\frac{\partial \hat{v}}{\partial TC} \times \frac{TC}{\hat{v}}$$

$\frac{\partial \hat{v}}{\partial TC} \approx \frac{\partial \hat{v}}{\partial f} = -0.0269$ Where f is the entrance fee per annum

The trip elasticity of entrance fee can be rewritten as

$$\frac{\partial \hat{v}}{\partial f} \times \frac{f}{\hat{v}}$$

Now using the individual function above and the trip elasticity of entrance fee, the following table is displays the various elasticities at different annual entrance fees and number of visits.

Table 4.7b: Elasticity Computation for Maximum Entrance Fee

$fee\,(f)$	$\hat{v}$	Elasticity	Remarks
GH¢ 10	3.99479	0.067338	Inelastic
GH¢ 20	3.45679	0.155636	Inelastic
GH¢ 30	3.18779	0.253153	Inelastic
GH¢ 40	2.91879	0.368646	Inelastic
GH¢ 50	2.64979	0.507587	Inelastic
GH¢ 60	2.38079	0.677926	Inelastic
GH¢ 70	2.1179	0.889088	Inelastic
GH¢ 71	2.08489	0.916068	Inelastic
GH¢ 72	2.05799	0.941112	Inelastic
GH¢ 73	2.03109	0.966821	Inelastic
GH¢ 74	2.00419	0.993219	Inelastic
GH¢ 74.1	2.00415	0.994581	Inelastic
GH¢ 74.2	1.99881	0.998584	Inelastic
GH¢ 74.3	1.99612	1.001277	Unitary elastic
GH¢ 74.4	1.99343	1.003978	Elastic
GH¢ 74.5	1.99074	1.006686	Elastic
GH¢ 74.6	1.98805	1.009401	Elastic
GH¢ 74.7	1.98536	1.012124	Elastic
GH¢ 74.8	1.98267	1.014854	Elastic

Source: Author's calculations

From table 4.3 above, the maximum entrance fee that can be charged is GH¢ 74.3 per annum or GH¢ 0.21 per day (GH¢ 74.2/365). It is at this entrance fee that the elasticity co-efficient becomes one. This figure is plausible in the sense that the Elmina beach is a public area and currently the there is no entrance fee paid to visit the beach. That is, its current entrance price is zero. Comparably, the average fee charged currently for using a public places of convenience in the country is GH¢ 0.20. So therefore, charging GH¢ 0.21 for the first time is realistic enough.

times the number of visitors in the past one year, already stated in the earlier analysis as 25,560. This gives a total annual revenue of GH¢ 4,737.6

4.8 Limitation of study

The survey for this research was supposed to be carried out during the whole year to be able to get a clearer picture of visitor characteristics to the Elmina beach. But since, the researcher was bound to finish within a particular time frame, this was not achieved. It was therefore a challenge to find an appropriate time period which could capture visitors, both local and non-local, very well. The survey was also costly as the researcher had to train and pay all expenses of 5 students for a period of two and half weeks to collect data through administering questionnaires.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATION AND CONCLUSION

5.1 Summary of findings

This research work used the travel cost method to assess the welfare value of the Elmina beach in the central region of Ghana. The specific objectives of the research included analyzing the factors affecting recreational visits to the Elmina beach, estimate consumer surplus for Elmina beach recreational visitors and compute an entrance fee that will maximize entrance income. This work also tested the two hypotheses, that multi-purpose and multi-destination trips do not affect recreational visit to the Elmina beach and secondly, there was no difference between consumer surpluses between local and non-local visitors.

The Negative Binomial Maximum Likelihood (NBML) was used to estimate the trip generating function for recreational trip to the Elmina beach. The results showed that there was a negative and significant relationship between travel cost and number of visits made to the Elmina beach for all visitors (local and non-local) in the year under consideration. This means as the travel cost increases, the number of recreational visitors reduces, which is consistent with the theory of travel cost. This shows that recreational visitors are responsive to changes in travel cost.

There was also a negative and significant relationship between the level of education and the number of recreational visits made to the Elmina beach. Most individuals with higher level of education are usually actively employed and may not have enough leisure time. They may visits recreational sites on very few days, especially on holidays and weekends.

There was also a negative and significant relationship between age and number of recreational visits. The negative relationship between age and the number of visits can be explained from the point of view that older individuals are usually settled, either working or taking up other responsibilities that may not give them enough time for leisure, whilst younger individuals may not be engaged in a lot of responsibilities. They are usually very active, energetic and may have more time for recreation.

There were other factors that become significant if the error level is increased to 10%. These factors include annual disposable income and price to substitute sites. There was a negative relationship between annual disposable income and the number of recreational visits, showing that beach recreational visits was considered inferior to visitors. There was, however, a positive relationship between the price to substitute sites and number of recreational visits. Perceived level of quality was seen as insignificant determinant. So far as this research is concerned, the most significant factors determining the number of recreational visits made to the Elmina beach are travel cost, age and the level of education.

Both null hypotheses were rejected showing that multi-purpose and multi-destination trips affect the number of recreational visits made to the Elmina beach and consumer surpluses for local and non-local visitors are not the same. This shows that the issue of multi-purpose and multi-destination is a significant factor in determining number of recreational visits made by individuals to the Elmina beach. Non-local visitors have a higher willingness to pay to visit the Elmina beach than local visitors.

An entrance fee was also computed (GH¢ 0.21 per day) which is expected to maximize the annual income to authorities.

5.2 Recommendation

a) Recommendation for future research: In future, similar research should be undertaken in other beaches by Environmental Economics researchers in the country to have estimates of the welfare value of beaches in Ghana, in general. This will also bring to the fore more significant factors that affect recreational beach visits and provide relevant information to policy makers during the process of decision making.

b) Recommendation for policy: In implementing entrance fees by local authorities, further inquiries on market acceptance and a sensitivity analysis on visitation rates as a result of the introduction of a fee needs to be carried out. Further, more problems exist relating to the inability to monitor visitors' access to the site. This is especially so at the Elmina beach as it has multiple points of entry. Efforts should therefore be made to improve monitoring at the beach by local authorities.

