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Paper on

THE STRUCTURE AND LEVEL OF ENTRANCE FEE IN SERENGETI NATIONAL PARK IN TANZANIA

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Abstract

Whereas most valuation studies have provided useful insights of protected areas and their benefit in developing countries, they have typically focused more on benefit sharing than on how the adjacent local community will benefit from wildlife conservation and also they have typically focused more on estimating consumer surplus rather than on evaluating user fees as a guide toward designing improved park pricing strategies which is the focus of this paper. Many of the visitors to protected areas, such as national parks, are foreign tourists who incur few of the costs but enjoy many of the benefits stemming from resource conservation efforts. Tourism revenues, rather than being earmarked for park maintenance or resource conservation efforts, are frequently merged with other sources of general revenues.

Funding conservation activities in the Serengeti is a big problem which requires revenue management by national park that will ensure sustainability of the social ecological system. Serengeti National Park is regarded as one of the major attraction to the foreign tourists. We applied a twist in the Contingent Behavior (CB) methodology in the context of a developing country, which has never been applied in literature. We find out that as the entrance fee increases tourists tend to switch to substitute park which is the Maasai Mara Game Reserve in Kenya and the demand is elastic. In reality, the park agency is inept to charge the revenue maximizing price because of the competition from other parks, both locally and regionally. Nevertheless, the fact that we found that the fees could be increased significantly over and above the current fees to maximize the revenue collection is important.

Keywords: Serengeti, foreign, tourism, entrance fee, revenue, Contingent Behavior.

JEL Codes: Q 51, Q57

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1. Introduction

Conservation of nature is important for both utilitarian and intrinsic values. Every year around $6 billion is spent on more than 100,000 protected areas around the world (James et al. 1999, 2001; Pearce 2005). Conservation in many of the African countries differs in terms of approaches but it is generally accepted that no matter what system is adopted all aim at protecting the resources in an optimum condition, as would be practicably possible through application of the most contemporary acceptable methodologies. All aim to balance development that assures acceptable levels of resource impacts while taking into consideration benefit to local communities.

Proactive communities and the private sector are key dimensions to ensure this achievement in the real sense. Presently, conservation aims at enhancing satisfaction of tourists through increasingly diversified activities at a high quality with very minimum negative impact to the resources. The largest challenge, however, is to balance resources utilization with development of different facilities in line with community needs.

A growing body of literature has emphasized the role of user fees in the management of national parks and protected areas, primarily in developed countries (Chase et al 1998, Alpizar 2006, Krug et al 2002). In developing countries seeking to balance environmental and economic growth objectives, the challenges facing policymakers are particularly great. Government funds are typically in short supply and enforcement of environmental regulations is negligent or non-existent.

Many of the visitors to protected areas, such as national parks, are foreign tourists who incur few of the costs but enjoy many of the benefits stemming from resource conservation efforts. Tourism revenues, rather than being earmarked for park maintenance or resource conservation efforts, are frequently merged with other sources of general revenues. "Yet, without user fees to effectively capture eco-tourism revenues, alternative land uses that provide greater short-run returns-such as logging, agriculture, and cattle g razing-will often be pursued on public as well as private lands" (Chase et al 1998). The result is often deforestation, soil erosion, watershed degradation, and irreversible loss of biodiversity (Southgate and Whitaker 1994).

Since the market fails to reflect these environmental costs, fewer wildernesses are preserved than is optimal (Dixon and Sherman 1990). Under these circumstances, the potential benefits from charging user fees to national parks are significant. User fees are one tool to capture for the public the benefits of ecotourism which often accrue primarily to the private sector. They also can be used to reduce visitation in areas that suffer from overuse and accompanying ecological damage. Some experimentation has occurred (Bamford et al. 1988), but these opportunities have been limited because of the practical difficulties in convincing policy makers to allow for such experiment.

In countries where the majority of the population lives in poverty, peoples' willingness to pay (WTP) for conservation is generally low, so alternative strategies to finance conservation are urgently needed to reduce or stop the current rate of biodiversity loss (Krug et al 2002). "Studies show that societies in rich nations are concerned about wild species and habitats in Africa and are willing to pay for their protection. The challenge is to create mechanisms and institutions to capture this form of international WTP and to channel these values into African conservation" (Krug et al 2002).

Achieving conservation requires mitigating problems such as natural resource consumption, and human population growth which requires solutions that address these problems simultaneously. In finding solutions for conservation, there are often difficult trade-offs between conservation and other social goals such as development, and between anthropocentric and bio centric goals. One example of an area where such trade-off are thought to exist is the Serengeti[2] ecosystem. Serengeti National Park is the part of the larger Serengeti ecosystem. It is managed by Tanzania National Parks and has the area of 14,763 km^2.

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[2] The name "Serengeti" is an approximation of the word used by the Maasai to describe the area, siringet, which means "the place where the land runs on forever."

However, governments in poor countries such as Tanzania cannot afford to fully finance conservation due to budgetary constraints. There is an increasing pressure on park managers to find alternative financing mechanisms. They need financial resources for general park management. They need financial resources for sharing with adjacent communities as compensation for their role in supporting conservation.

There are significant opportunities for generating more revenues by reforming the tariff structures for amenities produced by national parks. However little experience exists, particularly in these developing countries, to guide park managers in designing effective pricing strategies for protected areas. In our context there is a need to help the Serengeti National Park to design an appropriate structure and level of entrance fee that they should implement hence the objective of this paper. This paper uses a contingent behavior (CB) methodology to generate experimental data to assess the effects of differential pricing of entrance fees to Serengeti national parks in Tanzania.

2. Ecotourism in Tanzania

Ecotourism is becoming more popular among the tourists. Ecotourism presents developing countries with increasing opportunities for improving resource conservation and economic growth, but also raises management and policy challenges. Africa hosts some of the world's most biodiversity rich areas, but many African countries find it difficult to maintain their biodiversity due to increasing land use pressures and insufficient conservation funds and Tanzania is no exceptional. The continuing conversion of natural habitat to agriculture and other uses is the main reason for the dramatic loss of biological diversity. Faced with many social and economic problems, governments are forced to cut their environmental budgets in favour of other priorities (Ministry of Natural Resources and Tourism 2002).

