Economic Value of Ecotourism to Local Communities in the Nigerian Rainforest Zone

Eugene E. Ezebilo (Corresponding Author)

Southern Swedish Forest Research Centre

Swedish University of Agricultural Sciences, Box 49, 230 53 Alnarp, Sweden

Tel: 46-40-415-197   E-mail: Eugene.Ezebilo@ess.slu.se

Leif Mattsson

Southern Swedish Forest Research Centre

Swedish University of Agricultural Sciences, Box 49, 230 53 Alnarp, Sweden

Tel: 46-40-415-195   E-mail: leif.mattsson@ess.slu.se

Carolyn A. Afolami

Department of Agricultural Economics and Farm management

University of Agriculture Abeokuta, P. M. B. 2240 Abeokuta, Nigeria

Tel: 2-34-803-389-9539   E-mail: carolynafolami@yahoo.co.uk

Abstract

This study estimates community willingness to contribute for an ecotourism improvement project and its determinants in the Okwangwo Division of the Cross River National Park, Nigeria. Personal interviews were conducted with 150 households in three communities located in the proximity of the park. The study showed that the respondents were willing to contribute an average of about one percent of their mean annual income per year. Determinants of the respondents' willingness to contribute amount was estimated with the aid of the ordinary least squares and tobit models. The results showed that willingness to contribute were influenced by factors such as income, distance of respondents' residence to the park, post-high school education, occupation and membership of an environmental conservation group. The results generated from this study will contribute to the knowledge of sustainable management of ecotourism projects.

Keywords: Ecotourism, Willingness-to-contribute, Cross River National Park, Contingent valuation

1. Introduction

The increase in human population and preferences for leisure activities often leads to an increase in demand for recreational use of public lands in many parts of the world (Foot, 1990 and 2004; Bowler *et al*., 1999; Nickerson, 2000). Ecotourism, travel to natural areas that conserves the environment and improves the well-being of local people (TIES, 1990), is a fast growing industry. Research shows that there are more than five million eco-tourists and most of them are from North America, Europe and Australia (Kamauro, 1996). Ecotourism accounts for a large share of some countries' gross domestic product, and so contributes to livelihoods of many people, as in Kenya, Madagascar, Nepal, Thailand and Malaysia (Isaacs, 2000). Benefits of protected areas often accrue to the national and global economy, but the costs are usually borne by local communities. Therefore integrating nature conservation and ecotourism has become a popular way to motivate local communities to support nature conservation projects (Abbot *et al*., 2001). When ecotourism is supported in protected areas, it is often argued that economic benefits will accrue to local communities (Marsh, 2000). Some of the economic benefits which local communities can derive from ecotourism are employment opportunities, development associated with infrastructure (e.g. better road network and water) and ecotourism businesses (Hall, 2006a; Marsh, 2000; Weiler and Scidl, 2004).

Benefits from recreational use of public lands, e.g. ecotourism, are typically estimated by means of non-market valuation methods (Mitchell and Carson, 1989; Loomis, 1993). The contingent valuation method is widely applied in estimating the economic value of non-marketed goods (Champ *et al.*, 2003; Carson, 2004; Garrod and Willis, 1999; Majid *et al.*, 1983). It uses survey questions to elicit people's preferences for non-marketed goods by asking them how much they would be willing to pay for specified improvements or to avoid decrements in them (Mitchell and Carson, 1989). Most contingent valuation studies (Nuva and Shamsudin, 2009; Maharana *et al.*, 2000; Lindsey *et al.*, 2005; Yacob *et al.*, 2009) on ecotourism have focused on values which eco-tourists attach to ecotourism. Values of ecotourism development to local communities are rarely studied and it is often claimed that ecotourism promotes conservation of natural and cultural heritage of an area and may improve the standard of living of local residents (Boo, 1990; Linberg and Hawkins, 1993, Eraqi, 2008). Advocates of national parks often claim that income from ecotourism will supplement the livelihoods of individuals who reside in the vicinity of a park. The support of local communities is often required for sustainable development of ecotourism. Therefore, it is important to have knowledge about the value which local communities attach to ecotourism development projects. This will help policy makers with regards to decisions concerning how to package an ecotourism project to benefit more individuals in local communities. The aim of this study is therefore to estimate, using the contingent valuation method, how much local communities would be willing to contribute to support an ecotourism project and also the determinants of these values. The location of the study is the communities in the vicinity of the Okwangwo Division of the Cross River National Park.