5.3 Conclusion

The significance of recreational visits to the Elmina beach cannot be over emphasized, as most respondents have indicated high level of significance during the survey. The consumer surplus value estimate of the recreational visits to the Elmina beach is an indicator of the flow of benefits that could be generated by this site. The welfare value of this site will help policy makers to manage this resource optimally. Frequently, policy makers find it difficult to make management decisions because they do not know the welfare value of this site as a source of recreation to visitors and what forms of development project to allow. The welfare value estimate of the Elmina beach provides the useful information for policy makers to help them get a general idea about how valuable the Elmina beach is in order to make relevant reservation policy. And it is also important for the beach managers to optimize the resource allocation in the beach development and compare with other public sites.

In the event that the government and local authorities intend charging an entrance fee for engaging in recreation at the Elmina beach, the average consumer surplus per trip estimated and computed maximum entrance fee could be used as a guide on the fee structure to gain enough funding to allocate to the development of the beach and make better improvement to the recreational environment of the beach. The average expenditure of recreational visitors, time spent on the beach and consumer surplus provides market signals to individuals who would like to engage in some form of economic activity such as providing some form of service to serve visitors. This could help improve the standard of living of such individuals by providing some form of livelihood and give them the opportunity to earn some form of income.

The results for this research have shown consistency with the literature that there is a negative relationship between travel cost and the number of visits made to a recreational site. Results have also provided information on significant factors that affect number of visits to a recreational site. All these tend to provide information which will be helpful for academic purposes in the use of the travel cost method for research.

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Appendix

Appendix A: Descriptives

Table 4.8: Travel characteristics with frequencies

Distance to beach	Frequency	Percent
1	84	29.6
3	35	12.3
8	8	2.8
13	119	41.9
18	3	1.1
23	4	1.4
28	9	3.2
33	12	4.2
38	7	2.5
43	3	1.1
Total	284	100.0

Means of travel	Frequency	Percent
commercial vehicle	212	74.6
private vehicle	48	16.9
on foot	24	8.5
Total	284	100.0

Length of time to site	Frequency	Percent
0.5hrs	86	30.3
2hrs	122	43.0
5hrs	44	15.5
7hrs	32	11.3
Total	284	100.0

Number of visits	Frequency	Percent
1	86	30.3
4	84	29.6
9	50	17.6
14	50	17.6
19	4	1.4
24	4	1.4
29	6	2.1
Total	284	100.0

Source of visit	Frequency	Percent
Local	86	30.3
non-local	198	69.7
Total	284	100.0

Length of time on site	Frequency	Percent
0.5hrs	56	19.7
2hrs	148	52.1
5hrs	50	17.6
7hrs	30	10.6
Total	284	100.0

Perceived level of quality	Frequency	Percent
Low	97	34.2
High	187	65.8
Total	284	100.0

Source: Author's fieldwork

Table 4.8: Travel characteristics with frequencies (continued)

expenditure on beach	Frequency	Percent
GH¢ 2.5	80	28.2
GH¢ 7.5	84	29.6
GH¢ 15	56	19.7
GH¢ 25	32	11.3
GH¢ 35	32	11.3
Total	284	100.0

Multipurpose and multi-destination	Frequency	Percent
No	154	54.2
Yes	130	45.8
Total	284	100.0

Trip cost	Frequency	Percent
GH¢ 0.5	84	29.6
GH¢ 2	24	8.5
GH¢ 4	62	21.8
GH¢ 6	112	39.4
GH¢ 8	2	.7
Total	284	100.0

Source: Author's fieldwork

Table 4.9: Socio-economic characteristics with frequencies

Age in years	Frequency	Percent
18	20	7.0
21	109	38.4
31	112	39.4
41	21	7.4
51	15	5.3
61	5	1.8
71	2	0.7
Total	284	100.0

Gender	Frequency	Percent
Female	110	38.7
Male	174	61.3
Total	284	100.0

Education	Frequency	Percent
no education	19	6.7
basic/JHS	31	10.9
SHS	23	8.1
vocational/technical	31	10.9
Tertiary	180	63.4
Total	284	100.0

Monthly disposable income	Frequency	Percent
GH¢ 50	110	38.7
GH¢ 150	88	31.0
GH¢ 250	34	12.0
GH¢ 350	12	4.2
GH¢ 450	10	3.5
GH¢ 550	30	10.6
Total	284	100.0

Source: Author's fieldwork

Table 4.10: Socio-economic variable statistics

	age in years	Education	monthly income/allowance	Annual income
Mean	28.85	4.1338	184.5070	2154.9
Std. Error of Mean	.598	.07831	9.51849	109.002
Median	31.00	5.0000	150.0000	1800
Mode	31	5.00	50.00	600.00
Std. Deviation	10.083	1.31975	160.40839	1836.94
Skewness	1.525	-1.242	1.245	1.290
Minimum	18	1.00	50.00	600.00
Maximum	71	5.00	550.00	6600.00
Sum	8194	1174.00	52400.00	612000

Source: Author's fieldwork

Appendix B: Regression Results

Dependent Variable: V
Method: ML - Negative Binomial Count (Quadratic hill climbing)
Date: 07/05/11 Time: 23:12
Sample: 1 284
Included observations: 284
Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
C	3.994790	0.163232	24.47310	0.0000
TC	-0.026881	0.000328	-8.192396	0.0000
PS	0.001779	0.001478	1.204200	0.2285
Y	-4.73E-05	2.65E-05	-1.786032	0.0741
A	-0.023750	0.004848	-4.898629	0.0000
E	-0.228525	0.029906	-7.641499	0.0000
O	-0.063154	0.086937	-0.726442	0.4676
	Mixture Parameter			
SHAPE:C(8)	-1.361850	0.143865	-9.466188	0.0000

R-squared	0.461399	Mean dependent var	6.753521
Adjusted R-squared	0.447739	S.D. dependent var	6.268646
S.E. of regression	4.658499	Akaike info criterion	5.239562
Sum squared resid	5989.645	Schwarz criterion	5.342350
Log likelihood	-736.0177	Hannan-Quinn criter.	5.280771
Restr. log likelihood	-1225.147	Avg. log likelihood	-2.591612
LR statistic (7 df)	978.2582	LR index (Pseudo-R2)	0.399241
Probability(LR stat)	0.000000		

Dependent Variable: V
Method: Least Squares
Date: 07/07/11 Time: 11:47
Sample: 1 284
Included observations: 284

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.27231	1.162236	18.30292	0.0000
TC	-0.013905	0.002150	-6.468155	0.0000