Tanzania is richly endowed in natural beauty, but most of its inhabitants are poor that is 28% of the population live below the national basic needs poverty line (Tanzania household budget survey 2011/12). Tourism presents an opportunity to capitalize on the world-class concentrations of wildlife. Tourism offers the potential to earn substantial income from these resources.
While developing countries like Tanzania may lack industrial and technological capital that other countries have used to develop their economies, its natural capital can be used as a comparative advantage. The Tanzanian government recognizes the potential the country holds; the Ministry of Natural Resources and Tourism has stated, "Tanzania is exceptionally well endowed with the type of natural resources that provide the raw material from which tourism attractions and products are fashioned" (Ministry of Natural Resources and Tourism 2002). The global tourism industry's size alone makes it impossible for any country to ignore as a possible income generating activity; claims differ, but tourism is generally agreed to be in the top five or six sectors in terms of overall value worldwide.

Conservation of eco-systems and tourism development in all areas designated as national parks is the core business of the Tanzania National Parks. Nature-based or wildlife tourism is the main source of income that is ploughed back for management, regulation and fulfilment of all organizational mandates in the national parks. The primary role of Tanzania National Parks is conservation.

The 16 national parks which are in Tanzania, many of which form the core of a much larger protected ecosystem, have been set aside to preserve the country's rich natural heritage and to provide secure breeding grounds where its fauna and flora can thrive, safe from the conflicting interests of a growing human population. TANAPA is particularly charged with functions of: Protection of natural resources, park facilities and tourists visiting the parks, Park management and development, Ecological and wildlife health monitoring, Tourism development and Community involvement in conservation efforts.

It is the responsibility of TANAPA to ensure security and safety of visitors, park inhabitants, wildlife and park infrastructures. Although security is the responsibility of every park inhabitant, the Organization has rangers who are directly responsible for this. To ensure that rangers are equipped with the right skills to execute their duties, different kinds of training are conducted and equipment procured to ease their tasks. Training focuses on wildlife protection, strategic field patrol methods, intelligence gathering operations and use of modern intelligence and security equipment.

Average annual growth of tourist numbers in Tanzania for the five years from 2008/2009 to 2012/2013 was 55,712 which is 8.1 %. Annual revenue growth for the same period was TZS 12.11 billion, which is 10.9 %. This has been made possible through efforts made by the Organization to market the unique attractions the country is endowed within its national parks as well as ever improving customer services offered by TANAPA employees and other stakeholders in the hospitality industry.

In 2012/2013, the number of tourists recorded in our National Parks was 901,892, of which 537,675 were foreign tourists and 364,217 were locals. Likewise, revenue generated was TZS 124.806 billion in the year 2012/2013 which is an increase of 0.04% compared to the previous year's revenue which was TZS 124.758 billion.

Parks arrivals highlights

Table : Number of tourist arrivals to parks for the year 2012/2013				
S/N	PARKS	FOREIGN	DOMESTIC	TOTAL
1	ARUSHA	33106	33702	66808
2	GOMBE	1094	760	1854
3	KATAVI	1512	1623	3135
4	KILIMANJARO	54584	3876	58460
5	KITULO	117	292	409
6	LAKE MANYARA	126124	52349	178473
7	MAHALE MOUNTAINS	1032	42	1074
8	MIKUMI	20308	21358	41666
9	MKOMAZI	597	990	1587
10	RUAHA	12963	8304	21267
11	RUBONDO ISLAND	492	256	748
12	SAADANI	4185	11230	15415
13	SERENGETI	175356	160821	336177
14	TARANGIRE	102140	59652	161792
15	UDZUNGWA MOUNTAINS	3878	3871	7749
16	SAANANE	187	5091	5278
	TOTAL	**537,675**	**364,217**	**901,892**

Source; Tanzania National Parks Authority (2014)

The Serengeti is one of the most famous national parks and tourist destination in the world, with 150,000 visitors in the financial year 2003-4. This tourism contributes considerable economic benefit to the nation, with revenues from SENAPA amounting to Tsh 5,500 million for 2003/4. In terms of revenue generation, the Serengeti National Park is second to only Kilimanjaro National Park, and together the two parks account for about 77% of TANAPA's total revenue (Gereta et al., 2003).

The neighbouring district authorities also benefit through tax revenue and levies; for example, the Serengeti District Authority collects about Tsh 1,100 million per annum from five hotels/ camps operating within the Park. Tourist shops in the Park generate a further Tshs 4 million per annum in terms of taxes (Gereta et al. 2003).

The communities neighbouring the Park receive direct economic benefit predominantly through employment with SENAPA departments and tourist facilities; both within the Park and the neighbouring community areas. Another area of direct economic benefit comes from the SENAPA Revenue Sharing Programme, which provides a percentage of Park fees through the Support to Community Initiated Projects (SCIP). In line with TANAPA's Support for Community Initiated Projects (SCIP), the communities adjacent to the Park are given technical, material and financial assistance to implement community based development projects, such as the construction of school, health and water facilities and feeder roads to villages.

The total value of the SCIP projects contributed to by the Park since the start of the scheme in 1992 is about US$ 1,082,000(Document on Serengeti National Park general Management Plan 2006-2016). The SENAPA Community Outreach Department also has a very strong and active conservation education programme, which encourages and supports conservation clubs in over 70 primary schools surrounding the Park. In particular, SENAPA provides educational materials for students including maps, posters and activity books and holds regular teacher training workshops to increase teachers' ability to convey conservation ideas to their students.

