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An Estimation of the Recreational Use Value of Kursunlu Waterfall Nature Park by the Individual Travel Cost Method*

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Abstract: The recreational use value of Kursunlu Waterfall Nature Park in the Antalya province of Turkey was studied by using the Individual Travel Cost Method (ITCM). For this purpose, 500 on-site questionnaires were administered between September 1998 and June 1999. By applying certain criteria to these questionnaires, 280 cases were selected for economic analysis. The number of visits made by individuals was used as the dependent variable, while travel costs of individuals to the Park, socio-economic variables (age, education and household income) and alternative sites were selected as the independent variables in the demand model of the Park. A semi-log functional form was used to estimate the consumer surplus of the Park users. The results showed that Kursunlu Waterfall Nature Park has an annual recreational use value of \$50,000 with July 1999 exchange rates. It was concluded that the ITCM can be used in the estimation of recreational use value of the natural areas in Turkey, but further research on the type of costs to be considered in the calculation of travel costs is needed.

Key Words: Individual travel cost method, Recreation, Economic value, Protected areas, Cost-benefit analysis

Kurşunlu Şelalesi Tabiat Parkı'nın Rekreatiyonel Kullanım Değerinin Bireysel Seyahat Maliyeti Yöntemi ile Hesaplanması

Özet: Bu araştırmada, Antalya'da yer alan Kurşunlu Şelalesi Tabiat Parkı'nın rekreatiyonel kullanım değerinin Bireysel Seyahat Maliyeti Yöntemi (BSMY) ile belirlenmesine çalışılmıştır. Bu amaçla, Eylül 1998 - Haziran 1999 tarihleri arasında Parkı ziyaret edenlere yüz yüze görüşme yoluyla 500 anket uygulanmıştır. BSMY'nin uygulamasına olanak veren kriterleri taşıyan 280 anket ekonomik analize dahil edilmiştir. Kurşunlu Şelalesi Tabiat Parkı'nın talep fonksiyon modelinde seyahat masrafları (akaryakıt giderleri), alternatif alanların varlığı, ziyaretçilerin yaşı, eğitim düzeyi ve gelir durumu bağımsız değişkenler; alana bir yılda yapılan ziyaret sayısı da bağımlı değişken olarak alınmıştır. Tüketici rantının hesaplanmasında fonksiyon tipi olarak yarı-logaritmik fonksiyon tipi kullanılmıştır. Araştırma sonuçları, Kurşunlu Şelalesi Tabiat Parkı'nın Temmuz 1999 fiyatlarıyla, yılda yaklaşık 21.500.000 TL'lik rekreatiyonel kullanımdan doğan bir ekonomik değere sahip olduğunu göstermiştir. Çalışmada, BSMY'nin Türkiye'deki doğal alanların rekreatiyonel kullanım değerlerinin hesaplanmasında kullanılabileceği, ancak, seyahat masrafları hesaplanırken gözönüne alınacak masraf türleri hakkında daha ayrıntılı araştırmaların yapılması gerektiği sonucuna varılmıştır.

Anahtar Sözcükler: Bireysel seyahat maliyeti yöntemi, Rekreatiyon, Ekonomik değer, Doğa koruma alanları, Fayda-maliyet analizi

Introduction

The economics of outdoor recreation deals with the supply of and demand for natural resources for recreational purposes (McConnell, 1985). Some methods were developed for estimating the economic value of non-market environmental goods such as parks and recreation areas in the last 40 years. These methods may be divided into two groups: direct and indirect methods. The indirect

methods rely on the behavior of consumers in related markets to reveal their valuations of the non-market goods, while direct methods use surveys to ask individuals' valuations for these goods in a hypothetical market (Smith et al., 1986).

The Travel Cost Method (TCM) is the most common indirect method used to estimate the recreational use value of natural areas. This method was initially

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suggested by Harold Hotelling in the 1930s as a potential means of valuing national parks. Clawson and Knetsch developed Hotelling's approach and used the name Travel Cost Method (Tisdell, 1991).

TCM is based on the assumption that total expenditures made by an individual for visiting a recreation site reflects his/her willingness to pay for this site. The sole decision variable is the number of visits to a certain recreation site in a certain period of time (generally one year). Consumer surplus is estimated by relating expenditures to the number of visits (Ortaçesme et al., 1999). The Travel Cost Method is applied in two different ways, namely the Individual Travel Cost Method (ITCM) and the Zonal Travel Cost Method (ZTCM).

Materials and Methods

Kursunlu Waterfall Nature Park was selected for this research. The Park is located near the city of Antalya, some 25 km from the city center, on the new road to the neighboring Isparta province. An area of 30 hectares around Kursunlu Waterfall was declared for the first time a Forest Recreation Area in 1979. Later, in 1991, the area was given the status of a Nature Park due to its rich flora and fauna and interesting geological stands, by enlarging its size to approximately 400 hectares (Anonymous, 1999). Today, Kursunlu Waterfall Nature Park is a very popular recreation site in Antalya province. It offers opportunities for a variety of recreation activities, and receives some 400,000 visitors each year according to estimations.