PS	0.010430	0.009643	1.081587	0.2804
Y	-7.33E-05	0.000171	-0.428825	0.6684
A	-0.116364	0.032329	-3.599381	0.0004
E	-1.855901	0.224892	-8.252424	0.0000
Q	-0.801630	0.606074	-1.322660	0.1870

R-squared	0.455804	Mean dependent var	6.753521
Adjusted R-squared	0.444017	S.D. dependent var	6.268646
S.E. of regression	4.674171	Akaike info criterion	5.946320
Sum squared resid	6051.862	Schwarz criterion	6.036259
Log likelihood	-837.3774	F-statistic	38.66802
Durbin-Watson stat	1.468376	Prob(F-statistic)	0.000000

Dependent Variable: V
Method: ML - Negative Binomial Count (Quadratic hill climbing)
Date: 05/18/11 Time: 10:45
Sample: 1 86
Included observations: 86-local
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
C	2.673582	0.171812	15.56109	0.0000
TC	-0.025361	0.000545	-4.653107	0.0000
PS	0.018679	0.039745	0.469973	0.6384
Y	1.91E-05	3.86E-05	0.495255	0.6204
A	-0.004742	0.006260	-0.757546	0.4487
E	-0.207021	0.042776	-7.177503	0.0430
Q	-0.065788	0.102240	-0.643467	0.5199
	Mixture Parameter			
SHAPE:C(7)	-2.335910	0.353256	-6.612517	0.0000

R-squared	0.247541	Mean dependent var	9.744186
Adjusted R-squared	0.190392	S.D. dependent var	4.705906
S.E. of regression	4.234290	Akaike info criterion	5.882813
Sum squared resid	1416.408	Schwarz criterion	6.082585
Log likelihood	-245.9609	Hannan-Quinn criter.	5.963212

Restr. log likelihood	-279.8498	Avg. log likelihood	-2.860011
LR statistic (6 df)	67.77767	LR index (Pseudo-R2)	0.121097
Probability(LR stat)	1.17E-12		

Dependent Variable: V
Method: ML - Negative Binomial Count (Quadratic hill climbing)
Date: 05/18/11 Time: 10:27
Sample: 1 198 non-local
Included observations: 198
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.149663	0.239234	17.34566	0.0000
TC	-0.015511	0.000433	-3.581932	0.0003
PS	0.046020	0.019137	2.404759	0.0162
Y	-2.47E-05	3.07E-05	-0.803207	0.4219
A	-0.035164	0.006432	-5.467425	0.0000
E	-0.307027	0.042776	-7.177503	0.0000
Q	-0.170671	0.112415	-1.518220	0.1290
	Mixture Parameter			
SHAPE:C(8)	-1.590548	0.223669	-7.111160	0.0000

R-squared	0.466834	Mean dependent var	4.464646
Adjusted R-squared	0.447191	S.D. dependent var	4.203728
S.E. of regression	3.125520	Akaike info criterion	4.572535
Sum squared resid	1856.086	Schwarz criterion	4.705395
Log likelihood	-444.6810	Hannan-Quinn criter.	4.626312
Restr. log likelihood	-640.9010	Avg. log likelihood	-2.245864
LR statistic (7 df)	392.4400	LR index (Pseudo-R2)	0.306163
Probability(LR stat)	0.000000		

Table 4.7a: Symmetric Measures for cross tabulation

	monthly income/allowance * number of visits	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.183	.047	-3.120	.002[c]
Ordinal by Ordinal	Spearman Correlation	-.207	.057	-3.557	.000[c]
	trip cost * number of visits	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.393	.030	-7.181	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.537	.043	-10.698	.000[c]
	education * number of visits	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.529	.048	-10.457	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.504	.046	-9.809	.000[c]
	age in years* number of visits	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.401	.046	-7.361	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.534	.047	-10.617	.000[c]
N of Valid Cases		284			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Appendix C: Sample Questionnaire

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF ECONOMICS

Questionnaire

This questionnaire is to elicit information from you to assist in estimating the economic value of the Elmina beach.

GUIDE TO THE RESPONDENT

I am undertaking this research to estimate the economic value of the Elmina beach and you have been carefully selected through a random sampling technique as one of the respondents for this survey. Your responses will be regarded as your own opinions and will not be subject to any inferences. Your responses will be treated with strict confidentiality. Thank you for your co-operation.

Date ________
Time ________
Code ________

Sex: ☐ Male ☐ Female

You may either tick/circle your choice or provide your response in the spaces provided.

Part 1: General information

1. Is this the first time you have come to the Elmina beach?
   ☐ Yes ☐ No

2. When was your most recent trip to this place?
   ☐ Month____ ☐ Year____

3. For what purpose have you come to this beach? _______________

4. Will you come to this beach again next year?
   ☐ Definitely
   ☐ Maybe
   ☐ Never

Part 2: Travel Cost information

5. Where is your country of origin? _________________

6. Where is your place of abode? ___________________

7. How far is your place of abode from this beach?
☐Under 1km ☐ 1 to 5km ☐ 6 to 10km ☐ 11 to15km ☐16-20km
☐21-25km ☐26-30km ☐31-35km ☐ 36-40km ☐ above 40km

8. How much did it cost you to travel to this site?
☐ less than GH¢ 1 ☐ GH¢ 2-5 ☐GH¢ 6-9 ☐ GH¢ 9-12 ☐ GH¢ 13-16
☐ GH¢ 17-20 ☐ GH¢ 21-24 ☐ GH¢ 25-28 ☐ GH¢ 29-32 ☐ above GH¢ 33

9. How many times have you visited Elmina beach during the past 12 months?
☐ 1 ☐ 2-6 ☐ 7-11 ☐ 12-16 ☐ 17-21 ☐ 22-26 ☐ more than 27

10. Name an alternate place you would have visited if you did not come to this beach
----

11. How far is this alternate site from your place of abode?
☐Under 1km ☐ 1 to 5km ☐ 6 to 10km ☐ 11 to15km ☐16-20km
☐21-25km ☐26-30km ☐31-35km ☐ 36-40km ☐ above 40km

12. What would you be doing if you did not come to this beach? ______________
☐ Work related ☐ Not work related

13. How did you travel to this beach?
☐ by commercial vehicle
☐ by private vehicle
☐ on foot
☐ other__________

14. How long does it take you on, average, to get to this beach per visit? (In hours)
☐Less than 1 ☐1-3 ☐4-6 ☐ above 6

15. How long, on average, do you stay at the beach per visit? (In hours)
☐Less than 1 ☐1-3 ☐4-6 ☐ above 6

16. How much do you spend, on average, in this beach per visit?
☐less than GH¢ 5 ☐GH¢ 5-10 ☐GH¢ 10-20 ☐GH¢ 20-30 ☐above GH¢ 30