The next section gives an overview of the Okwangwo Division as well as surrounding villages, and the data collection methodology, followed by theoretical framework and statistical analysis. Section four includes results and discussion, and the final section is devoted to concluding remarks.

2. Materials and methodology

2.1 Study site

The Okwangwo Division (OD) of the Cross River National Park is located in the Cross River State in south-eastern Nigeria and covers an area of 1 000 Km². The elevation of the OD ranges from 1 000 to 1 700 meters above sea level. The vegetation of the park comprises lowland rainforest at lower elevations and montane grasslands along the ridges in the higher elevations. The OD plays an important role in protection of fisheries, watersheds and climatic stability, ecotourism and preservation of genetic resources (Coldecott *et al.*, 1990). Wildlife found in the park includes antelopes, chimpanzees, high forest monkeys, buffaloes, high forest elephants, manatees, wild pigs, baboon, leopards and gorillas. The area is a centre of endemism for frogs, birds and four primates, including the endangered Cross River Gorilla – *Gorilla gorilla diehli* (Oates *et al.*, 1990; White, 1990). Over 280 bird species have been recorded including *Picathartes oreas* and *Calyptocichla serina* (BirdLife International, 2009). The park harbours 950 species of butterflies (Cross River State Government, 2008). Apart from seeing diverse plant species and mammals the Okwangwo Division also offers eco-tourists opportunities for hiking, bird watching, sport fishing, and boat cruising. The park is surrounded by 66 villages with a total population of 36 000 people (Ite, 2004). The economy of these communities is characterized by subsistence agriculture. The crops cultivated include banana, plantain, cocoa, oil palm, cassava, and yam, while livestock reared include poultry, cattle, sheep and goats. Some individuals in the communities engage in hunting and gathering of non-timber forest products such as game animals, bush mangos, wild vegetables, mushrooms and medicinal plants. Some people already engage in ecotourism businesses such as guided tours, transportation of tourists and catering. If quality of services in the ecotourism sector of the economy is improved, more individuals in the local communities may participate in and benefit from ecotourism.

2.2 Data collection

The data collection involved standardized face-to-face interviews that were designed, and tested in a community outside the study area. Pre-test interviews were conducted in November 2007 covering 20 randomly selected individuals. Findings from the pre-test interviews motivated several changes in the questionnaire e.g. the wording of the hypothetical market scenario and the payment vehicle. The major survey was conducted during the months of April and May 2008. Two interviewers were recruited and trained for two days. Three villages from the 66 villages located within the proximity of the OD were randomly selected for the survey. The villages were Bukalom, Butatong and Wula in the Boki Local Government Area of Cross River State. Every other house along the street was visited in each of the villages. If a house was not occupied, then it was omitted and the next house was visited. The interviewees alternated between the eldest male and the eldest female in each selected household. If the gender of the eldest in a household did not coincide with the interviewee selection method, then a member of the opposite gender was interviewed and the respondent's gender was alternated again from there on. Interviews were conducted in the Boki language. A total of 150 respondents were interviewed in the study area (50 respondents in each village).

The study was described to the respondents and then they were asked series of demographic questions such as their occupation, annual income and whether they have passed through primary, high and post-high school education.

Furthermore, they were asked about the distance of their residence to the OD and also whether they belonged to an environmental conservation group.

2.3 Contingent valuation format

The hypothetical market scenario was developed to describe improvement in the quality of services in ecotourism in order to attract more eco-tourists to the OD. This would give more individuals in the local community the opportunity to derive income from ecotourism. It will also help to improve infrastructure such as better road network. The people in this study area often contribute to the provision of infrastructure such as community school classrooms. This kind of contribution is known as development levy. Therefore the payment vehicle – annual contribution to a community development fund – was not new to the respondents. Individuals in the study area often bargain the price of anything they wish to buy. This is the tradition of the people thus the bidding game elicitation technique may not be new to the respondents.

