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Underutilization of Cultural Heritages for Tourism Due to Poor Entrance Fee Determination Based on the Travel Cost Framework

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Abstract
Tourism is one of the world's fastest growing industries and is one of the largest industries in the world. *Cultural tourism is often argued to be one of the most important and rapidly growing areas of global tourism.* Ethiopia, a country in East Africa can be expressed as a mosaic of people and cultures, encyclopedia of geology, the cradle of humankind and civilization. The natural and interesting landscape, endowed with rich biodiversity, socked in history, culturally hospitable, traditionally sensitive, and intrinsically religious people put together Ethiopia a tourist paradise though the entrance fee, the value and other characteristics of these heritage resources are left unaddressed**.** The study uses the Individual Travel Cost Method to estimate the use value of RHCL. The truncated negative binomial method (TNBM) was employed to derive the demand function for use value of RHCL. The result of the study showed that the potential annual use value of the RHCL was estimated to be 759,687,113 ETB per annum[1]. Furthermore; the entrance fee that would maximize the use value of the church is 11.32 US Dollars per four days. which has a significant difference from the existing entrance fee(50 US Dollars per four days) . Future researches are recommended.
Keywords: Individual travel cost method; cultural Heritage; economic value

1. Introduction

Tourism is one of the world's fastest growing industries and is one of the largest industries in the world. It is also becoming a major source of income for many countries. The international tourism revenue amounted to 1.16 trillion U.S. dollars in 2013. This figure has been 475 billion USD in 2000 which shows that sector is growing very fast.[2]

Cultural tourism is often argued to be *one of the* most important and rapidly growing areas of global *tourism.* It is believed that almost all stakeholders are now aware of the importance of cultural tourism and give more attention to the development of the sector and its significance to the national economy (Richards, 1996).

Ethiopia, a country in East Africa can be expressed as a mosaic of people and cultures, encyclopedia of geology, the cradle of humankind and civilization. The natural and interesting landscape, endowed with rich biodiversity, socked in history, culturally hospitable, traditionally sensitive, and intrinsically religious people put together Ethiopia a tourist paradise (Pankhurst, 2005).

Despite the country's potential in attracting tourists and enhance the contribution of the sector to the economy, the country could not be able to benefit from the sector. For instance, Ethiopia's share of the African tourism market in 2009 was less than 1 percent. By recognizing the potential as well as the problems of the tourism sector, the government of Ethiopia has set ambitious growth targets of doubling tourist arrivals from the current 500,000 to 1 million, and a twelve-fold increase in tourists' expenditures, from US$250 million in 2010 to US$3 billion by 2015 (Ministry of culture and Tourism,2012). In order to achieve these targets, the policy makers and other relevant stakeholders need to consult the experiences of other successful countries and conduct empirical studies on the current status, problems or constraints, and visitors' valuation of the country's tourist areas. It is important to for the government to get information based on a rigorous study on how tourists value tourist attraction areas in general and cultural heritages such as the Rock-Hewn churches of Lalibela in particular. Hence, this study estimates a recreation demand function for visiting the site and approximates the economic benefit of the site using TCM. Further, it determines the optimum and efficient entrance fee that would be charged to visitors.

2. Travel Cost Method (TCM)

TCM approach was first recommended by Harold Hotelling in 1940s in USA national parks by the National Park Service using Zonal travel cost method (Ward and Beal, 2000). Since then, the methodology was applied and developed by others, including Clawson (1959), and Clawson and Knetsch (1966). The TCM is usually estimated as a trip generating function such as the following:

$$VR = f(TC, Ts, D) \quad (1)$$

[1] 1 US Dollar=19.3469 of Ethiopian Birr(ETB) while the study is conducted
[2] This was retrieved from http://www.statista.com/statistics/273123/total-international-tourism-receipts/

Where VR is the visit rate and/or number of trips per year for zonal travel cost method and individual travel cost method respectively, P is the cost of travel to the site and T_s is a vector of travel costs to substitute sites and D is other socio economic variables.