Part 3 perceived quality of respondent and socio-economic characteristics

17. Use the following scale to rate your answers:
1=Strongly Disagree (SD), 2 =Disagree, (D) 3 =Neutral, (N) 4 =Agree, (A) 5 =Strongly Agree (SA)

		SD	D	N	A	SA
A	View in the beach is good	1	2	3	4	5
B	The beach has good service	1	2	3	4	5
C	Beach is clean and well maintained	1	2	3	4	5
D	Beach has good facilities	1	2	3	4	5
E	Entrance fee is reasonable	1	2	3	4	5
F	It is easy to access the beach	1	2	3	4	5

18. How important is this beach trip to you?
☐ not important ☐ indifferent ☐ important ☐ very important

19. What is your age? (in years)
☐ under 18 ☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66 and more

20. What is your level of education?
☐ Non ☐middle school/JHS ☐ SHS ☐ Technical/Vocational ☐ Tertiary

21. What is your approximate monthly disposable income/allowance?
☐ Less than GH¢ 100 ☐ GH¢ 100-200 ☐ GH¢ 201-300
☐ GH¢ 301-400 ☐ GH¢ 401-500 ☐ More than GH¢ 500

Thank you very much for your assistance in conducting this study by responding to this questionnaire.

Appendix D: Survey Data

Source	D	v	TC	MnM	Ps	t	Ex	Q	A	E	gender	Y	Local TC
Local	3	29	40.52	no	0	5.5	2.5	low	18	basic/JHS	male	1800	0.5
non-local	1	29	36.27	yes	0	1	2.5	high	21	no education	male	1800	0
non-local	1	24	100.52	yes	0	5.5	7.5	high	31	basic/JHS	male	1800	0
non-local	1	19	98.05	no	18.9	2.5	7.5	low	21	basic/JHS	female	1800	0
non-local	1	4	132.96	no	18.9	3.5	7.5	low	21	tertiary	female	600	0
Local	3	4	223.51	yes	0	5.5	15	high	21	tertiary	female	600	3.5
Local	3	1	223.1	yes	0	4	15	high	21	tertiary	female	600	3.5
non-local	1	4	189.29	yes	0	12	15	low	31	vcational/technical	male	600	0
non-local	1	14	98.05	yes	0	7.5	7.5	low	21	basic/JHS	male	1800	0
non-local	1	9	96.68	no	18.9	2.5	7.5	high	31	basic/JHS	female	1800	0
Local	3	4	133.1	no	18.9	4	7.5	low	31	vcational/technical	male	600	3.5
Local	3	4	183.29	yes	0	4	7.5	high	31	SHS	male	1800	7.5
non-local	1	4	37.51	yes	0	5.5	2.5	high	41	tertiary	male	600	0
non-local	1	14	36.27	yes	0	1	2.5	high	21	basic/JHS	male	1800	0
non-local	1	1	513.29	no	0	4	35	high	41	tertiary	male	1800	0
Local	13	1	327.86	no	0	4	15	high	41	tertiary	male	5400	11.5
Local	13	4	187.4	no	78.3	9	7.5	high	18	vcational/technical	male	1800	7.5
non-local	1	4	96.68	yes	0	2.5	7.5	high	18	vcational/technical	male	600	0
Local	13	1	441.29	yes	0	4	25	low	31	tertiary	female	1800	11.5
Local	33	1	465.59	yes	0	7	7.5	high	31	tertiary	female	3000	30.5
Local	43	1	506.05	yes	0	2.5	7.5	high	21	tertiary	male	3000	34.5
Local	33	1	813.12	no	78.3	9	35	high	31	tertiary	female	6600	30.5
Local	13	4	75.29	yes	0	4	2.5	high	21	SHS	male	1800	3.5
Local	23	4	315.29	yes	0	4	7.5	high	31	SHS	female	1800	18.5
Local	18	4	75.29	yes	0	4	2.5	high	31	SHS	male	1800	3.5
Local	38	9	312.05	yes	0	4	2.5	high	41	SHS	male	1800	22.5
Local	38	9	302.05	yes	0	2.5	2.5	high	21	tertiary	male	1800	22.5
Local	13	4	137.48	yes	0	4	7.5	high	31	vcational/technical	male	3000	3.5

Local	13	9	75.29	yes	0	4	2.5	high	21	vcational/technical	male	1800	3.5
Local	43	1	595.1	yes	0	4	15	low	31	tertiary	male	600	34.5
Local	13	9	72.68	no	62.1	2.5	2.5	high	21	vcational/technical	female	600	3.5
Local	13	9	120.68	no	0	2.5	2.5	high	21	basic/JHS	male	600	7.5
Local	13	1	270.68	yes	0	2.5	15	high	21	tertiary	female	600	7.5
Local	13	1	270.68	yes	0	2.5	15	high	21	tertiary	male	600	7.5
Local	13	4	225.29	no	78.3	12	15	low	21	tertiary	female	600	3.5
Local	13	1	224.05	no	0	2.5	15	high	21	tertiary	male	1800	3.5
Local	13	1	344.05	yes	0	2.5	25	low	31	vcational/technical	female	1800	3.5
Local	13	1	120.68	no	0	2.5	2.5	high	21	tertiary	female	600	7.5
Local	13	9	133.42	yes	0	7	2.5	high	31	SHS	male	4200	7.5
Local	13	9	123.42	no	0	2.5	2.5	high	21	SHS	male	3000	7.5
Local	13	4	125.75	no	0	7	2.5	low	21	vcational/technical	male	1800	7.5
Local	33	4	411.1	yes	0	7	25	low	31	vcational/technical	female	6600	7.5
Local	13	19	192.33	no	78.3	9	7.5	high	31	basic/JHS	female	600	7.5
Local	43	1	465.1	yes	0	7	2.5	low	41	tertiary	female	6600	34.5
Local	18	1	129.59	yes	0	7	2.5	low	41	tertiary	female	3000	7.5
Local	13	4	139.4	yes	0	9	7.5	low	41	tertiary	female	1800	3.5
Local	13	4	233.48	yes	0	4	7.5	high	41	tertiary	male	3000	11.5
Local	13	1	192.33	yes	0	9	7.5	high	31	tertiary	male	3000	7.5
Local	13	4	136.58	yes	0	5.5	2.5	low	31	tertiary	male	6600	7.5
Local	38	1	416.38	yes	0	7.5	15	high	31	tertiary	male	4200	18.5
Local	38	1	345.29	no	78.3	4	25	high	31	tertiary	male	1800	3.5
Local	13	4	129.59	yes	0	5	2.5	high	31	tertiary	male	4200	7.5
Local	28	1	300.14	no	62.1	10	15	high	71	tertiary	female	6600	7.5
Local	28	1	397.4	yes	0	9	25	low	61	tertiary	female	1800	7.5
Local	13	4	229.4	no	78.3	9	15	low	41	vcational/technical	male	1800	3.5
Local	13	4	345.42	no	78.3	2.5	25	high	41	vcational/technical	male	3000	3.5
Local	13	4	479.26	yes	0	7	35	low	31	vcational/technical	female	5400	3.5
Local	13	1	342.68	no	78.3	2.5	25	high	51	tertiary	female	600	3.5
Local	1	4	344.	yes	78.	2.	25	high	31	vcational/techn	male	180	3.5