The hypothetical market scenario and payment vehicle was described to the respondents. They were asked if they were willing to contribute anything at all for improving the quality of services in ecotourism. If the answer was 'no', which was the case for only a small fraction (6%) of the respondents, the respondent was asked to give the reason. If the answer was 'yes', the second step was to determine the maximum amount the respondent was willing to contribute. The interviewer started the bidding game by an initial bid of 100 Nigeria Naira (NGN). If the respondent said 'yes' to that amount, which a large majority of the respondents did, the interviewer raised the amount sequentially by 5 times (NGN 500), 10 times (NGN 1,000), 15 times (NGN 1 500), 20 times (NGN 2 000), 30 times (NGN 3 000), 40 times (NGN 4 000), 50 times (NGN 5 000) and 60 times (NGN 6 000), until the respondent's answer was 'no'. No respondent answered 'yes' to the highest bid of NGN 6 000. The amount which the respondent said 'no' to was then reduced by 12.5%, 25% and 50% respectively, until the respondent's answer was 'yes'. If the respondent said 'no' already to the initial bid of NGN 100, the interviewer reduced the amount by 12.5%, 25% and 50%, respectively, until the respondent's answer was 'yes'. No respondent who said 'no' to the amount equivalent to 50% of the initial bid i.e. NGN 50.

3. Theoretical framework and statistical analysis

The Okwangwo Division serves as site for nature conservation. The park also attracts eco-tourists and some local residents in the periphery of the park benefit from income from ecotourism. However, it is considered that if quality of services in ecotourism is improved it will attract more eco-tourists to the park and more of the residents may derive income from ecotourism. Suppose that improvement in quality of services in ecotourism is proposed. Before the improvement in quality is implemented, we would like to know the residents' preferences for the improvement. The utility function can be written as:

$$U = U(J, Q) \tag{1}$$

where, J denotes a vector of goods consumed and Q denotes quality of services in ecotourism. The status quo of the quality of services is Q_0, and it is proposed to improve the quality to the level Q_1. The individual's willingness to contribute (WTC_i) for improvement in quality from Q_0 to Q_1 is given by:

$$WTC_i = e(p, U_i, Q_{1i}; S_i) - e(p, U_i, Q_{0i}; S_i) + \varepsilon_{1i} - \varepsilon_{0i} \tag{2}$$

where, p is a price vector for goods consumed J, $e(.)$ is an expenditure function and S_i is vector of personal characteristics of the individual i. The individual expenditure function is assumed to be known to the individual, but is known with a margin of error ε_i to investigators. WTC_i can be expressed as:

$$WTC_i = X_i\beta + \varepsilon_i \tag{3}$$

$$\varepsilon_i \sim N(0, \sigma^2)$$

where, X_i is vector of explanatory variables thought to influence the valuation process, β is the set of unknown parameters which reflect the effect of changes in a given explanatory variable on WTC_i, and ε_i is a random error term which reflect factors affecting utility that the researcher is unable to observe. The parameter ε_i is assumed to be normally distributed with zero mean and constant variance.

Valuation functions using WTC estimates, which result from open-ended contingent valuation studies, can be examined with ordinary least squares (OLS) and tobit models, respectively. However, there is often debate among contingent valuation researchers as to whether it is more appropriate to use censored regression (tobit) models or linear models using OLS. Proponents of the tobit models argue that it addresses the censoring, i.e. large number of zeros typically found in contingent valuation surveys, but linear models ignore this censoring. The OLS model fail to account for qualitative differences between zero and positive WTC values (Greene, 2003). This may result in a biased estimate of the parameters of interest. This has led to widespread use of tobit models especially among economists (Floro and Miles, 2003; Kimmel and Connelly, 2007). The linear models we estimate using OLS are of the form:

$$y_i = X_i \beta + \varepsilon_i \tag{4}$$

Where, y_i is the observed individual i WTC value which is greater than 0, X_i is the vector of the individual i personal characteristics, β is vector of parameter to be estimated and ε_i is the error term which is normally distributed with mean zero and variance σ^2.