TCM classified into zonal travel cost method (ZTCM) and individual travel cost method models (ITCM). However, both of them have rarely applied into cultural heritage resources than natural heritage resources. According to the research trend of outdoor recreation resources, the zonal model is mostly employed in the early stage. However, the individual model is recently common owing to its methodological advantages (Forrest et al., 2000).

The ITCM is prepared and administered to a sample of visitors at a site in order to ascertain where they began their journey, demographic and attitudinal information, their frequency of visits to sites, and trip details such as purpose, length and associated expenditures. From these the cost of visits is calculated and related with other relevant factors to visit frequency so that a demand relationship may be established (Ward and Beal, 2000).

According to Ward and Beal (2000), the main advantage of the ITCM is that it is more appropriate and efficient than the ZTCM when the objective of an analysis is to explain individual consumer behavior. They also argued that ITCM gave a demand curve more efficient than the ZTCM in the sense that there was more variation on variables such as tests and preference as well as on frequency of trips and travel cost.

On the other hand, limitations of the ITCM approach have been identified as follows. First, if most of the recreationists take one trip per season or per year, it is almost impossible to detect the demand curve by the individual approach (Freeman, 1979).This is because there will not be sufficient variation in the number of visit even if travel distance increases. Second, the individual observation approach does not include the potential recreationist who may become a user if the price is reduced or the quality of the recreation site improved. This leads to underestimation of aggregate visitation when a closer similar site is included (Ward and Loomis, 1986).

3. Description of the study area, Data, and Econometric model specification

The study is conducted in a town known as Lalibela. It is found in the Northern part of Ethiopia in the North Wollo Zone of the Amhara regional state. Lalibela is found 642 Km North of Addis Ababa, the capital city of Ethiopia. The town is roughly 2500 meters above sea level. The Holy city Lalibela was a capital of Ethiopia in 12th century. The place is a wise possessing of the UNESCO's world heritage site and magnificent Rock-Hewn churches.

The Rock-Hewn Churches of Lalibela were one of the first twelve sites to be inscribed by UNESCO on the World Heritage List in 1978. The town is famous for its monolithic rock cut churches, one of the Ethiopian's holiest cities second to Aksum with almost completely a population of orthodox Christian, center of pilgrimage for much of the country and symbolic representation of Jerusalem. During the reign of Saint *Gebre Mesqel* (Lalibela) in 12th and early 13th century this town was known as Roha. In the town, many features have Biblical names – even the town's river is known as the River Jordan.

The perplexing Rock Hewn Churches of Lalibela and its vicinity inspire many guests to visit city of Lalibela in particular and Ethiopia in general. Great many tourists stream to Lalibela town to applaud the rock-hewn churches of King Lalibela dated back about 800 years. The construction of these churches is said to have been done by King Lalibela himself and it is said that he had finished the work in 23 years of time.

Rock Hewn churches are grouped in to three with the reference frame of the river called Jordan. The first group north of Jordan river comprises six churches; Bete Medihanealem (The House of the Redeemer of the World), Bete Maryam(House of Mary), Bete Meskel(House of Cross), Bete Denagil(House of Virgins), Bete Debre Sina(House of mount Sinai) and Bete Golgota(House of Golgota or interchangeably called House of St. Michel). This group of churches symbolizes the Earthly Jerusalem. The second group (Western group) contains only Bete Giyorgis(House of St. George) church and the third group (Eastern part) contains Biete Amanuel, Beite Qeddus Merkoreus(House of St. Merkreous), Betie Aba Libanos(House of St. Aba Libanous who was saint father of Ethiopian Orthodox Church), Biete Gebriel-Rrufael and Bete Lehem.

However, these churches are highly damaged by different internal and external factors and they demand quick conservation and research and development actions for their everlasting functions. Taking in to account these stricken ideas, this study intended to estimate the value of these churches.

The sample population was composed of tourists who visited the Rock-Hewn churches in 2014. Respondents younger than age 18 were automatically excluded. In this study, the probability sampling method was difficult since there was no specific information of population. Since the site has an international wide market extension, it costs too much time and money to employ probability-sampling method (Parson, 2003). However, NOAA report suggested that probability sampling could be proper for accurate valuation analysis (Arrow et.al, 1993). Therefore, we devised to interview every odd numbered visitor on site after they visited all churches at St. George church (the last visiting church for most visitors). Regarding the sample size, following, Calia and Strazzera (1998) frameworks, only 250 visitors (both domestic and foreign visitors) were participated.