	3		05		3	5				ical		0	
	3		546.		62.	1					femal	660	
Local	8	1	16	no	1	2	35	low	31	tertiary	e	0	7.5
	3		192.		62.						femal	660	
Local	8	1	05	no	1	4	7.5	high	51	tertiary	e	0	7.5
	1		189.		62.							300	
Local	3	9	59	no	1	7	7.5	high	31	tertiary	male	0	7.5
	1		231.		62.						femal	300	
Local	3	4	59	no	1	7	15	high	31	tertiary	e	0	3.5
	2		559.		78.								
Local	8	1	92	no	3	7	35	high	61	tertiary	male	600	11.5
	1		402.		78.						femal	300	
Local	3	1	33	yes	3	9	25	low	51	tertiary	e	0	7.5
		1	100.			5.						540	
Local	3	4	52	no	2.7	5	7.5	low	21	basic/JHS	male	0	0.5
non-		1				7.						540	
local	1	4	58.6	no	2.7	5	2.5	high	18	basic/JHS	male	0	0
non-		1	42.1		40.	7.						300	
local	1	4	6	no	5	5	2.5	high	18	SHS	male	0	0
	1				62.							180	
Local	3	9	73.1	no	1	4	2.5	high	21	tertiary	male	0	3.5
non-		1	98.0		40.	2.					femal	180	
local	1	4	5	no	5	5	7.5	low	21	SHS	e	0	0
non-		1	96.6		40.	2.					femal		
local	1	4	8	no	5	5	7.5	low	21	basic/JHS	e	600	0
	1		393.			2.					femal	300	
Local	3	4	42	yes	0	5	25	high	31	tertiary	e	0	7.5
non-		1	96.6		18.	2.							
local	1	4	8	no	9	5	7.5	high	21	no education	male	600	0
	2		228.		78.	2.						540	
Local	8	1	68	no	3	5	7.5	high	41	tertiary	male	0	11.5
	1		512.									540	
Local	3	1	47	yes	0	9	35	high	41	tertiary	male	0	7.5
non-			96.2		18.							300	
local	1	9	7	no	9	1	7.5	high	21	tertiary	male	0	0
			72.6		62.	2.					femal		
Local	3	9	8	no	1	5	2.5	high	21	tertiary	e	600	3.5
			223.		62.						femal	180	
Local	3	4	1	no	1	4	15	high	31	tertiary	e	0	3.5
	1		243.		62.					vcational/techn		180	
Local	3	4	1	no	1	7	15	high	31	ical	male	0	3.5
	1	1	85.4		78.								
Local	3	4	2	no	3	7	2.5	high	21	tertiary	male	600	3.5
	3		322.			5.						180	
Local	3	4	52	no	0	5	15	high	31	tertiary	male	0	11.5
	1		122.		78.	1					femal		
Local	3	9	74	yes	3	0	2.5	high	18	tertiary	e	600	7.5
	1		471.									300	
Local	3	1	59	yes	0	7	35	low	31	tertiary	male	0	3.5
		1	271.								femal		
Local	3	4	92	yes	0	7	15	low	21	basic/JHS	e	600	7.5
	1		124.			5.						180	
Local	3	4	52	yes	0	5	2.5	low	31	tertiary	male	0	7.5
	1		412.									540	
Local	3	1	19	no	0	9	25	low	51	tertiary	male	0	7.5
	1		272.		78.						femal		
Local	3	1	47	yes	3	9	15	low	51	tertiary	e	600	7.5
	1		521.		62.	1						180	
Local	3	1	51	no	1	4	35	high	31	tertiary	male	0	7.5
non-		1	189.		18.						femal	180	
local	1	4	29	no	9	4	15	low	31	no education	e	0	0