Map of Serengeti National Park showing delimitation of the study area.
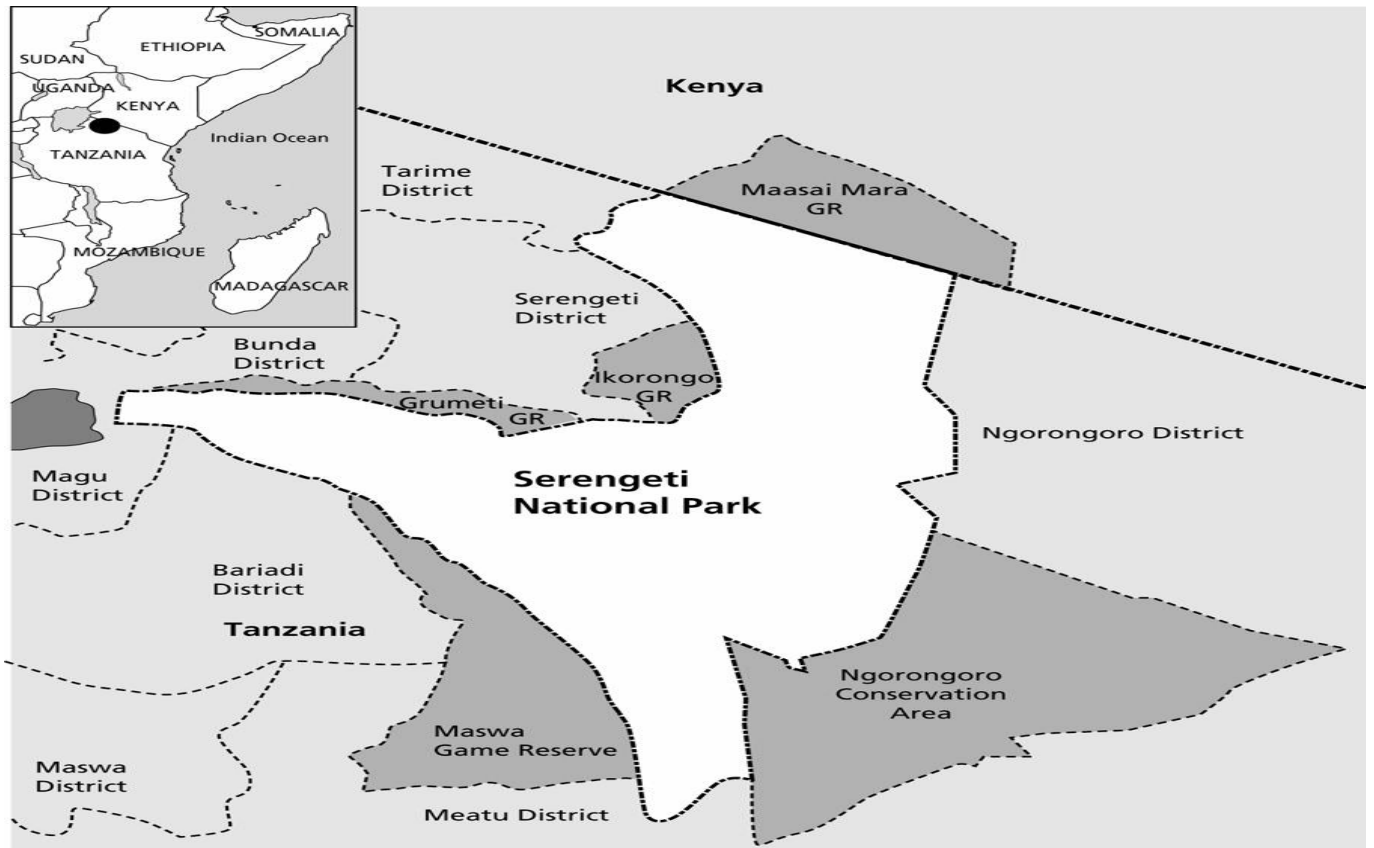
Source; Kideghesho, JR, (2006)

3. Methodology

Motivating the Contingent Behaviour

Chase et al (1998) argued that; there is an emerging, though growing body of literature that focuses on valuing ecotourism and wilderness areas in developing countries, the primary approaches used in these studies were travel cost (TC) and contingent valuation (CV). Where data constraints are typically greater and eliciting consumers' valuations of environmental amenities has proven more problematic (Schultz et al. 1997).

Chase et al. (1998) further argued that, the travel cost approach derives a demand curve for recreational use values in a specific protected area based on travel expenses for a vacation in that park. It is expected that there will be more tourists visiting from nearby and fewer coming from greater distances where travel costs are higher. Thus a demand curve for a park can be derived based on the relationship between travel costs and the corresponding amounts of visitation. This method, though long used in developed countries, has limitations, particularly in applications to multiple destination trips (Pearse 1968). In addition, the assumption that visitors from each origin are homogeneous in marginal costs and preferences and other assumptions of the method are questionable (Wennergen 1964).

To circumvent such limitations studies that have estimated use values of protected areas in developing countries have often excluded non-residents (Durojaiye and Ipki 1988; Tobias and Mendelsohn 1991) or if foreign visitors are included, restrictive simplifying assumptions have been imposed (Mungatana and Navrud 1994).

On the other hand, contingent valuation relies on surveys containing hypothetical scenarios in order to place values on goods that cannot be priced directly through a market (Cummings et al. 1986). Thus, CV has more flexibility than TC in that a survey can be designed to elicit many different types of values, not only the use value of a specific area such as a national park.

Using conventional CV survey techniques, it has often not been possible to collect the data necessary to estimate an unrestricted system of demand equations including cross-price elasticities - which can then to be used in designing effective differential pricing policies (Brown 1994). To accomplish this, a contingent behaviour approach is employed in this study to generate experimental data to assess the structure and level of entrance fees to Serengeti national park in Tanzania.

The CB approach has been applied in several previous studies, including those by Ward (1987), Loomis (1993), Adamowicz et al. (1994), Layman et al. (1996) and Chase et al. (1998). A stated preference approach to the estimation of visitation demand can be used that presents respondents with an array of sites and characteristics and asks them which site they would visit (Adamowicz et al. 1994).

The CB approach used in our study specifies a change in entrance fees at one park and asks how visitation patterns would change at a substitute park. The responses provide data that allow for the estimation of price elasticity and also in the estimation of demand function. This is necessary in order to fully understand the effects of change in entrance fee on park visitation patterns.

Model

A commonly used economic model of resource valuation suggests that a representative consumer maximizes a direct utility function

$$(U) = U(X, Q), s.t$$
$$M = P_X X + P_Q Q$$

Where: X is a vector of commodities; Q is the quantity of an environmental amenity (in this case, visits to national parks in Serengeti); M is consumer income; Px is a vector of commodities' prices; and PQ is a price vector of entrance fees for visits to national parks. Maximization of the above constrained utility function yields individual demand curves, and aggregation across the market yields the aggregate demand curve for Q: $Q = Q (M, Px, P_Q)$.

Based on the theory and past empirical studies, aggregate demand curve for national park visitation in Serengeti is expected to be a function park's entrance fee as well as the entrance fees of other park and attractions, park visitors' incomes, demographic characteristics, and trip-related factors.

The demand function can be written in general form as:

Q= Q (P, M, Z)

Where;

Q = visitation at Serengeti National Park (in days);

P = vector of entrance fees at Serengeti and competing parks (in dollars);

M = park visitors' income (1,000 dollars); and

Z = demographic and trip-related characteristics.