The survey was conducted through on-site surveys with a selected sample of people visiting a site. This is because an on-site survey results in a higher response rate compared with other method of surveys. In addition to improving the response rate, this approach avoid answer from someone never visited the attraction. Moreover, it has an advantage of hitting the target population directly (Parson, 2003).

Due to the difficulties to address qualitative data (age, sex, and other socio- economic variables) through averaging and limitations of the zonal travel cost method (ZTCM) to describe individuals from different perspectives, this study has employed individual methods of TCM.

The number of days spent on site is considered as the dependent variable. Bell and Leeworthy (1990), and Kealy and Bishop (1986) also used a similar measure in their economic analysis of the importance of Saltwater Beaches in Florida , valuation of the Coastline for Tourism in Barbados , Theoretical and empirical specifications issues in travel cost demand, respectively. The number of trips per visitor was constant for most visitors and hence cannot consider it as a dependent variable.

Count data models have become the standard in single site recreational demand models. Regression models for this type are different from the classical regression model in that the response variable is discrete with a distribution that places probability mass at non-negative integer values only. In this study, as the sample was taken from the visitors only, we have a non-negative integer data as a dependent variable. Accordingly, count data model using ML estimator was employed rather than the application of Ordinary Least Square (OLS) to avoid biased estimates of the parameters (Creel and Loomis, 1990).

The starting point for most cross-sectional count data analyses is the Poisson regression model. The Poisson regression model specifies that the random days spent Y take on the value y with: Where n = 1 ... N and y_i is the number of days spent on site by person[1].

$$\Pr(Y = y_i) = \frac{e^{-ui}\, ui^{y_i}!}{yi!}, y_i = 1, 2, 3, \qquad (2)$$

For a sample of *N* observations, the log likelihood function becomes:

$$lnL(\beta) = \sum_{i=1}^{N}\{y_i x_i'\beta - \exp(x_i'\beta) - lny_i!\} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3.2).$$

Where P (*yi*) = the probability of spending y_i days on the site. $\mu_i = \exp(\beta_0 + \sum_{j=1}^{n} X_{ij}\beta_j)$, where X_{ij} is the vector of all demand covariates and, β_j is a conformable matrix of k x 1 parameter vector to be estimated. The Poisson model implicitly assumes its conditional variance of days spent equals its conditional mean. That is E(Y) =μ and V(Y) =μ. This shows the well-known equal-dispersion (equality of mean and variance) property of the Poisson distribution (Hellerstein and Mendelsohn, 1993).

However, most of the time, the variance is larger than the mean for the data, because a few respondents (most of domestic respondents) have a large number of days spent while most respondents make only a few (over-dispersion). This makes the Poisson model restrictive. For cases where the over dispersion problem is serious, a widely used alternative is the negative binomial model (NBM). According to Yen and Adamowicz (1993), the probability density function of the Negative Binomial model is the following.

$$\Pr(Y = y_i/\mu_i, \alpha) = \frac{\tau\left(y_i + \frac{1}{\alpha}\right)}{\tau(y_i + 1)\tau\left(\frac{1}{\alpha}\right)} \left[\frac{\frac{1}{\alpha}}{\frac{1}{\alpha} + \mu_i}\right]^{\frac{1}{\alpha}} \left[\frac{\mu_i}{\frac{1}{\alpha} + \mu_i}\right]^{y_i} \qquad (3)$$

Where α is the over-dispersion parameter and the variance is $\mu_i(1 + k\mu_i)$ and mean equal to μ_i since *α>0 and μ>0*. If *α* equals zero, the Negative Binomial reduces to the Poisson model. The larger the value of *α,* the more variability there is in the data over and above that associated with the mean. The letter τ represents the gamma function. In this study, a likelihood-ratio test based on the parameter α is employed to test the hypothesis of no over dispersion.