Local	3	14	136.79	no	18.9	2.5	7.5	high	21	basic/JHS	male	600	3.5
non-local	1	4	308.05	no	2.7	2.5	25	low	31	basic/JHS	male	1800	0
non-local	1	4	308.05	no	2.7	2.5	25	high	31	tertiary	female	1800	0
Local	3	14	465.29	no	18.9	12	35	low	21	tertiary	female	600	3.5
non-local	1	14	37.51	no	2.7	5.5	2.5	high	21	tertiary	male	600	0
Local	33	1	357.29	no	78.3	4	15	high	31	tertiary	male	1800	14.5
Local	13	9	120.68	no	78.3	2.5	2.5	high	21	tertiary	male	600	7.5
non-local	1	14	42.16	yes	0	7.5	2.5	low	31	tertiary	female	1800	0
Local	33	1	537.12	no	78.3	9	35	high	41	basic/JHS	male	6600	7.5
Local	13	4	522.05	no	78.3	4	35	low	51	tertiary	male	6600	7.5
Local	28	1	523.7	no	78.3	10	35	low	51	tertiary	female	3000	7.5
non-local	1	14	58.6	no	40.5	7.5	2.5	high	61	tertiary	male	600	0
non-local	1	14	42.16	no	40.5	7.5	2.5	high	21	tertiary	male	1800	0
Local	13	4	121.1	no	78.3	4	2.5	high	21	SHS	male	600	7.5
non-local	1	4	98.05	no	18.9	2.5	7.5	low	21	tertiary	female	1800	0
non-local	1	9	96.68	no	18.9	2.5	7.5	low	18	tertiary	female	600	0
Local	13	4	393.42	yes	40.5	2.5	25	high	31	tertiary	female	3000	7.5
non-local	1	14	96.68	no	18.9	2.5	7.5	high	21	vcational/technical	male	600	0
Local	28	1	180.68	no	78.3	2.5	7.5	high	31	tertiary	male	600	7.5
Local	33	1	512.47	yes	78.3	9	35	high	31	tertiary	male	600	7.5
non-local	1	4	96.27	no	18.9	1	7.5	high	21	tertiary	male	1800	0
Local	3	1	72.68	no	18.9	2.5	2.5	high	21	tertiary	female	600	3.5
Local	3	9	223.1	no	18.9	4	15	high	21	SHS	female	600	3.5
non-local	1	4	243.1	no	18.9	7	15	high	31	SHS	male	6600	0
non-local	1	14	85.42	no	18.9	7	2.5	high	31	basic/JHS	male	4200	0
Local	3	14	226.52	no	18.9	5.5	15	high	18	tertiary	male	1800	3.5
non-local	1	4	122.74	yes	0	10	2.5	high	31	tertiary	female	3000	0
non-local	1	1	471.59	yes	0	7	35	low	31	tertiary	male	5400	0
non-local	1	9	271.92	yes	0	7	15	low	21	tertiary	female	600	0
Local	8	1	124.52	yes	0	5.5	2.5	low	31	tertiary	male	1800	7.5
non-	1	4	412.	no	78.	9	25	low	31	tertiary	male	540	0

local	3		19		3							0	
Local	1	14	40.52	no	18.9	5.5	2.5	low	21	tertiary	male	1800	0.5
non-local	1	14	36.27	yes	0	1	2.5	high	21	no education	male	600	0
non-local	1	14	100.52	yes	0	5.5	7.5	high	18	tertiary	male	1800	0
non-local	1	14	98.05	no	18.9	2.5	7.5	low	18	basic/JHS	female	1800	0
non-local	1	9	132.96	no	2.7	3.5	7.5	low	18	no education	female	600	0
Local	3	4	187.51	yes	0	5.5	15	high	21	SHS	female	600	0.5
Local	3	9	187.1	yes	0	4	15	high	21	no education	female	600	0.5
non-local	1	9	189.29	yes	0	12	15	low	31	no education	male	600	0
non-local	1	14	98.05	yes	0	7.5	7.5	low	21	no education	male	600	0
non-local	1	9	96.68	no	40.5	2.5	7.5	high	31	tertiary	female	600	0
Local	3	4	133.1	no	18.9	4	7.5	low	31	no education	male	600	3.5
Local	3	9	183.29	yes	0	4	7.5	high	31	tertiary	male	1800	7.5
non-local	1	9	37.51	yes	0	5.5	2.5	high	21	tertiary	male	600	0
non-local	3	9	36.27	yes	0	1	2.5	high	18	tertiary	male	600	0
non-local	13	14	513.29	no	0	4	35	high	21	basic/JHS	male	600	0
Local	3	1	231.86	no	0	4	15	high	31	tertiary	male	5400	3.5
Local	8	4	139.4	no	18.9	9	7.5	high	21	tertiary	male	1800	3.5
non-local	1	9	96.68	yes	0	2.5	7.5	high	21	tertiary	male	600	0
Local	13	1	345.29	yes	0	4	25	low	31	tertiary	female	1800	3.5
Local	13	1	141.59	yes	0	7	7.5	high	31	tertiary	female	3000	3.5
Local	13	1	134.05	yes	0	2.5	7.5	high	21	vcational/technical	male	1800	3.5
Local	13	1	537.12	no	78.3	9	35	high	31	tertiary	female	6600	7.5
Local	3	29	40.52	no	0	5.5	2.5	low	21	basic/JHS	male	1800	0.5
non-local	1	29	36.27	yes	0	1	2.5	high	21	no education	male	600	0
non-local	1	24	100.52	yes	0	5.5	7.5	high	18	tertiary	male	600	0
non-local	1	24	98.05	no	18.9	2.5	7.5	low	18	basic/JHS	female	600	0
non-local	1	14	132.96	no	18.9	3.5	7.5	low	21	no education	female	600	0
Local	3	4	223.51	yes	0	5.5	15	high	18	vcational/technical	female	1800	3.5
Local	3	1	223.1	yes	0	4	15	high	21	vcational/technical	female	1800	3.5
non-local	1	4	189.29	yes	0	12	15	low	31	vcational/technical	male	600	0

non-local	1	19	98.05	yes	0	7.5	7.5	low	21	vcational/technical	male	600	0
non-local	1	14	96.68	no	18.9	2.5	7.5	high	21	tertiary	female	600	0
Local	3	14	133.1	no	18.9	4	7.5	low	31	no education	male	600	3.5
Local	3	4	183.29	yes	0	4	7.5	high	31	tertiary	male	1800	7.5
non-local	1	14	37.51	yes	0	5.5	2.5	high	21	tertiary	male	600	0
non-local	1	14	36.27	yes	0	1	2.5	high	21	tertiary	male	600	0
non-local	13	4	513.29	no	0	4	35	high	31	tertiary	male	1800	0
Local	28	1	231.86	no	0	4	15	high	31	tertiary	male	5400	3.5
Local	13	4	187.4	no	78.3	9	7.5	high	21	tertiary	male	1800	7.5
non-local	1	4	96.68	yes	0	2.5	7.5	high	21	tertiary	male	600	0
Local	33	1	345.29	yes	0	4	25	low	31	tertiary	female	1800	3.5
Local	33	1	141.59	yes	0	7	7.5	high	31	tertiary	female	3000	3.5
Local	38	1	134.05	yes	0	2.5	7.5	high	21	tertiary	male	1800	3.5
Local	13	1	537.12	no	78.3	9	35	high	31	tertiary	female	5400	7.5
Local	13	9	75.29	yes	0	4	2.5	high	21	tertiary	male	1800	3.5
Local	13	4	183.29	yes	0	4	7.5	high	31	tertiary	female	1800	7.5
Local	13	9	75.29	yes	0	4	2.5	high	31	tertiary	male	600	3.5
Local	13	1	132.05	yes	0	4	2.5	high	41	tertiary	male	6600	7.5
Local	13	4	74.05	yes	0	2.5	2.5	high	21	tertiary	male	1800	3.5
Local	33	1	137.48	yes	0	4	7.5	high	31	tertiary	male	3000	3.5
Local	13	9	75.29	yes	0	4	2.5	high	21	tertiary	male	1800	3.5
Local	13	1	223.1	yes	0	4	15	low	31	tertiary	male	600	3.5
Local	13	9	120.68	no	62.1	2.5	2.5	high	21	SHS	female	600	7.5
Local	13	9	120.68	no	0	2.5	2.5	high	21	SHS	male	600	7.5
Local	28	1	270.68	yes	0	2.5	15	high	31	tertiary	female	600	7.5
Local	13	1	270.68	yes	0	2.5	15	high	31	tertiary	male	600	7.5
Local	13	4	225.29	no	78.3	12	15	low	21	tertiary	female	600	3.5
Local	13	1	224.05	no	0	2.5	15	high	21	tertiary	male	1800	3.5
Local	13	1	344.05	yes	0	2.5	25	low	31	vcational/technical	female	1800	3.5
Local	13	4	120.68	no	0	2.5	2.5	high	21	tertiary	female	600	7.5
Local	2	1	133.	yes	0	7	2.5	high	31	tertiary	male	420	7.5