The demographic and trip-related characteristics that will be incorporated in the demand equations include visitor age, education, nationality, and whether the visitor was part of a tour.

We wish to look on the utility one derives from visiting the Serengeti National Park. This is the utility of going. Therefore the logit model is used in our estimation.

Generic Model

We derive the utility of an individual going to Serengeti National Park compared to that of not going.

It is assumed that the utility of going is linear in explanatory variables; thus the model is specified as

$$Y_i = X_i \beta + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1)}$$

Where Y_i is the utility of visiting Serengeti National Park,

X_i is a vector of explanatory variables,

and ε_i is the random error term.

Y_i is considered to be a discrete (dichotomous) variable, taking a value of 1 or zero if the answer to the question regarding whether an individual is willing to go is YES or NO respectively. Y_i is motivated by a latent variable, y*.

Thus,

$$Y_i = 1 \text{ if } y_i^* > 0 \text{, and } Y_i = 0 \text{ if otherwise}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

The latent variable y_i^* is assumed to be a linear function of the explanatory variables X_i and unobserved error variable ε

$$y_i^* = \alpha + \beta_i X_i + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3)}$$

If we arbitrarily assume a logistic distribution for ε, then we can define the probability of a person to answer YES as π_i and NO as $1 - \pi_i$.

This probability is derived as follows:

$$\pi_i = \Pr(Y_i = 1) = \Pr(y_i^* > 0) = \Pr(\alpha + \beta_i X_i + \varepsilon > 0) = \Pr(\varepsilon_i < \alpha + \beta_i X_i) \dots\dots \text{ (4)}$$

Where the distribution of Y_i is a Bernoulli distribution[3] with parameter π_i represented by equation (4), with a mean=π_i and a variance=$\pi_i(1 - \pi_i)$.

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[3] In probability theory and statistics, the Bernoulli distribution, is a discrete probability distribution, which takes value 1 with success probability p and value 0 with failure probability $q = 1 - p$. So if X is a random variable with this distribution, we have:

$$\Pr(X = 1) = 1 - \Pr(X = 0) = 1 - q = p.$$

The probability mass function f of this distribution is

$$f(k; p) = \begin{cases} p & \text{if } k = 1, \\ 1 - p & \text{if } k = 0, \\ 0 & \text{otherwise.} \end{cases}$$

This can also be expressed as

$$f(k; p) = p^k (1 - p)^{1-k}.$$

The expected value of a Bernoulli random variable X is $E(X) = p$, and its variance is

$$\Pr(Y_i = y_i^*) = \pi_i^{y_i^*}(1 - \pi_i)^{1-y_i^*} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (5)$$

For the logistic model, both the mean and variance depend on the underlying probability π_i.

Hence, any factor that affects the probability will automatically alter the mean and variance of the observation. This limitation implies that a linear model that allows the predictions to affect the mean while the variance remains constant is inadequate for analysis of binary data.

Thus, the logit model (Gujarati, 1988; Hosmer and Lemesher, 1989) is specified as in equation (6) below and used for estimation:

$$\text{logit}(\pi_i) = \ln\left(\frac{\pi_i}{1 - \pi_i}\right) = \alpha + \beta_i X_i + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (6)$$

Specifically we wish do the following;

$$prob(Going = 1) = \frac{\exp(y^*)}{(1 + \exp(y^*))} = \delta \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (7)$$

Where $y^* = \alpha^* + \beta_i^* \bar{X}_i$; α^* and β_i^* are estimated coefficients

Thus, the empirical model for estimation is specified as

$$Ugo = \beta_0 + \beta_1 TotalCost + \beta_2 Income + \varepsilon_{going} \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (8)$$

Where, Ugo is a binary dependent variable (which takes the value 1 for the yes answer and 0 for the no answer.

$$\text{var}(X) = p(1 - p).$$

How much can a person willing to Visit Serengeti National Park before one is indifferent is when

if $Ugo = Unogo \Rightarrow \hat{\beta}_0 + \hat{\beta}_1 TotalCost + \hat{\beta}_2 Income + \varepsilon_{going}$ …………………… (9)

Utility of not going is $0 + \varepsilon_{nogo}$

Thus taking expectations we will have,

$\hat{\beta}_0 + \hat{\beta}_1 TotalCost + \hat{\beta}_2 Income = 0$ ……………….. (10)

If we suppress the role of income we will have the following;

$\hat{\beta}_0 = -\hat{\beta}_1 TotalCost$

$-\dfrac{\hat{\beta}_0}{\hat{\beta}_1} = TotalCost$ ……………………………………………(11)

Hence the person is indifferent, and it is this equation that will be fundamental in explaining the switching behavior of the tourists.

4. Data, Sampling and Survey

To get the data for estimating the visitation demand function for Serengeti national park, we made use of the Contingent Behaviour (CB) approach. We have adopted the CB model similar to the one used by Chase et al (1998). In our context, the CB approach generates experimental data to assess the effects of changes in entrance fees to the Serengeti national park taking into account the substitutability with the Maasai Mara Game Reserve across the border. We have interviewed tourists in both Serengeti and Maasai Mara. This has been done as part of an on-going project by the Environment for Development Initiative in Kenya, South Africa and Tanzania.

A random sampling technique of foreign tourists was surveyed in Serengeti national park in Tanzania. Primary data were collected through in-person interviews conducted in 2013 and 2014 during Serengeti peak tourist season. The study reported here is based on a total of 539 usable surveys of foreign visitors. It was decided that in-person interviews should be conducted in order to ensure full understanding and completion of the questions.

The interview began with questions about the tourists' views about protection of wildlife and experiences in Africa and its national parks. Information on actual park fees paid, opinions regarding "appropriate" fee levels, and willingness to pay for higher fees was collected. In the last case, the respondent was asked, "If the entrance fee were increased only at this park, how high the daily entrance fee per person would have to be so that you would choose not to visit this park?"

Many respondents had visited or were otherwise familiar with the national parks in question and had little difficulty stating if and how their visitation plans would change. Those that did have problems were able to understand the question after discussing it with the interviewer. While time consuming, it was possible to elicit responses to these hypothetical questions through a combination of in person interviews and a chart visible to both the interviewer and respondent. Finally, standard demographic information (household income, nationality, age, education, etc.) was also collected.