The Individual Travel Cost Method (ITCM) was applied to determine the consumer surplus of the visitors and the economic value of the recreation activities in the Park. Five hundred on-site questionnaires were administered on weekdays as well as on weekends and during holidays between September 1998 and July 1999. The questionnaire contained questions to determine the socioeconomic characteristics of visitors and to find out the travel costs involved in their visiting the Park.

In the selection of the questionnaires to be included in the economic analysis, the following criteria were applied.

The visitors included in the analysis are as follows:

- Those who came to the Park for a day-long visit,
- Those who traveled that day for visiting the Park only,

- Those who live in Antalya and the two neighboring provinces,
- Those who do not live in Antalya or the two neighboring provinces (Burdur and Isparta), but they spend their vacations in their second houses or in the houses of their relatives in Antalya and engage in either of the first two.

The following visitors were not included in the economic analysis:

- Those who visited the park while spending their vacations in Antalya,
- Those who had not visited the Park before,
- Those who traveled that day for visiting other recreation areas too,
- Those who have houses in Antalya, but live in other countries, and came to Antalya for a vacation,
- Those who gave unreliable answers (e.g. some respondents said that they visit the Park 50 or 60 times a year).

Based on the above criteria, the problem of different types of travelers is solved by disregarding holidaymakers and other non-traditional visitors from the sample. Therefore 280 questionnaires were considered in the economic analysis.

Results

Socioeconomic and Other Trip-related Characteristics of the Visitors

Number of Visits

The number of visits made by an individual in a year is used as a dependent variable in the Individual Travel Cost Method. The rate of visits to the Park twice a year was most common (35.7%). It was followed by three visits (21.1%) and only one visit a year (19.6%). The average number of visits a year was found to be 2.75.

Alternative Sites

Availability and price of alternative goods is one of the important factors that determines the price of a good in free market economies. This is also true for environmental goods. Therefore alternative sites are considered an independent variable. As there is another

recreation site very similar in characteristics to Kursunlu Waterfall Nature Park in Antalya (Duden Waterfall Recreation Area), alternative sites were used as an independent variable in this study also. It was found that 79.3% of the respondents were aware of the alternative site.

Travel Costs

Traveling costs are the most important independent variable that determines the value of consumer surplus in TCM studies. Estimations of travel cost vary in different research. In this study, only gasoline costs were considered as travel costs. In the calculation of gasoline costs, the travel distance was determined for each respondent by using a map of Antalya province scaled to 1/100,000. Travel distance was multiplied by two to find out total distance.

As for gasoline price, the research team decided to take per km gasoline support of the financing institution of the project, the Scientific and Technical Research Council of Turkey (TÜBİTAK), which was calculated as 50,000 TL (\$0.12)* according to the normal gasoline prices in July 1999.

It was found that the travel cost of visitors (gasoline cost) varied between 50,000 TL (\$0.12) and 16,000,000 TL (\$37.60) per visit, with an average of 2,890,000 TL (\$6.80). About 51.5% of the respondents' gasoline costs varied between 2,500,000 and 2,800,000 TL (\$5.90 – 6.60).

Age

The age of visitors was considered according to age groups as follows: 18-25, 26-35, 36-45, 46-60 and over 60. Visitors 36-45 and 26-35 years of age were represented at levels very close to each other with 35.7% and 33.6% respectively. The age groups 18-25 and 46-60 were also very close to each other, having a share of about 15%.

Education

Visitors were classified into 5 groups based on their education level: illiterate, primary education, middle school education, high school education, university bachelor's level education and university masters and PhD education. It was found that visitors that graduated from

a university (bachelor's level) had the highest share (42.1%). They were followed by visitors with high school education (28.6%) and visitors with primary school, middle school and university masters and PhD education. The share of the illiterate visitors was the lowest among the respondents.

Household Income

Household income was also grouped into 5 different groups: 50–100 million TL (\$120–240), 101–150 million TL (\$241–360), 151–200 million TL (\$361–480), 201–250 million TL (\$481–600), and more than 250 million TL (\$600) monthly incomes. Visitors with incomes more than 250 million TL (\$600) ranked first, represented by 42.5%. This means that approximately half of the total respondents belong to higher income groups.

Model Specification

The demand function of Kursunlu Waterfall Nature Park was formed as follows:

$$V_{ak} = f(TC_{ak}, D_a, A_a, E_a, HI_a, e_{ak})$$

V_{ak} : Number of annual visits of individual **a** to Kursunlu Waterfall,

TC_{ak} : Travel costs (gasoline costs) of individual **a** involved in his/her visiting the Kursunlu Waterfall,

D_a : 0-1 dummy variable for alternative waterfall recreation site,

A_a : Age,

E_a : Education,

HI_a : Household income,

e_{ak} : Error.

F and t tests were applied to the model. According to the test results and in light of previous studies, a semi-log function type was selected. The results are given in Tables 1, 2 and 3.

Table 1. Model Summary.

R value	R ² value	Adjusted R ² value	Standard error of the Estimate
0.248	0.062	0.045	0.546326

* \$1 equals 425,000 TL according to the exchange rates in July 1999.