For the censored tobit, model the dependent variable is observed only if it is above or below some cut off level. The tobit model (Tobin, 1958) combines the elements from ordinary least squares with a normal probit equation, i.e. the size of the bid and the probability of bidding a positive amount. In this study the WTC values were censored at zero, i.e. all reported WTC values are larger or equal to zero since it is not possible to bid negative amounts. The formulation of the tobit model is:

$$y_i^* = X_i \beta + \varepsilon_i \tag{5}$$

where, $\varepsilon_i \sim N(0, \sigma^2)$. y_i^* is a latent variable that is observed for WTC values greater than 0 and censored otherwise. The observed y_i is defined by:

$$y_i = y_i^*, \text{ if } y_i^* > 0 \tag{6}$$

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

The log likelihood function for the tobit model is:

$$\log L = \sum_{y_i > 0} -\frac{1}{2} \left[\log(2\pi) + \log \sigma^2 + \frac{(y_i - \beta X_i)^2}{\sigma^2} \right] + \sum_{y_{i=0}} \log \left[1 - F\left(\frac{\beta X_i}{\sigma} \right) \right] \tag{7}$$

These models were estimated using the LIMDEP NLOGIT version 4.0.1 statistical package (Table 3). In this study we have examined the impacts of the respondents' characteristics on WTC using the OLS and the tobit model, respectively. The OLS was used to analyse the influence of the respondents' characteristics on WTC > 0, and WTC ≥ 0 for the tobit model, respectively.

The principles for consistency in the bidding game means that a point estimate of the individual respondent's maximum WTC was not determined. Instead, the respondent's true maximum WTC lies in the interval between the highest amount that the respondent said 'yes' to, and the lowest amount with a 'no' answer from the respondent. Mean WTC (MWTC) was thus estimated as:

$$MWTC = \frac{1}{n} \sum_{i=1}^{n} \frac{B_{ij+} B_{ik}}{2} \tag{8}$$

where, n is the sample size, B_{ij} is the highest amount with a 'yes' answer from the respondent and B_{ik} is the lowest amount with a 'no' answer from the respondent. A description of variables that were used in the analysis is presented in Table 1.

Table 1

We expect the following impacts of the explanatory variables on the WTC:

3.1 Annual disposable income

Individuals who have more money are often willing to pay more for public goods (Boman *et al*., 2008; Hökby and Söderqvist, 2003). They are often less risk averse and may be more willing to invest in new projects. Hence, we expect a positive influence of income on WTC.

3.2 The distance of the respondent's residence to the Okwangwo Division

Ecotourism activities often take place in the national park therefore individuals (respondents) who live closer to the park will expect to derive more net benefit from an ecotourism project (Pate and Loomis, 1997). Therefore we expect a negative effect of distance of the respondent's residence to the park on WTC.

3.3 Respondents who have passed through primary, high, and post-high school education

Education often gives individuals the opportunity to access information about benefits of new projects (Brander *et al*., 2006; Baral *et al*., 2008). We expect a positive influence of the coefficients associated with the respondents who have passed through primary, high, and post-high school on WTC, respectively.

3.4 Occupation

Individuals who engage in formal (non-traditional) employment such as teaching and nursing often have more education thus may have greater tendency to infer the importance of developmental projects. Hence, we expect the coefficient associated with the respondents' occupation to have a negative influence on WTC.

3.5 Gender

In Nigeria, men are often 'bread-winners' of the household. Ecotourism projects would give them the opportunity to diversify their livelihood and earn more income. It is expected therefore that gender will have a positive influence on WTC.

3.6 Membership of an environmental conservation group

Environmental conservation groups comprise individuals who have positive views about protection of nature. Ecotourism project is an incentive for local communities to support environmental conservation. Therefore we expect the coefficient associated with membership of environmental conservation group to have positive influence on WTC.

The results of the impacts of the above variables on respondents' WTC are presented in Table 3.

4. Results and discussion

4.1 Description of the sample and WTC estimate

Ninety four percent of the respondents were willing to contribute to the improvement in quality of services in ecotourism and of these 47% were female and 53% male. Of the respondents who were not willing to contribute anything at all for ecotourism 78% (7) were male and 22% (2) female. The mean annual disposable income for the female and male respondents was NGN 123 672 ($US 824.48) and NGN 185 508 ($US 1 236.72), respectively. Seven percent of the respondents belonged to an environmental group. Descriptive statistics for the respondents' characteristics are presented in Table 2.

Table 2

Fifty-five percent of the respondents were male as shown in Table 2. Eighty-four percent of the respondents passed through the primary school education, about 71% passed through the high school education and 35% passed through the post-high school education.