5. Empirical Findings

We present a brief discussion of the empirics in Serengeti National Park in Tanzania.

Descriptive Analysis

Characteristics of the Sample

The data collected from 539 observations (international tourists) were coded and analyzed using STATA 12. These simple statistical analyses produced means and other statistics, cross-tabulations, and percentage frequencies that are presented in this section. The descriptive statistics of the variables used in the study are summarized in Table 1.

Of the 539 respondents surveyed from the data 286 (53.06 %) were male and 253 (46.94%) were female. Table 1 shows that the average age of the respondents is 43 years, implying a middle-aged respondents, which was more likely to be better placed at understanding the questions than it would have been the case with a younger or older individuals. The education status suggests that a majority of the respondents had achieved at least a minimum level of schooling; i.e., the majority attained, at the highest, primary education. The income from all sources of the majority of respondents is between US\$ 50,001 to US\$ 100,000 and the average size of the number of households accompanying the tourist is about 2 people (1.6)

Table 1; Descriptive Statistics of some of the variables used in the Study

Variable	Mean	Sd	min	max	N
Age	43.12	15.02	15	88	539
Household(accompanying the tourist)	1.607	1.886	0	18	540
Income(US$ 0-50,000)	0.126	0.332	0	1	524
Income(US$ 50,001-100,000)	0.410	0.492	0	1	524
Income(US$100,001-200,000)	0.321	0.467	0	1	524
Income(over US$ 200,000)	0.143	0.351	0	1	524
Gender(male dummy)	0.531	0.500	0	1	539
Nights spent so far in Serengeti	2.111	1.355	1	11	539
total nights to be spent in Serengeti	3.128	1.401	1	11	539
Price(cost of trip)1(choice of Serengeti)	0.0451	0.208	0	1	399
price(cost of trip)2(choice of Serengeti)	0.0326	0.178	0	1	399
price(cost of trip)3(choice of Serengeti)	0.922	0.268	0	1	399
Visit(recommendation by friend)1(choice of Serengeti)	0.0253	0.157	0	1	434
Visit(recommendation by friend)2(choice of Serengeti)	0.429	0.495	0	1	434
Visit(recommendation by friend)3(choice of Serengeti)	0.546	0.498	0	1	434
Reason(recommendation by travel agent)1(choice of Serengeti)	0.0683	0.253	0	1	439
Reason(recommendation by travel agent)2(choice of Serengeti)	0.308	0.462	0	1	439
Reason(recommendation by travel agent)3(choice of Serengeti)	0.624	0.485	0	1	439
uniqueness1(choice of Serengeti)	0.0160	0.126	0	1	312
uniqueness2(choice of Serengeti)	0.554	0.498	0	1	312
uniqueness3(choice of Serengeti)	0.429	0.496	0	1	312
Package(other elements of tour package)1(choice of Serengeti)	0.0447	0.207	0	1	246
Package(other elements of tour package)2(choice of Serengeti)	0.626	0.485	0	1	246
Package(other elements of tour package)3(choice of Serengeti)	0.329	0.471	0	1	246
Outside Serengeti(%spent)	39.36	19.62	0	100	537
Travel cost	2288	1405	200	13000	539
Individual cost(total cost)	5092	3005	820	26000	539
New total cost	5359	3012	0	26500	540
Highest cost increment	208.1	238.4	10	2600	539

From the table above we can see that most of the tourists go to Serengeti National Park because of its uniqueness and this is the motivation behind the visit to Serengeti National park. Uniqueness is ranked with the highest importance. Moreover other elements of the Safari package also plays a role on the motivation of an individual to choose Serengeti. Though they rank it as a moderate reason.

Park pricing for Serengeti is different from other parks and we find that price provides a reason as to why people choose Serengeti though the reason behind the price is ranked as moderate about. The recommendations by travel agent and friends do play part in one's decision but not to a large extent.

Moreover on the answering the question if an individual will still choose Serengeti if there is entrance fee increase. The table shows that if there is an increase in entrance fee the tourist will still choose Serengeti. Almost 71% will still choose to visit Serengeti. This can be attributed by its uniqueness.

Also we looked on tourists and where they are coming from so as to see which regions represent more tourist in visiting the national Parks. Here we compared the Serengeti National Park and its substitute which is Maasai Mara Game Reserve. The following tables illustrate;

Table 2; Tourists visiting Serengeti National Park

Regions where tourist come from	Freq.	Percent	Cum.
Australia	46	8.53	8.53
Europe	303	56.22	64.75
North America	139	25.79	90.54
Asia	25	4.64	95.18
South America	6	1.11	96.29
Africa	10	1.86	98.14
New Zealand	10	1.86	100
Total	539	100	

As we can see the majority of the tourists visiting the Serengeti National Park come from Europe (56.22%) followed by the North America (25.79%). It is therefore important for the park authorities to envisage the means of attracting more tourists from other regions and also get more of them from these leading regions.

For the substitute Park which is Maasai Mara we have also the large proportion of tourists coming from Europe (48.5%) followed by North America (26.43%) as shown in table 3 below.

Table 3; Tourists visiting Maasai Mara Game Reserve

Regions where tourist come from	Frequency	Percent	Cumulative
Australia	12	3.27	3.27
Europe	178	48.5	51.77
North America	97	26.43	78.2
Asia	52	14.17	92.37
South America	4	1.09	93.46
Africa	23	6.27	99.73
New Zealand	1	0.27	100
Total	367	100	

Upon comparing the choice of the tour package according to the regions where tourists come from if there is an increase in entrance fee in both national parks we have the following results.

Table 4; Choice of the same tour Package due to an increase in entrance fee in Serengeti

Choice of the same package (for Serengeti)	Australia	Europe	North America	Asia	South America	Africa	New Zealand	Total
No	13	101	26	6	2	4	3	155
Yes	33	202	113	19	4	6	7	384
Total	46	303	139	25	6	10	10	539

From the above table we can see that the large proportion of the tourists would still choose the same tour package if there is an increase in entrance fee Europeans and Americans being the leading tourists opting that.

For Maasai Mara we see that though it is a substitute park the tourist would still choose the same tour package to remain in game reserve as the table below indicates.