In line with Fix and Loomis (1998), since the data was collected from the people who actually visit the site, we also used the traditional models for truncation. The models are truncated at zero as the data begins at one because everybody has visited the site at least once and for one night. If we fail to account for truncation, it will leads to estimates that are biased and inconsistent (Shaw, 1988; Creel and Loomis, 1990; Yen and Adamowicz, 1993). Therefore, the density of the negative binomial distribution truncated at zero for the count (y) is given by:

$$\Pr(Y = y_i/Y > 0) = \frac{\tau\left(yi + \frac{1}{a}\right)}{\tau(yi + 1)\tau\left(\frac{1}{a}\right)} (\alpha\mu)^{yi}(1 + \alpha\mu)^{-(yi+\alpha^{-1})} \left[\frac{1}{1 - (1 + \alpha\mu)^{-\alpha^{-1}}}\right] \qquad (4)$$

Having used the truncated negative binomial model (TNBM) in this study, trip costs and visitors socioeconomic characteristics are considered in the empirical analysis. So, within the framework of the individual travel cost method, the single-site demand function has general form of (Fix and Loomis, 1998):
Number of days spent on site =f (travel costs, travel time, demographics, site attributes, configuration variables and satisfaction after visiting). That is:

[1] Assuming "one full day staying" for those respondents devoted only half day (only night or day time) to visit the site.

$$DAYS_{ij} = \beta' X + \varepsilon_i \quad (5)$$

$$\text{and assume that } DAYS_{ij}/X_i \approx N(\mu;\, \sigma^2);\ \mu = \beta' X$$

Where $DAYS_{ij}$ is individual i's days spent on site j, X_i is vector of explanatory variables, β_i is a parameter vector to be estimated, and $\mathcal{E}_i$ is an error term.

With this functional formulation, the linear form of specification is selected after modification and estimation of all functional forms. Specifically, the equation of individual visitors demand functions to RHCL can be formulated as follows:

$$DAYS_i = \beta_0 + \beta_1 GEN + \beta_2 AGE + \beta_3 DMAR + \beta_4 OCC + \beta_5 DEMP + \beta_6 INCOM + \beta_7 FMSIZ + \beta_8 EDU + \beta_9 DENVA + \beta_{10} KNW + \beta_{11} FIRVIS + \beta_{12} DGRO + \beta_{13} SUBSITE + \beta_{14} PERVIST + \beta_{15} TRAVT + \beta_{16} TC + \beta_{17} OP - WTP + \beta_{18} SATSFAC + \mathcal{E}i \quad (6)$$

Where $DAYS_i$=the total number of days spent on site by respondent 'i'.

AGE = Age level
TC = Travel cost
EDU = Education level
$FMSIZ$ = Family size
$DMAR$ = Martial status for respondents
$DENVA$ = Membership in any environmental groups
$DGRO$ = Number of individuals in a group tour including the respondents him/herself
$INCOM$ = Household's monthly income
KNW = Previous knowledge about the site
$DMAR$ = Marriage status
OCC = Occupation,
DEMP = Employment conditions
$FIRVIS$ = Visiting for the first time or not
$TRAVT$ = Total travel time
$OP - WTP$ = Opinion to pay for conservation
PERVIST =Total amount of pervious visit to the site
$SATSFAC$ = Opinion to the level of satisfaction.
$SUBSITE$ = Number of substitute sites suggested by the respondents

The benefit measures associated with Poisson and Negative binomial models will derive using the estimated parameter on the travel cost variable ($\boldsymbol{\beta_{tc}}$). Following Creel and Loomis (1990) and Su Thi Oanh Hoa (2012), the consumer surplus (CS) of TNBM model per person per day is measured by:-

$$\frac{-\mathbf{r_o}}{\boldsymbol{\beta_{tc}}} \quad (7)$$

Where $\boldsymbol{r_o}$ is the expected number of days spent from equation (3.6) given above evaluate at mean value of statically significant variables and $\boldsymbol{\beta_{tc}}$ is the coefficient of travel cost in the model. Once the parameters of the model are estimated, the surplus value for each individual in the sample is calculated and then aggregated over the population of users to arrive at a total access value.