	3		42									0	
	2		123.			2.						300	
Local	3	1	42	no	0	5	2.5	high	18	tertiary	male	0	7.5
	1	1	125.									180	
Local	3	4	75	no	0	7	2.5	low	21	SHS	male	0	7.5
	1		411.								femal	660	
Local	3	4	1	yes	0	7	25	low	31	tertiary	e	0	7.5
	1	1	192.		78.						femal	300	
Local	3	4	33	no	3	9	7.5	high	21	SHS	e	0	7.5
	3		141.								femal	660	
Local	3	1	1	yes	0	7	2.5	low	41	tertiary	e	0	7.5
	1		81.5								femal		
Local	3	4	9	yes	0	7	2.5	low	21	basic/JHS	e	600	3.5
	1		139.								femal	180	
Local	3	1	4	yes	0	9	7.5	low	41	tertiary	e	0	3.5
	1		233.									300	
Local	3	1	48	yes	0	4	7.5	high	41	tertiary	male	0	11.5
	1		192.									300	
Local	3	4	33	yes	0	9	7.5	high	31	tertiary	male	0	7.5
	1		136.			5.						660	
Local	3	9	58	yes	0	5	2.5	low	21	tertiary	male	0	7.5
	1		284.			7.						420	
Local	3	1	38	yes	0	5	15	high	31	tertiary	male	0	7.5
			345.		78.							180	
Local	8	9	29	no	3	4	25	high	31	SHS	male	0	3.5
	1		129.									420	
Local	3	9	59	yes	0	5	2.5	high	31	SHS	male	0	7.5
	1		300.		62.	1					femal	660	
Local	3	1	14	no	1	0	15	high	71	tertiary	e	0	7.5
	1		397.								femal	180	
Local	3	1	4	yes	0	9	25	low	61	tertiary	e	0	7.5
	1		277.		78.							300	
Local	3	1	4	no	3	9	15	low	41	tertiary	male	0	7.5
	1		393.		78.	2.						300	
Local	3	4	42	no	3	5	25	high	21	tertiary	male	0	7.5
	1		527.								femal	540	
Local	3	1	26	yes	0	7	35	low	31	tertiary	e	0	7.5
	1		390.		78.	2.				vcational/techn	femal		
Local	3	4	68	no	3	5	25	high	21	ical	e	600	7.5
	1		392.		78.	2.				vcational/techn		180	
Local	3	4	05	yes	3	5	25	high	31	ical	male	0	7.5
	1		546.		62.	1					femal	660	
Local	3	1	16	no	1	2	35	low	31	tertiary	e	0	7.5
	1		192.		62.						femal	660	
Local	3	1	05	no	1	4	7.5	high	51	tertiary	e	0	7.5
	1		189.		62.							300	
Local	3	9	59	no	1	7	7.5	high	31	tertiary	male	0	7.5
	1		279.		62.						femal	300	
Local	3	4	59	no	1	7	15	high	31	tertiary	e	0	7.5
	1		511.		78.								
Local	8	1	92	no	3	7	35	high	21	tertiary	male	600	7.5
	1		402.		78.						femal	300	
Local	3	1	33	yes	3	9	25	low	51	tertiary	e	0	7.5
			100.			5.						180	
Local	3	9	52	no	2.7	5	7.5	high	21	tertiary	male	0	0.5
non-		1				7.						660	
local	1	4	58.6	no	2.7	5	2.5	low	21	tertiary	male	0	0
non-		1	42.1		40.	7.						180	
local	1	4	6	no	5	5	2.5	low	21	tertiary	male	0	0
	1		121.		62.					vcational/techn			
Local	3	4	1	no	1	4	2.5	low	31	ical	male	600	7.5