Table 5; Choice of the same tour Package due to an increase in entrance fee in Maasai Mara

Choice of the same package (for Masai Mara)	Australia	Europe	North America	Asia	South America	Africa	New Zealand	Total
No	2	40	24	22	3	9	0	100
Yes	10	137	73	30	1	14	1	266
Total	12	177	97	52	4	23	1	366

Furthermore, if there is an increase in cost in Serengeti National Park the tourist would still choose Serengeti over the substitute park which is Maasai Mara. Almost 66% of the respondents said they would still choose Serengeti. Table 6 below provides a summary.

Table 6; Choice between Serengeti and Maasai Mara

Choice	Frequency	Percent	Cumulative
Mara	182	33.77	33.77
Serengeti	357	66.23	100
Total	539	100	

If we look on the choice according to the regions the table below shows that most of the tourist from Europe and America would still choose Serengeti over the substitute park which is Maasai Mara. This could be attributed by the uniqueness nature of Serengeti National park.

Table 7; Choice according to the Regions visiting Serengeti

Choice	Australia	Europe	North America	Asia	South America	Africa	New Zealand	Total
Mara	18	102	44	9	2	2	5	182
Serengeti	28	201	95	16	4	8	5	357
Total	46	303	139	25	6	10	10	539

For substitute Park which is Maasai Mara Game Reserve the distribution is as follows;

Table 8; Choice between Serengeti and Maasai Mara

Choice	Frequency	Percent	Cumulative
Mara	237	64.75	64.75
Serengeti	129	35.25	100
Total	366	100	

Table 9; Choice according to the Regions visiting Maasai Mara

Choice	Australia	Europe	North America	Asia	South America	Africa	New Zealand	Total
Mara	9	120	53	35	3	17	0	237
Serengeti	3	57	44	17	1	6	1	129
Total	12	177	97	52	4	23	1	366

From the above tables we can see that, the tourists tend to stick on the same national park they first visited. In other words we can say that the sensitivity to increase in the entrance fee is low and tourists can afford to pay higher as they derive high utility in wildlife amenity. Therefore the park authority can slightly increase the entrance fee so as to generate more revenues.

Furthermore if we look on the behavior of the tourist to switch as the entrance fee increases (focusing on Serengeti National Park) we find out that higher the entrance fee prompts tourist to switch to substitute park. The following table illustrates.

Entrance Fee	No	Yes	Total	% of Tourist who will go to Serengeti
10	1	14	15	93.33333333
25	1	10	11	90.90909091
50	19	92	111	82.88288288
75	24	84	108	77.77777778
100	30	72	102	70.58823529
125	33	61	94	64.89361702
150	47	51	98	52.04081633
Total	155	384	539	

Moreover we wanted to know that if the behavior of the tourists follow the rationality of the consumer behavior if there is an increase in price of the commodity. In our case we looked on the behavior of the tourists if there is an increase in entrance fee.

The following graph show the demand function when you increase the entrance fee in Serengeti National Park

Graph 1;
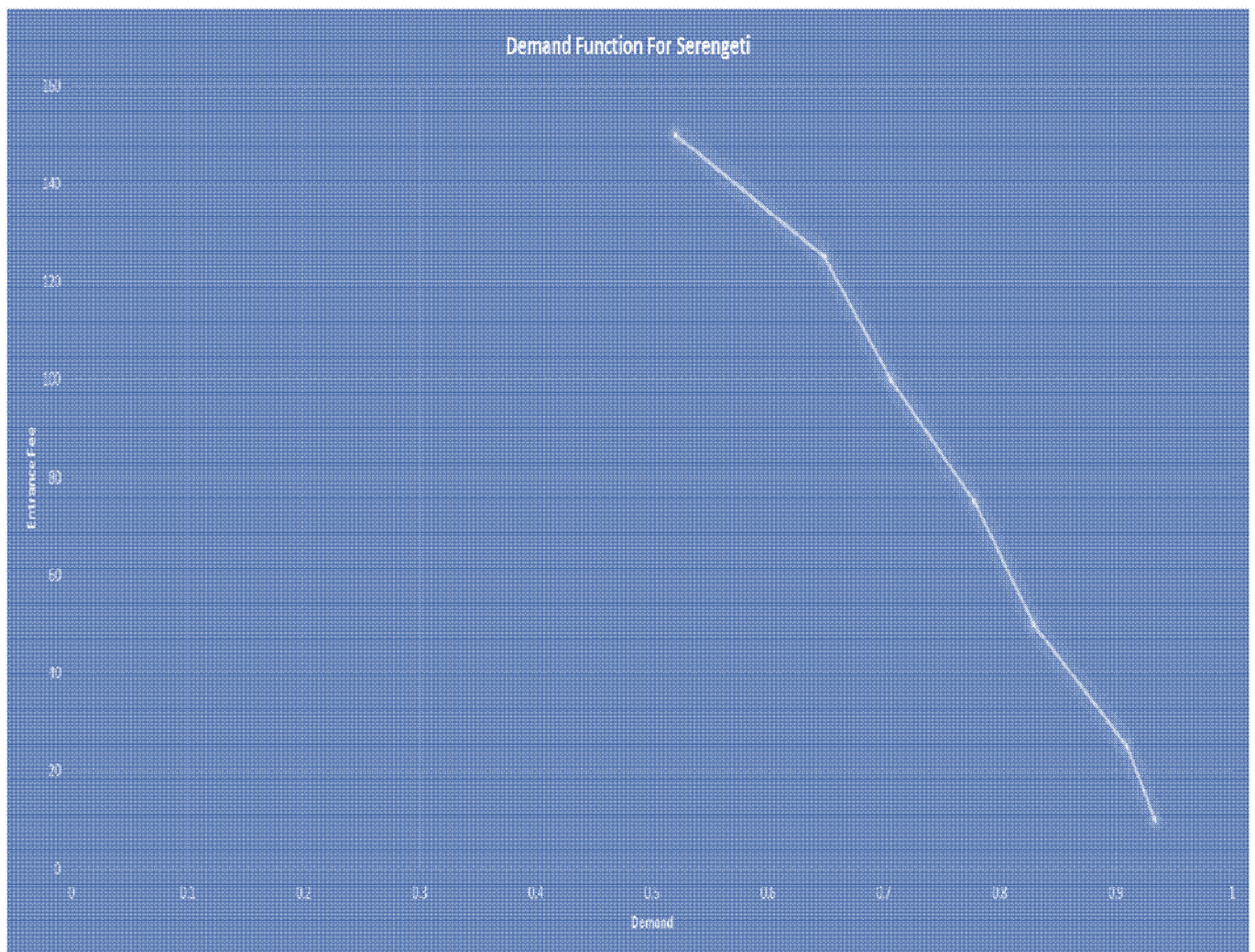
Here it shows that as you increase the entrance fee the demand decreases as we expected. That is the higher the price the lower should be the demand.