4. Result and Discussion

Though the original sample of respondents was 250, only 200 questionnaires (80%), 106 foreigners and 94 domestic visitors were included in the analysis. The main reason for this was language barrier. We have come across with many foreigners who cannot speak English. In addition, some respondents were reluctant to participate in the survey. The summary of the descriptive statistics of the variables used in the empirical analysis are presented in table 1 below.

The average age of respondents was 38.9 and 36.15 years and average family size 2.72 and 3.06 for foreign and domestic visitors respectively. The mean income of visitors was Birr74, 828 (US$3867.699) and Birr 2193 (113.351 US$) for foreigners and domestic visitors per month respectively.

Table 1 Descriptive Statistics of the Continuous Variables

Variables	Foreign visitors				Domestic visitors			
	Mean	St.Dev.	Min.	Max.	Mean	St.Dev.	Min.	Max.
AGE	38.9	12.6	21	67	36.15	14.00	19	79
INCOM	74827.5	58436.85	544	33533	2193.47	1393.12	150	7500
FMSIZ	2.72	1.69	1	8	3.06	1.83	1	8
EDU	18.23	4.20	8	25	13.56	5.95	0	23
KNW	8.27	7.71	1	35	21.21	12.43	1	60
TRAVT	23.92	9.14	2	48	22.62	19.87	1	72
PERVIS	1.73	1.72	1	12	11.18	23.37	1	178
TC(‘000)	40.29	29.95	8.74	190.6	2.01	1.40	0.2	8.02
DAYS	4.19	3.03	1	14	5.81	7.03	1	41

Source: Own computation based on survey data

Note that: *St.dev. = standard deviation, Min. = minimum value, Max. =maximum value, Number of observation =106(foreign) and 94(domestic) DAYS= Days Spent on Site by visitors which is dependent variable in travel cost model ('000)*

The regression results are presented in table 2. The analyses were carried out using STATA version 12. Most of the estimated coefficients have the expected signs. The characteristics of the respondent such as, age, household income, education level, and knowledge about the Rock Hewn Churches of Lalibela (KNW) are all significant and have a positive effect on the number of days spent on the site. Similarly, membership in any environmental group and visitor’s visiting experience are also significantly and positively related with the number of days spent on the site. On the other hand, variables such as gender of the visitor, travel cost, and travel time are significant and negatively related with the number of days spent on the site.

The coefficients of total travel cost is negative which means that the higher the cost is for the trip; the lower is the visit rate (number of staying days). This is consistent with expectations (i.e. the demand theory, which stipulates that when the price of travel increases then the number of visits will decrease), and is a necessary condition for the TCM model to be valid. More specifically, the coefficient is significant at 1% confidence level. This is quite standard in the TCM literatures (Parsons, 2003). Travel cost, as a price variable with negative sign is the main result of the recreation demand model, suggesting downward slopping demand curve. However, price here is not very sensitive to the demand. This happened due to the insensitivity of number of staying days to the total travel cost i.e. even if there exists a negative relationship between them, the onsite travel cost part is mostly small as compared to other costs and visitors may consider other socio-environmental, and suitability of the site to decide to stay more or less other than the travel cost part.

The coefficient of household income is positive although the effect on the demand is quite small. The result is often encountered in travel cost demand models (Creel and Loomis, 1990).The positive relation between household income and the number of staying days as proxy of visit rate indicates that the more income of visitors, the more visits/days onsite. This seems reasonable, because when the income of an individual increases then the individual might be willing to substitute wage for leisure. On the other hand it is natural that people are willing to pay more for normal goods when their income increases. One explanation for the positive relation is that the visit to the site is a normal good.

Basically, the household income has two effects, substitution effect, and a complementary effect. On one hand, the complementary effect, which is the direct influence of income on the number of days devoted on site, means that higher income of the family lead to more days they will take on the site. On the other hand, the substitution effect stems from the impact of income on travel cost. The total cost of the trip contains two factors, round trip travel cost and time cost. The latter is correlated with income. The more income one has the higher opportunity cost of traveling and staying days which lead to the lower visit rate and staying days on site. Thus, the final sign of the coefficient of household income depends on the weight of the two effects. If the substitution effect outweighs the complementary effect, the sign of the coefficient will become negative.