The MWTC of the respondents was NGN 1 047. The mean willingness to contribute for the female and male respondents was NGN 885 and NGN 1 215, respectively. A possible reason may be that the male respondents earned more income than the female. The mean annual income of the male respondents (NGN 185 508) was 33% more than that of the female (NGN 123 672).

The adult population (≥20 years) in the Cross River State is estimated to be 35% as reported by the Cross River State Government (2008). Since the human population in the periphery of the OD is 36 000, the adult population there should be 12 600. Aggregating the MWTC over the relevant population of 12 600, the total perceived welfare benefit for the improvement in quality of services in ecotourism to residents at the periphery of the OD is estimated to be NGN 13 192 200 (US$ 87 948) each year.

4.2 Impacts of the respondents' characteristics on willingness to contribute

We now examine whether support for the improvement in quality of services in ecotourism cuts across all, or just some groups of the respondents, and so whether some common factors might have influenced the elicited WTC amount. This analysis is shown in Table 3, which is based on OLS and tobit models estimates. The dependent variable was respondents' WTC amount for the improvement in quality of services in ecotourism.

Table 3

The tobit, and OLS estimates showed similar effects. For these models, coefficients associated with the respondents' income, post-high school education, distance of residence to the OD, occupation and membership of environmental conservation group were statistically significant. A possible reason may be that the data used in this study contains only a few observations (6%) that were censored at zero. There are some sizable differences between OLS coefficients and that of tobit. In general tobit coefficients are larger than that of the OLS.

The coefficient associated with the respondents' annual disposable income has a positive and statistically significant impact on WTC for the improvement in quality of services in ecotourism. This suggests that an increase in the respondents' annual disposable income increases the WTC. A possible reason may be that respondents who earn more income may expect to derive more benefit from the improvement of quality in services perhaps because they often have more access to resources for investment. For example, respondents who earn more income may have higher propensity to save money thus giving them more opportunity to invest in more alternatives to increase livelihood.

As expected, the coefficient associated with the distance between the respondent's residence and the OD had a negative and statistically significant effect on WTC, i.e., the farther the respondent's residence is from the park the lower would the WTC be. A possible reason may be that the respondents who live farther from the Okwangwo Division may not expect to derive much benefit, in the form of an increase in income from the improvement in the services in ecotourism, because most of the ecotourism activities take place in areas closer to the OD. The distance between the respondent's

residence and the park is also likely to influence the amount of information that the respondent may have about the improvement in quality of services, i.e. the longer the distance the less the information about the park would be. Respondents who have more information about the quality of services in ecotourism may be willing to contribute more.

The coefficient associated with the respondents who have post-high school education has a positive and statistically significant effect on WTC, i.e., the respondents who have post-high school education were more likely to contribute to the ecotourism project. Respondents who have post-high school education are more likely to be employed in the formal sector of the economy and may earn more income and thus may have more money to support the improvement in quality of services project. Another reason may be that post-high school education helps to comprehend the news about e.g. future benefits of an improvement in quality of services in ecotourism.

Unexpectedly, the coefficient associated with the respondents' occupation has a positive and statistically significant effect on WTC, i.e., respondents who engaged in traditional employment such as farming and gathering of non-timber forest products were more willing to contribute for the improvement in quality of services in ecotourism. A reason may be that respondents who are occupied with traditional income generating activities may expect to benefit more from the improvement in quality of services because it may provide them the opportunity to diversify in their livelihood activities. This may reduce the risk associated with farming activities and thus improve their opportunity to have a sustainable livelihood. Furthermore, income from farming activities is often seasonal therefore improvement in quality of services in ecotourism may give the respondents whose livelihood are associated with farming an opportunity to earn more income to supplement their present income.

As expected, the coefficient associated with the membership of an environmental conservation group has a positive and statistically significant effect on WTC. This indicates that respondents who were member of an environmental conservation group were more willing to contribute for the improvement in quality of services in ecotourism. A possible reason may be that members of environmental conservation groups are often individuals who support environmental friendly activities. Ecotourism is often seen as an activity which has the potential to promote sustainable development of nature conservation, i.e. contribute to the livelihood of local communities and also maintain nature conservation. This is often the goal of environmental conservation group thus respondents who belonged to this group may be willing to contribute more for ecotourism project to indicate their interest for the environmental group.

The coefficient associated with the respondents' gender has the expected sign however it was not statistically significant. The coefficients associated with the respondents who have primary school, and high school education, respectively were not statistically significant.