To conform our result on Serengeti National Park we calculated the elasticity of demand to see if the demand is elastic. Elastic demand means that demand for a product is sensitive to price changes. The reason of calculating the elasticity comes from the notion of Monopoly.

In the theory of demand the monopoly aims at maximizing revenue. In order to maximize revenue/profit the monopoly firm operates at the elastic part of the demand curve. Therefore at the point where demand is elastic is where the monopoly maximizes revenue. Thus we calculated elasticity at various points and we picked a point where demand is elastic.

The formula for the coefficient of price elasticity of demand for a good is $e_R = \dfrac{\partial Q / Q}{\partial P / P}$

At entry fee equals to 50 the elasticity is; $\left| \dfrac{[0.83 - 0.78]/0.83}{[50 - 75]/50} \right| = 0.12$

At an entry fee equals to 75 elasticity is; $\left| \dfrac{[0.78 - 0.71]/0.78}{[75 - 100]/75} \right| = 0.27$

At entry fee equals 100 elasticity is; $\left| \dfrac{[0.71 - 0.65]/0.71}{[100 - 125]/100} \right| = 0.34$

And at entry fee equals 125 the elasticity is; $\left| \dfrac{[0.65 - 0.52]/0.65}{[125 - 150]/125} \right| = 1$ Thus at 125 is where revenue is maximized since elasticity equals to 1.

Therefore Entrance fee equals to 125 is where the park will maximize revenue. This is because the demand is elastic. It is at this point where the Serengeti National Park should charge the entrance fee if they want to look at the quality and maximize revenue. Thus for policy perspective we recommend the entrance fee of US$125.

The revenue is given by the following; $Revunue = P * Q$

Currently the entry fee in Serengeti National Park is $60. Given the sample of 539 of tourists who were interviewed in Serengeti National Park we can calculate the revenue at current entry fee and our recommended entry fee that Serengeti National Park should charge so as to maximize revenue.

Therefore given the current entry fee the revenue is; $Revenue = \$60 * 539 = \$32,340$ and at the entry fee equals to 125 where the demand is elastic the revenue $Revenue = \$125 * 539 = \$67,375$. The revenue foregone is $35,035. However there will be a decline in the percentage of tourist who will be going to Serengeti. At entry fee of $125 only 65% will go to Serengeti compared to 81% if the entry fee was $60. On the other hand if the Serengeti National Park wants to maximize revenue as well as maintaining the quality of the park they should charge an entry fee equals to $125.

6. Results and Discussion

We want to look on the key questions in the decision of the tourist on Serengeti National Park. First we look on the choice of the tourist if there is an increase in the entrance fee what would be the reaction of the tourist. As we have seen from the table the tourist would still choose Serengeti. Of importance here was the total travel cost and its influence on choosing the Serengeti National Park. As table 10 below indicates if there is an increase in entrance fee the total cost is significant. Our expectation is that the travel cost influences one's decision thus it concurs.

Table 10; Estimation Results from the Logistic Regression of the effect of Travel Cost on the the choice of package to Serengeti

Variables	Regression	Standard Error
Total travel cost	0.545***	0.205
Constant	-3.699**	1.730
Observations	539	

        *** $p<0.01$, ** $p<0.05$, * $p<0.1$

If we look on the influence of other explanatory variables on the choice of the tour package we find that along with the total travel cost among the variables hypothesized to influence the individual choice of the same tour package, income, the tour package to Serengeti, satisfaction of safari experience and day's package were statistically significant. The statistical significance of income indicates its importance in influencing people's choice of tour package.

The variable day's package is significant because it plays an important role in determining ones decision of choosing the safari package to Serengeti. Of a surprise is the education which is statistically insignificant and this can be due to the fact that education level has a little importance in ones decision of choosing the same tour package or not. The following table illustrates.

Table 11; Estimation Results of the variables influencing the choice of package to Serengeti

Variables	Regression	Standard Error
Age	0.0189	0.0407
Age Square	-0.000203	0.000420
Household member accompanying the tourist	-0.0667	0.0514
Income category 2	0.566*	0.309
Income category 3	0.651**	0.327
Income category 4	1.057**	0.415
Education category 2	1.231	1.031
Education category 3	1.282	0.987
Education category 4	1.445	0.980
Education category 5	1.238	0.966
Tour Package to Serengeti	0.954**	0.376
Satisfaction of safari experience	0.477**	0.207
Days Package to Serengeti	-0.0280*	0.0163
Gender	-0.0201	0.206
Total travel cost	0.393*	0.227
Constant	-5.339**	2.349
Observations	524	

       *** p<0.01, ** p<0.05, * p<0.1

We also wanted to see if the cost change had any influence on the choice of the tour package. As table 12 below indicates if there is an increase in entrance fee the cost change is significant. And this confirms our expectation that the cost change influences one's decision

Table 12; Estimation Result on the choice of same tour package due to changes in cost

Variables	Regression	Standard Error
Cost Change	-0.734***	0.164
Constant	4.987***	0.925
Observations	539	

*** p<0.01, ** p<0.05, * p<0.1

If we look on the influence of other explanatory variables on the choice of the tour package if we include the cost change we now find it being significant along with education this time which we thought it is very important in one's choice.

The other variables which are significant in influencing the individual choice of the same tour package, income, the tour package to Serengeti, satisfaction of safari experience and travel cost. The statistical significance of income indicates its importance in influencing people's choice of tour package. The following table illustrates.