However, in our case, the complementary effect outweighs the substitution effect, and then sign of the coefficient become positive. However, the household income here is not very sensitive to the demand. This small marginal effect of income may be due to the reason that the entrance fee to the site to domestic visitors is zero and the dumbfounding and cultural nature of the site which are less income sensitive than those natural heritage resources for foreign visitors.

The coefficients of age and age-squared are positive. The possible explanation for this might be peaceful, cultural, and religious places are more enjoyable to older people than the relatively younger ones. As people gets older, they may know more about the site and want to devote much time on the site due to the peculiar nature of the RHCL. In addition to this, the desire of old people to have more leisure and having low responsibility in other socio-economic aspects of their life may also contribute to the desire to stay more in the site. Moreover, the gender variable shows that female are more willing to stay more than male visitors. This is difficult to explain.

Knowledge about the site (KNW) is important determinants of a recreation demand at RHCL and it is significant at 5 percent level. That is the higher the number of years an individual has information about the RHCL, the larger the staying days on site to confirm more and to fill their knowledge gap about the site which is also true for making more trips to RHCL.

The variable EDU (maximum number of years devoted for formal education by an individual) presents positive sign and significant at 1% level of significant, which may suggest that as the number of years of education increased awareness to this kind of goods also increase and they may initiated to know more and to write more about the site they observe which in turn demanded more days on site.

The variable FIRVIS (dummy first visit) has positive and significant effects in both models. The respondents visiting for the first time in the cultural site are likely to take larger days on site. This result may be attributable to the relatively revelation nature of the site from time to time.

The negative sign on coefficient of the variable total travel time indicated that the longer trip duration is likely to reduce both trip frequency and the number of staying days on site, consistent with Creel and Loomis (1990).

The respondents who are a member of any of the environmental groups are more likely stay more number of days and higher trips to RHCL. This result may be attributable to their knowledge on environmental protection and resource conservation and hence attach more value to this kind of historical heritages than those who are not a member of environmental groups.

Table 2: Maximum Likelihood Estimation of Truncated Negative Binomial Model (Robust)

Variables	**Truncated Negative Binomial Model**		
	Coefficient(RSE)	Z-statistic	Marginal Effects
GEN*	-.18(.094)*	-1.93	-0.65
AGE	.01(.003)***	3.32	0.04
AGESQU('000)	. 007(.003)**	2.21	0. 4
DMAR*	.02(.109)	0.27	0.10
OCC*	.009(.036)	-0.33	0.03
DEMP*	-.03(.115)	-0.33	-0.13
INCOM('000)	4.12e-04(1.10e-04)***	3.74	0. 02
FMSIZ	-.03(.031)	-1.05	-0.12
EDU	.12(.046)***	2.69	0.44
DENVA*	.59(.108)***	5.45	2.53
KNW	.01(.005)**	2.44	0.04
FIRVIS*	.22(.120)**	1.91	0.80
DGRO*	-.08(.096)	-0.87	-0.30
SUBSITE*	-.01(.044)	-0.26	-0.04
PERVIST	-.00007(.002)	-0.03	0.0001
TRAVT	-.004(.003)*	-1.3	-0.01
TC('000)	-.002(2.93e-04)***	-7.33	0. 00767
OP -WTP*	-.08(.134)	-0.64	-0.31
SATSFAC*	.07(.118)	0.63	0.26
_CONS	.64(.325)**	1.97	
Wald chi2(18)	398.19		
Prob > chi2	0.000		
Pseudo R^2	0.3956		
Log likelihood	-416.54281		
Alpha(α)	.1012534(.0413253)**		

Source: Model estimation based on survey data

- ✓ ****= 1 percent level of significance, ** =5 percent level of significance and * =10 percent level of significance.*
- ✓ *Numbers in parenthesis are RSE (robust standard error)-values*
- ✓ *(*) on the head of the variables is dy/dx for discrete change of dummy variable.*
- ✓ *('000)= shows the variables whose coefficient have to be multiplied by 1000 in the interpretation.*

