WILLINGNESS TO PAY FOR TRIPS IN ROMANIAN PARKS. EVIDENCE FROM A CASE STUDY

Diana Elena DUMITRAŞ

University of Agricultural Sciences
and Veterinary Medicine, Cluj-Napoca
e-mail: ddumitras@usamvcluj.ro

This study provides information about tourists' willingness to pay for trips in Romanian national and natural parks. The contingent valuation method is used to determine the willingness to pay for trips taken in the parks for increases in travel costs. Responses to valuation questions are used as data in econometric models to estimate individual benefits. Bucegi Natural Park has the lowest values, while Portile de Fier Natural Park has the highest values. Domogled National Park and Piatra Craiului have similar values. The median willingness to pay per trip differ among parks, but per day values reveal different results due to the calculation based on the average trip length. Per day values are similar for Bucegi, Domogled and Portile de Fier, respectively individuals are WTP on average 13.52 RON, 13.43 RON and 14.77 RON per day. At Cozia and Piatra Craiului, people are willing to pay on average more than for the other three parks, respectively 26.97 RON and 29.57 RON. Results indicate that the contingent valuation method is a proper instrument to determine the benefits of the Romanian parks. This study contributes not only with information for park managers but also as a starting point for more detailed valuation studies.

Keywords: contingent valuation, willingness to pay, single bounded, random utility model, non-market valuation, parks.

An efficient management of protected areas assumes not only knowledge about the natural resources but also on how to maximize tourists' preferences, in the condition of minimizing the negative impacts on natural resources, cultural and on the local communities around and within the areas [2]. The determination of the economic values of protected areas is a critical factor in the decision processes regarding the development and management of the areas.

This study uses the contingent valuation method to measure the benefits of five parks, expressed by the willingness to pay (WTP) for trips. The literature on contingent valuation method (CVM) is vast; it has been used by many researchers to value natural resources and public goods. Although the first studies were done decades ago, for the first time in US, it took a long time until it came into the attention of European researchers. Romania is just at its first steps in this direction of valuing natural resources.

The main task of this research is to determine the respondents' willingness to pay for several Romanian public parks [1], [6]. The parks present different

characteristics and offer different recreation activities to tourists, thus it is hypothesized that the willingness to pay per trip vary by park.

The CV method relies on data collected in a survey format, composed of specific valuation questions. Respondents face hypothetical markets in which they have the opportunity to "buy" the good, i.e. to take another trip to the park for an increase in travel costs. The responses are used further to estimate the benefits. The choice of bid amounts offered (the increase in travel costs) is a complex process. This study is an open up, thus it is difficult to set up the bid amount offered to respondents.

MATERIAL AND METHODS

This study focuses on five protected areas in Romania: Bucegi Natural Park, Portile de Fier Natural Park, Cozia National Park, Piatra Craiului National Park and Domogled-Valea Cernei National Park.

Data were collected by a survey given to tourists in the parks during the summer of 2005. A total of 357 surveys were collected: 130 at Bucegi, 41 at Portile de Fier, 67 at Cozia, 59 at Domogled and 60 at Piatra Craiului. Table 1 indicates the average values for the duration of the trip, respondents' income, age and the travel costs by park.

Table 1

Respondents' trip length, income, age and travel costs by park

Park	Mean trip length (days)	Mean income (RON)	Mean age (yrs.)	Mean travel costs (RON)
Bucegi	3.35	1644.05	34.08	55.64
Cozia	2.16	1350.05	37.19	41.20
Domogled	5.44	1652.70	37.94	106.74
Piatra Craiului	2.38	2011.05	33.1	35.69
Portile de Fier	7	1653.51	37.31	63.61

Respondents were asked if they are willing to take a trip in the same park in the future if it would cost with a certain amount more, expressed as a percentage (20%, 50%, 100% more) of the travel costs of the trip where they were approached. In a previous question they were asked to state the travel costs related to the trip.

This study uses the random utility model [4] for analyzing the marginal changes in willingness to pay for a trip affected by an increase in cost. Individuals are asked about their willingness to pay using three single bounded dichotomous choice questions. Having three responses per respondent and willing to account for correlation between and within responses, data are arranged in a panel format with three observations per respondent.

The random effects probit model is used to estimate the probability that individuals would be willing to pay a certain amount to take the same trip in future.

The general expression [3] for the random effects probit model is:

$$Y_{it}^{*} = \beta X_{it} + u_i + \varepsilon_{it} \quad ...(8)$$

$$Y_{it} = 1 \text{ if } Y_{it}^{*} > 0 \; , \; Y_{it} = 0 \text{ if } Y_{it}^{*} \leq 0$$

where i subscript indicates the individual respondent, t subscript indicates the number of responses per individual, Y_{it}^* is an unobserved latent variable, Y_{it} is the observed random variable, X_{it} is a vector of independent variables, and β is a vector of coefficients. The unobservable characteristic, u_i, is specific to individual i, does not vary among the t observations and is $IN(0, \sigma_u^2)$. Under the assumption that u_i is uncorrelated with the independent variables maximum likelihood estimation of the model yields consistent and efficient coefficient estimates [3]. The error terms, ε_{it}, vary among individuals and across the t observations and is $IN(0, \sigma_\varepsilon^2)$.