4.3 Respondents who were not willing to contribute

As with any type of economic development, ecotourism development could create changes that threaten the quality of life. Social and cultural changes that ecotourism may introduce to host societies include changes in value systems, traditional life styles, family relationships, individual behaviour or community structure (Ratz, 2002). Six percent of the respondents did not support the improvement in the quality of services in ecotourism, and all of these were farmers and most (78%) were male. The most important reason was that they thought that the project will decimate their land and thus dissipate their source of livelihood. Another important reason was that they raised doubt about the capacity of the park authority to successfully implement the quality improvement project, and they also raised concerns regarding the sustainability of the project. They thought that successful implementation of the quality improvement project will attract more people to the area and could increase the demand for land for commercial activities such as market places and guest houses, which could reduce the land available for farming and collection of non-timber forest products.

The portion of respondents who did not support the project appears to be small, but the concerns raised indicate the presence of lapses in communication between the Okwangwo Division authority and the local residents, especially farmers. It suggests that sensitive issues, such as the impacts of ecotourism on the traditions of the people, need to be addressed.

5. Concluding remarks

Local communities often support projects which they believe will contribute to their livelihood. If they do not expect to derive benefit from a project they may not cooperate with the managers of the project. This study has been conducted in a developing country to examine the value which local communities attach to an ecotourism project and factors which may influence this value. The study showed that most of the respondents were willing to support the project. The study revealed that respondents who earn more income, reside closer to the OD, are occupied in traditional income generating activities, have post-high school education and belonged to an environmental conservation group may benefit more from the ecotourism project. There was no difference in the qualitative results for our models regardless of whether we used OLS or tobit model. The study indicated that annual contribution to a community development fund can be used as payment vehicle for contingent valuation studies in developing countries. The study suggests that when planning an ecotourism project there may be a need to involve the local communities. This may give them more access to

information about the project and may influence more of the local people to support the ecotourism project. Further research is needed in areas such as estimation of costs of a proposed improvement in quality of services in ecotourism and factors which could engender more local support for protected areas.

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Table 1. Definition of variables

Variable	Description
WTC	Willingness to contribute for the improvement in the quality of services in ecotourism (NGN per individual per year).
INCO	Annual disposable income (NGN per individual per year)
DIST	Distance (Kilometre) between the respondent's residence and the OD
P_SC	Respondent has passed through primary school (Yes = 1, No = 0)
H_SC	Respondent has passed through high school (Yes = 1, No = 0)
PH_SC	Respondent has passed through post-high school (Yes = 1, No = 0)
OCCU	Occupation of the respondent (1 = traditional, 0 = non-traditional)
GENDER	Gender of the respondent (Male = 1, Female = 0)
MEG	Member of environmental conservation group (Yes = 1, No = 0)

Table 2. Descriptive statistics for respondents

Variable	Mean	Std. Dev.
INCO	158,554.000	88,191.800
DIST	4.763	3.099
PR_SC	0.840	0.368
H_SC	0.707	0.457
PH_SC	0.353	0.479
OCCU	0.483	0.501
GENDER	0.553	0.499
MEG	0.0733	0.262

1 $US = NGN 150

Table 3. OLS and tobit models results for determinants of respondents' WTC

Variable	OLS	Tobit
	Coefficient	Coefficient
Constant	283.002 (254.003)	210.825 (275.623)
INCO	0.002* (0.001)	0.002* (0.001)
DIST	- 59.844** (25.676)	- 72.963** (29.400)
PR_SC	231.209 (269.867)	318.672 (287.042)
H_SC	112.248 (245.128)	157.026 (257.714)
PH_SC	453.973** (181.440)	423.235** (189.456)
OCCU	355.316** (159.853)	358.429** (168.201)
GENDER	21.291 (164.150)	- 31.447 (172.657)
MEG	545.548** (263.374)	545.466** (275.260)
R^2	0.263	0.243 [+]
Adjusted R^2	0.208	
Log likelihood	- 942.255	- 872.290
Chi-sq	35.660****	
LM statistic for tobit		35.742***

Figures in parenthesis are standard errors.

[+] represents pseudo R^2.

*, **, ***, **** represents 0.10, 0.05, 0.01, and 0.001 levels of statistically significance, respectively.