To calculate recreational benefit, a simple demand function can be estimated by using the coefficients and the mean values of significant variables reported in table 2. The estimated demand function is:

$$DAYS(days\ spent\ on\ site) = 3.138495 - 0.0000767TC \quad (8)$$

Once the demand function has been estimated, the consumer surplus provides an approximation of the welfare associated with visiting the site. Formally, based on equation above, the consumer surplus is equal to:

$$CS = -\frac{ro}{\beta tc} \qquad (9)$$

Where r_0 is the average number of days spent on site estimated by using the coefficients and the associated mean values of significant variables. From the estimated regression equation, expected number of staying days is calculated equal to 1.43. Individual consumer surplus for RHCL trip: $CSi = -\frac{roi}{\beta tci} = -\left(-\frac{1.43}{0.0000767}\right) = 18{,}252.934\ Birr$ (10)

Total recreational benefit of RHCL is computed by multiplying individual consumer surplus by the annual number of visits[1]. With the total number of visitors to the RHCL of 41,620 (from Lalibela city administration report, 2013), then the total recreational benefit is estimated to be 759,687,113 ETB (39,266,606.6915 USD) per year.

The maximum entrance fee that can be charged depends on how responsive the trip demand function is to price changes (i.e. travel cost). The maximum entrance fee is occurs at point where price elasticity is one (Tang, 2009). With the individual demand function given in equation (8), it can be estimated as follows:

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

$$\frac{\Delta T}{\Delta P} X \frac{P}{T} \qquad (11)$$

Let DAYS spent on site=T and TC=P, then from the given equation, $\frac{\Delta T}{\Delta P} = \frac{\partial T}{\partial P} = -0.0000767 \approx \frac{\partial T}{\partial f}$, where f=is the entrance fee per annum.

The trip elasticity of entrance fee can also be formulated as

$$\frac{\Delta T}{\Delta f} X \frac{f}{T}$$

Now using the individual function above and the trip elasticity of entrance fee, the following table displays Elasticities at different annual entrance fees and number of days spent on site.

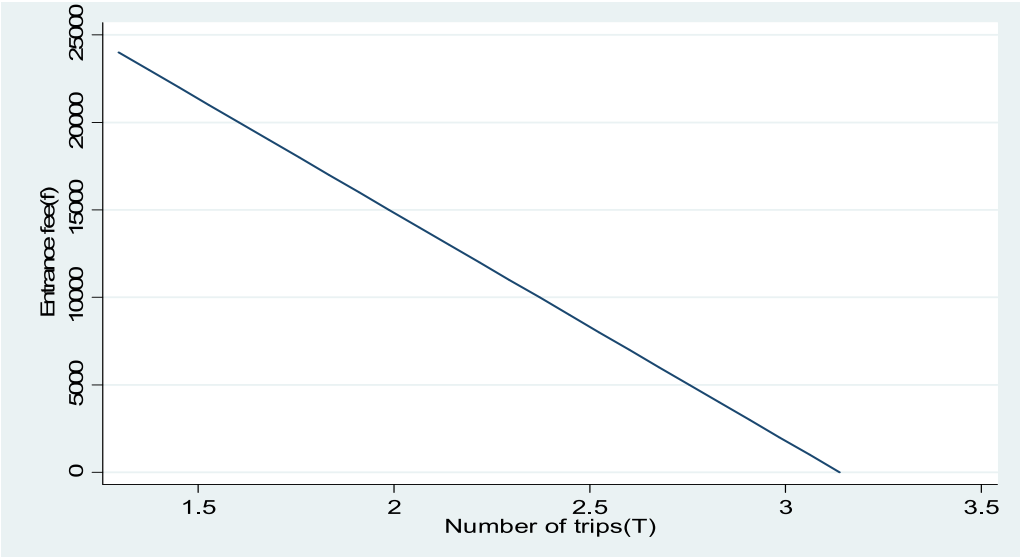
Table 3: Elasticity Computation for Maximum Entrance Fee