non-local	1	4	98.05	no	40.5	2.5	7.5	high	31	vcational/technical	female	1800	0
non-local	1	4	96.68	no	40.5	2.5	7.5	low	31	vcational/technical	female	600	0
Local	13	9	393.42	yes	0	2.5	25	high	21	vcational/technical	female	3000	7.5
non-local	1	14	96.68	no	18.9	2.5	7.5	high	18	basic/JHS	male	600	0
Local	13	9	180.68	no	78.3	2.5	7.5	high	21	tertiary	male	600	7.5
Local	23	1	560.47	yes	0	9	35	high	31	tertiary	male	600	11.5
non-local	1	4	96.27	no	18.9	1	7.5	high	21	tertiary	male	600	0
Local	3	1	72.68	no	62.1	2.5	2.5	high	51	tertiary	female	600	3.5
Local	3	4	223.1	no	62.1	4	15	high	21	tertiary	female	600	3.5
Local	13	4	243.1	no	62.1	7	15	high	31	vcational/technical	male	6600	3.5
Local	13	14	85.42	no	78.3	7	2.5	high	31	basic/JHS	male	600	3.5
Local	3	14	226.52	no	0	5.5	15	high	21	basic/JHS	male	600	3.5
Local	13	4	122.74	yes	78.3	10	2.5	high	31	tertiary	female	600	7.5
Local	13	1	471.59	yes	0	7	35	low	31	tertiary	male	3000	3.5
Local	13	4	271.92	yes	0	7	15	low	21	tertiary	female	600	7.5
Local	13	9	124.52	yes	0	5.5	2.5	low	31	basic/JHS	male	1800	7.5
Local	13	1	412.19	no	0	9	25	low	51	tertiary	male	5400	7.5
Local	13	1	272.47	yes	78.3	9	15	low	51	tertiary	female	600	7.5
Local	13	1	521.51	no	62.1	14	35	high	41	tertiary	male	1800	7.5
non-local	1	29	189.29	no	18.9	4	15	low	21	SHS	female	1800	0
Local	3	14	136.79	no	18.9	2.5	7.5	low	18	SHS	male	4200	3.5
non-local	1	4	308.05	no	2.7	2.5	25	high	21	tertiary	male	1800	0
non-local	1	4	308.05	no	2.7	2.5	25	high	21	tertiary	female	1800	0
Local	3	1	465.29	no	18.9	12	35	low	31	tertiary	female	600	3.5
non-local	1	29	37.51	no	2.7	5.5	2.5	high	31	basic/JHS	male	600	0
Local	13	1	273.29	no	78.3	4	15	high	31	tertiary	male	1800	7.5
Local	13	4	120.68	no	78.3	2.5	2.5	high	31	tertiary	male	600	7.5
non-local	1	14	42.16	yes	0	7.5	2.5	low	31	basic/JHS	female	1800	0
Local	13	1	537.12	no	78.3	9	35	high	41	basic/JHS	male	6600	7.5
Local	13	14	522.05	no	78.3	4	35	low	51	basic/JHS	male	600	7.5
Local	1	1	523.	no	78.	1	35	low	51	tertiary	femal	300	7.5

	3		7		3	0					e	0	
non-local	1	14	58.6	no	40.5	7.5	2.5	high	61	SHS	male	1800	0
non-local	1	14	42.16	no	40.5	7.5	2.5	high	21	tertiary	male	1800	0
Local	13	4	121.1	no	78.3	4	2.5	high	21	tertiary	male	600	7.5
non-local	1	9	98.05	no	18.9	2.5	7.5	low	21	tertiary	female	1800	0
non-local	1	4	96.68	no	18.9	2.5	7.5	low	21	tertiary	female	600	0
Local	13	4	393.42	yes	40.5	2.5	25	high	31	tertiary	female	3000	7.5
non-local	1	14	96.68	no	18.9	2.5	7.5	high	31	vcational/technical	male	600	0
Local	13	4	180.68	no	78.3	2.5	7.5	high	31	tertiary	male	600	7.5
Local	28	1	512.47	yes	78.3	9	35	high	31	tertiary	male	600	7.5
non-local	1	9	96.27	no	18.9	1	7.5	high	21	tertiary	male	600	0
Local	3	14	72.68	no	18.9	2.5	2.5	high	21	SHS	female	600	3.5
Local	3	9	223.1	no	18.9	4	15	high	21	tertiary	female	600	3.5
Local	13	4	243.1	no	18.9	7	15	high	31	vcational/technical	male	6600	3.5
Local	8	14	85.42	no	18.9	7	2.5	high	31	basic/JHS	male	1800	3.5
Local	3	9	226.52	no	18.9	5.5	15	high	21	tertiary	male	1800	3.5
Local	8	4	122.74	yes	0	10	2.5	high	31	tertiary	female	600	7.5
Local	13	1	471.59	yes	0	7	35	low	31	tertiary	male	3000	3.5
Local	8	4	271.92	yes	0	7	15	low	21	tertiary	female	1800	7.5
Local	8	14	124.52	yes	0	5.5	2.5	low	31	tertiary	male	1800	7.5
Local	13	4	412.19	no	78.3	9	25	low	31	tertiary	male	5400	7.5
non-local	1	14	40.52	no	18.9	5.5	2.5	low	21	tertiary	male	1800	0
non-local	1	4	36.27	yes	0	1	2.5	high	21	no education	male	600	0
non-local	1	24	100.52	yes	0	5.5	7.5	high	18	tertiary	male	1800	0
non-local	1	19	98.05	no	18.9	2.5	7.5	low	18	basic/JHS	female	1800	0
non-local	1	9	132.96	no	2.7	3.5	7.5	low	21	no education	female	600	0
non-local	1	4	187.51	yes	0	5.5	15	high	21	no education	female	600	0
non-local	1	9	187.1	yes	0	4	15	high	21	no education	female	600	0
non-local	1	14	189.29	yes	0	12	15	low	21	no education	male	600	0
non-local	1	14	98.05	yes	0	7.5	7.5	low	21	no education	male	600	0
non-local	1	9	96.68	no	40.5	2.5	7.5	high	31	tertiary	female	600	0

Local	3	4	133.1	no	18.9	4	7.5	low	31	no education	male	600	3.5
Local	3	9	183.29	yes	0	4	7.5	high	31	tertiary	male	1800	7.5
non-local	1	9	37.51	yes	0	5.5	2.5	high	31	tertiary	male	600	0
non-local	1	9	36.27	yes	0	1	2.5	high	21	tertiary	male	600	0
Local	13	9	513.29	no	0	4	35	high	31	tertiary	male	1800	7.5
Local	13	1	231.86	no	0	4	15	high	51	tertiary	male	5400	3.5
Local	8	4	139.4	no	18.9	9	7.5	high	21	tertiary	male	1800	3.5
non-local	1	9	96.68	yes	0	2.5	7.5	high	21	tertiary	male	600	0
Local	13	1	345.29	yes	0	4	25	Low	31	tertiary	female	1800	3.5
Local	13	4	141.59	yes	0	7	7.5	High	31	tertiary	female	3000	3.5
Local	13	4	134.05	yes	0	2.5	7.5	High	21	tertiary	male	1800	3.5
Local	13	1	489.12	no	78.3	9	35	High	41	tertiary	female	6600	3.5

Key

Source = country of origin
D = distance from place of abode to the beach
V = number of visits to the beach in the past year
TC = Travel Cost
MnM = Dummy for Multi-destination and multipurpose trips
Ps = Travel cost to alternate site
t = time cost
Ex = Expenditure on site
Q = Dummy for Perceived level of quality
A = Age in years
E = Educational level
Y = Annual disposable income/allowance
LocalTC = interaction of source and TC variables.