The log-likelihood is given by Loomis [5]:

$$\ln L = \sum_i \ln \left[\int_{-\infty}^{\infty} \frac{1}{(2\pi)^{1/2}} e^{-\varepsilon^2/2} \prod_t \Phi(r_{it} z_{it}) d\varepsilon_{it} \right] \quad (9)$$

where $r_{it} = 2y_{it} - 1$, $z_{it} = \beta X_{it} + [\rho/(1-\rho)]^{1/2} \varepsilon_{it}$ and $\Phi[\cdot]$ is the normal cumulative distribution function. The correlation coefficient between responses is indicated by ρ. The size of the correlation coefficient indicates if the variability in responses is due to the unobservable characteristic, u_i, or from the error terms, ε_{it}.

RESULTS AND DISCUSSIONS

A random effects probit model is estimated in order to calculate the median willingness to pay per trip for each park. The dependent variable is the "Yes/No" response to the valuation question; the independent variables include the bid amounts (increase in travel costs) set up as cross terms for each park, the income and the age of the respondents. Table 2 indicates the estimation results. All coefficients are statistically significant and the signs are as expected, excepting the trip length which was significant at a much lower level.

Thus, the negative values of the coefficients on 'increase in travel cost' and 'age' suggest that as the travel costs increases and as respondents get older the probability of "Yes" response decreases, thus the WTP decreases. Furthermore, the positive values on 'trip length' and 'income' suggests that as the respondents take longer trips and have a higher wage the probability of "Yes" response increases, thus the WTP increases.

Table 2

Estimation results per trip by park

Variables	Model
Increase in travel cost	
Bucegi Natural Park	-0.0191[a] (0.0029)
Cozia National Park	-0.0119[a] (0.0036)
Domogled National Park	-0.0120[a] (0.0024)
Piatra Craiului National Park	-0.0138[a] (0.0048)
Portile de Fier Natural Park	-0.0091[a] (0.0033)
Trip length	0.0293 (0.0183)

Variables	Model
Income	0.0003 [a] (0.0001)
Age	-0.0130 [b] (0.0071)
Constant	0.6814 [a] (0.3069)
Log likelihood	-614.251
ρ	0.5624
No. of observations	1047
No.of groups	349
Standard errors shown in parentheses [a] Significant at 1% level or above [b] Significant at 10% level or above	

Table 3 presents the median WTP per trip by park and the average daily values calculated by dividing the trip median WTP by the length of the trip.

Table 3

Median WTP per trip and per day for each park

Park	WTP (RON)	
	Per trip	Per day
Bucegi Natural Park	45.29	13.52
Cozia National Park	58.27	26.97
Domogled National Park	73.09	13.43
Piatra Craiului National Park	70.38	29.57
Portile de Fier Natural Park	103.42	14.77

Figure 1 illustrates the probability curves for each park, calculated from the sample data and the estimated coefficients. The horizontal axis is the increase in travel costs and the vertical axis represents the estimated probability of a "Yes" response. Thus, the median WTP is the amount that corresponds to a 50% probability that a person will respond "Yes".

The probability curves differ among parks, as expected. Portile de Fier trip values are higher over all; trip values for Domogled and Piatra Craiului are more similar. The lowest trip values are registered for Bucegi and Cozia.
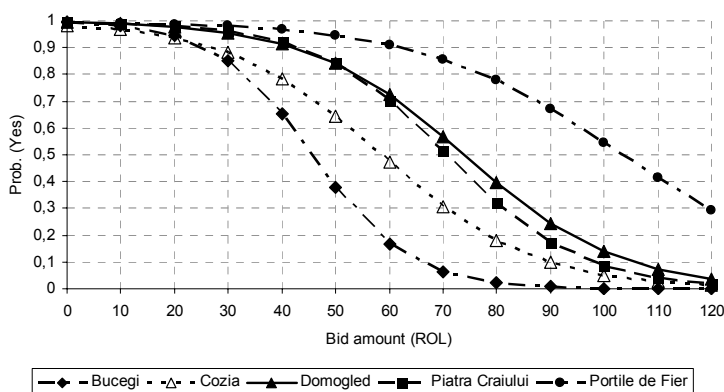

Figure 1. **Willingness to pay per trip by park**

The median WTP per trip differ among parks, but the per day values reveal different results due to the calculation based on the average trip length. Thus, per

day values are similar for Bucegi, Domogled and Portile de Fier, respectively individuals are WTP on average 13.52 RON, 13.43 RON and 14.77 RON per day. At Cozia and Piatra Craiului, people are willing to pay on average more than for the other three parks, respectively 26.97 RON and 29.57 RON.

CONCLUSIONS

Results indicate that people express different willingness to pay for trips taken in Romanian national and natural parks. A more precise analysis of the benefits is essential by estimating the WTP per trip for each user type, identified by the main recreation activity performed during the trip.

The contingent valuation method is a proper instrument to determine the benefits of the Romanian parks. This study contributes not only with information for park managers but also as a starting point for more detailed valuation studies. Having a foundation for bid amounts, other valuation formats may be used in order to obtain more accurate estimates, for instance the double bounded format which provides more information on the respondents' WTP.

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