Entrance fee(f) in Ethiopian Birr	**Number of trips(T)**	**Elasticity**	**Remark**
1000	3.061795	0.025050665	Inelastic
2000	2.985095	0.051388649	Inelastic
4000	2.831695	0.108345002	Inelastic
6000	2.678295	0.171825732	Inelastic
8000	2.524895	0.243020007	Inelastic
10000	2.371495	0.323424675	Inelastic
12000	2.218095	0.414950667	Inelastic
14000	2.064695	0.520076815	Inelastic
16000	1.911295	0.642077754	Inelastic
18000	1.757895	0.78537114	Inelastic
20000	1.604495	0.956064058	Inelastic
21000	**1.527795**	**1.054264479**	**Unitary elastic**
22000	1.451095	1.162845989	Elastic

Source: model estimation based on survey data

And graphically we can see the relationship between entrance fee and number of days spent (number of trips) as follows:

[1] It is difficult to get information on number of days spent by visitors per year and by taking in to account days spent as a proxy variable for trips per year, we have to just take the total number of trips to calculate total recreational benefit of the site. This, however, may underestimate the use value of the site.



Source: Own computation

From table above, the maximum entrance fee that maximize revenue is approximately ETB 21,000(1085.445$) per annum or ETB1750 ($90.454) per month or ETB 219($11.34) per 4 days. It is at this entrance fee that the elasticity co-efficient becomes one. This result is lower than the current amount charged by the churches' administration which is 50$ per 4 days to foreign visitors. However, currently there is no entrance fee paid to visit the site by domestic visitors(this may account for large difference on current entrance fee and the estimated one).

This result can be summarized from two basic perspectives to domestic visitors. These are from moral perspective and from economic perspective (conserving the site through entrance fee). From the moral perspective, charging such amount to domestic visitors (much of them are religious visitors) will be unfair and unreligious. It may also result in difficult resistance and opposition. This is still the main reason for zero entrance fees for domestic visitors. However, from economic point of view, it is plausible to charge such amount to conserve the site for its everlasting utilization and satisfactions of both current generation and future generation.

Regarding foreign visitors, charging $11.32 per 4 days rather than $50 will increase the number of days spent on the site and the number of people traveling to visit per year, keep other things constant. This in turn has two positive spillover effects (basically economic effects). One, if the number of days spent by visitors increases the entrance fee to the site increases by $11.32 for each additional 4 days. This could enhance the incomes of the surrounding community (hotel owners, tour guide persons, etc.) directly or indirectly. Two, if the entrance fee is decrease, other things being equal, the number of tourists may increase which will in turn compensate the decline in revenue due to the decrease in entrance fee. Here charging the same price for foreigners and domestic visitors may not be logical. Hence, further research is needed in order to differentiate and determine the price for the domestic and foreign visitors.

5. Conclusion

The main aim of this study was to analyze and estimate the economic (use) value of Rock-Hewn Churches of Lalibela using TCM. The study is timely and justified by the fact that cultural heritages have both economical and social contributions to the country. Specifically, the tourism industry provides a number of economic returns in the form of foreign exchange earnings, employment generation, individual income and government revenues. In this regard, the potentials for using this cultural and religious site as an instrument for economic growth and development are quite enormous. Although some developments have been recently witnessed in the sector, cultural heritages are still largely considered from the limited aesthetic and touristic functions. In this respect, valuation can show and quantify the actual and potential contribution of cultural heritages to national economic growth, employment and income to local livelihoods. Therefore, this study attempted to measure the use value of Rock-Hewn churches of Lalibela through the application of individual travel cost method.

The regression results showed that significant variables such as gender (GEN), travel cost (TC) and travel time (TRAVT) have negative effect on the number of days spent on site (demand to the site). Furthermore, it is identified that age(AGE), household income(INCOM), education level (EDU), knowledge about the Rock Hewn Churches Of Lalibela(KNW), membership in any environmental group(DENVA), and visiting experience (FIRVIS) have positive effect on the number of days spent on site. The positive relationship between monthly disposable income and the number of recreational visits (the number of days spent on site) shows that visits to

RHCL was considered as a normal good by visitors.

As estimated by the count data model, the study found the mean consumer surplus per individual to be 18,253 ETB per year. The total use value of the site is approximately estimated to be 759,687,113 ETB per annum. The significance of visits to the RHCL and its value cannot be over emphasized even more is left unwritten to the site, as most respondents have indicated high level of significance of the site and their respective satisfactions during the survey.

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