Table 13; Estimation Results on the choice of same tour package when all variables are included

Variables	Regression	Standard Error
Age	0.0333	0.0412
Age Square	-0.000321	0.000424
Household member accompanying the tourist	-0.0803	0.0581
Income category 2	0.487	0.318
Income category 3	0.656**	0.334
Income category 4	1.023**	0.423
Education category 2	1.592	1.057
Education category 3	1.632	1.013
Education category 4	1.822*	1.007
Education category 5	1.629	0.995
Tour Package to Serengeti	0.948**	0.381
Satisfaction of safari experience	0.489**	0.211
Cost Change	-0.915***	0184
Gender	0.0256	0.211
Travel cost	0.549***	0.213
Constant	-2.097	2.159
Observations	524	

*** p<0.01, ** p<0.05, * p<0.1

Moreover, we wanted to know that what will be the choice of the tourist between Serengeti and the substitute site which is Maasai Mara if there is cost increase and the added cost in which the tourist can tolerate. As indicated from above people would still choose Serengeti. Thus we regressed choice on added cost using logit and see if the added cost had significant impact on the choice of the tourist. The table below shows that Added cost is statistically significant at 5% in one's choice.

Table 14; Results for Serengeti National Park on the added cost in which the tourist can tolerate.

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	-0.369**	7.34
		(0.156)	
	Constant	2.709***	
		(0.868)	
	Observations	539	

*** p<0.01, ** p<0.05, * p<0.1

As we can see from the above table. The added cost in which the tourists can tolerate is $7. Besides we wanted to see the added cost in which the tourists from Europe and America can tolerate and remain in the same National Park. We chose Europe and America because they bring a large number of tourists to our National Parks.

Table 15; Regression when the tourist are from Europe the added cost in which the tourist can tolerate. (for Serengeti Data)

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	-0.457**	7.05
		(0.214)	
	Constant	3.220***	
		(1.205)	
	Observations	303	

*** p<0.01, ** p<0.05, * p<0.1

We can see that the added cost in which the tourists from Europe visiting Serengeti National Park would be indifferent is approximately $7. Likewise it is the same for the tourists from America.

Table 16; Regression when the tourist are from North America the added cost in which the tourist can tolerate. (for Serengeti Data)

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	-0.466	7.09
		(0.311)	
	Constant	3.304*	
		(1.710)	
	Observations	139	

*** p<0.01, ** p<0.05, * p<0.1

Table 17; Results for Maasai Mara the added cost in which the tourist can tolerate.

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	0.382*	7.327
		(0.227)	
	Constant	-2.799**	
		(1.309)	
	Observations	366	

*** p<0.01, ** p<0.05, * p<0.1

As we can see from the above table. The added cost in which the tourists can tolerate is almost $7 for Maasai Mara game reserve. And it is statistically significant, thus it has a significant impact on the choice of the tourist. On the other hand the added cost in which the tourists from Europe and America can tolerate is $11 and $6 respectively as the tables below illustrate.

Table 18; Regression when the tourist are from Europe the added cost in which the tourist can tolerate. (for Maasai Mara Data)

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	0.229	10.68
		(0.308)	
	Constant	-2.446	
		(1.765)	
	Observations	177	

*** p<0.01, ** p<0.05, * p<0.1

Table 19; Regression when the tourist are from North America the added cost in which the tourist can tolerate. (for Maasai Mara Data)

		(1)	-(b0/b1)
EQUATION	VARIABLES	Regression	
Choice of the tourist	Added cost	0.554	6.02
		(0.419)	
	Constant	-3.334	
		(2.396)	
	Observations	97	

*** p<0.01, ** p<0.05, * p<0.1

We can therefore conclude that the added cost in which the tourists from Europe and America can tolerate so as to visit Serengeti National Park is almost the same as the added cost for the all tourists across the globe combined. While for Maasai Mara Game reserve is $11 for Europe and $6 for America and $7 for all the tourist across the globe.

Our aim of calculating the price at which the tourist can tolerate was to see at which point we can increase our entry fee over and above the current entry fee in Serengeti National Park which is our primary focus. We found out that the tolerance level across the globe for tourists visiting Serengeti National Park is $7. Thus regardless of the quality the Park authorities can increase the entry fee by $7 making it to be $67 and this will slightly improve revenue as well as maintaining all the tourists.

We saw earlier at $60 entry fee given our sample the revenue is $32.340 but when the park increases revenue by $7 so that the entry fee is $67 the revenue will be; $Revenue = \$67 * 539 = \$36,113$ thus the park will make $3,773 extra by charging $67 as well as maintaining all the tourists because they will tolerate that increase in entry fee.

Further still, we estimate the equation (by doing regression analysis) which resembles the demand function we used earlier. We first estimate a simple equation where the choice of package is only the function of the entry fee. We find out that in our regression result that the entry fee is significant in influencing ones decision and it is also negative. The implication here is that the higher the entrance fee the fewer number of tourists who will choose to visit Serengeti National Park. The following table illustrates,

Table 20; estimated demand of Entrance fee effect

Variables	Regression	Standard Error
Entrance Fee	-0.0152***	0.00268
Constant	2.408***	0.294
Observations	539	

*** p<0.01, ** p<0.05, * p<0.1

If we include other variables that affect the choice of going to Serengeti National Park or not we find out that along with the entry fee, income, education, total travel cost, satisfaction of safari experience as well as if the tourist is a part of the tour package are significant in influencing one's decision. The following table illustrates;

Table 21; Estimation Results of estimated demand that include other variables along with the entry fee

Variables	Regression	Standard Error
Age	0.0235	0.0419
Age Square	-0.000271	0.000433
Household member accompanying the tourist	-0.0867	0.0556
Income category 2	0.468	0.319
Income category 3	0.635*	0.333
Income category 4	0.739*	0.429
Education category 2	1.344	1.041
Education category 3	1.598	1.000
Education category 4	1.927*	0.997
Education category 5	1.607	0.980
Tour Package to Serengeti	1.007***	0.387
Satisfaction of safari experience	0.424**	0.213
New entrance fee	-0.0174***	0.00294
Gender	-0.0764	0.214
Total travel cost	0.585**	0.235
Constant	-5.823**	2.382
Observations	524	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

7. Conclusion

From the Analysis we have seen that the behaviour of the tourist does not change much when the price changes. This can be attributed by the uniqueness of the Serengeti National Park. Regarding the optimal entrance fee on which Serengeti National Park should charge, we find out that people are willing to pay above what is currently charged which is $60. Thus in order to maintain the tourist and not taking into consideration if the park is crowded the Serengeti National Park should charge an entry fee equals to $67. However our primary aim was to give the recommendation on the entrance fee at which Serengeti National Park should charge where it maximizes revenue. The revenue is maximised at elastic part of the demand. And at that point the entry fee is $125. Therefore we recommend that in order to maximize revenue and improving the quality of Serengeti National Park, the park authorities should charge an entry fee of $125.

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