Model	Sum of Squares	df value	Mean Square	F value	Significance
Regression	5.379	5	1.076	3.605**	0.004
Residue	81.781	274	0.298		
Total	87.161	279			

Table 2. Variance Analysis.

**Significant at 1% alpha level.

Model Variables	Coefficients		t value	Significance
	β	Standard Error		
Constant (α)	0.444	0.223	1.987	0.048
Travel costs	- 5.126E-05	0.000	-1.976	0.049
Alternative sites	- 0.108	0.081	-1.323	0.187
Age	6.001E-02	0.036	1.657	0.099
Education	6.464E-02	0.031	2.082	0.038
Household income	3.883E-02	0.030	1.285	0.200

Table 3. Coefficients.

According to the results, the function was found to be significant at the 1% level. The results in the model variables are parallel to the theoretical expectations in TCM applications. The fact that the travel cost variable has a negative (-) value shows that there is an opposite relation between the travel costs and the annual number of visits. In other words, as the travel costs increase, the number of annual visits decrease. Similarly, the variable of "alternative site" took a negative (-) value, which means that the existence of an alternative site affects the number of the annual visits negatively. All three other variables (age, education and household income) had a positive relationship with the number of annual visits. This means that as the age, education level and household income increase, the number of visits to Kursunlu Waterfall Nature Park increase also.

Value of Consumer Surplus

In this study, the following formula was used to estimate the consumer surplus:

$$CS_{SL} = q / - \beta_{SL} \quad \text{where}$$

CS: Consumer surplus,

q: Average of the total annual number of visits,

β : Curve of the demand function (cost coefficient).

When the values were put into the formula, the individual consumer surplus was estimated to be

$$CS_{SL} = 2.75 / - (- 0.00005126) = 53,648 \text{ TL } (\$0.13)$$

As 400,000 persons visit Kursunlu Waterfall Nature Park each year according to the West Mediterranean Regional Forestry Directorate, this value was multiplied by the individual consumer surplus to estimate total consumer surplus (TCS):

$$\begin{aligned} TCS &= CS \times 400,000 \\ &= 53,648 \times 400,000 = 21,459,200,000 \text{ TL} \\ &\text{year}^{-1} (\$50,000 \text{ year}^{-1}) \end{aligned}$$

The value of the consumer surplus represents the annual recreational use value of Kursunlu Waterfall Nature Park. In other words, the Park provides a social benefit of some 21.5 billion TL (\$50,000) each year.

Discussion and Conclusion

Economic valuation studies on the benefits of natural areas have been done for many years in many countries. The recreational benefits derived from these areas should be determined. The results of these studies are helpful for planners and managers as well as policy makers. These results may help to determine the importance of

recreational areas as well as to determine the amount of funds to be reserved for these areas.

There are many protected areas such as national parks, nature parks and forest recreation areas used for tourism and recreation purposes in Turkey. There are also many natural areas not protected. The economic benefits provided from these areas need to be known for the areas' future protection, planning and management.

In this research, Kursunlu Waterfall Nature Park, one of the most visited recreation sites in the Antalya province of Turkey, was selected. The Individual Travel Cost Method (ITCM) was used to estimate the recreational use value of this site. However, some difficulties, mainly originating from the inclusion of the type of costs and calculation of travel expenditures, were encountered.

With reference to the type of costs to be considered, different approaches are adopted in different TCM studies. In many studies, depreciation and insurance costs in addition to the gasoline costs of automobiles and time costs, entrance fees and some other expenditures are considered in the calculation of travel costs.

Visitors have many types of automobiles with different ages, brands, motor volumes, types of gasoline consumed and associated costs. For this reason, it is not reasonable to consider the same amount of gasoline and other costs for all types of automobiles and there is a need to develop standards for the cost calculation. In the UK, the Royal Automobile Club (RAC) has solved this problem by developing a standard of full running costs, which is used in most UK studies. However, there is no standard value in Turkey for full car running costs. Because of the calculation difficulties, only the gasoline costs were considered as travel costs in this study.

In the calculation of gasoline costs, there are also some other difficulties. The cost of gasoline changes according to the type of automobile. No standard value developed by public or private institutions in Turkey was found. For that reason, the research team decided to consider the gasoline support of TÜBİTAK (the Scientific and Technical Research Council of Turkey) to the project (12 liters of normal gasoline per 100 km), which was accepted as a reasonable amount to be used. From this

amount, per km gasoline cost was calculated as 50,000 TL (\$0.12), based on the normal gasoline prices in July 1999.

With reference to the time costs, which is another cost considered in some previous studies, no standard was found in Turkey either. Various approaches are used regarding this matter. One approach is the consideration of 1 hour's equivalence of the individual's salary as the cost of time (McConnell and Strand, 1981; Adamowicz and Graham-Tomasi, 1991; Loureiro and Albiac, 1995). In the second approach, a certain proportion of the individual's salary is considered as the cost of time (Willis and Garrod, 1991; Benson and Willis, 1992). In most UK studies, 43% of the individual's salary is used as the value of non-working time, which is an official figure developed by the UK Ministry of Transport. Although some approaches have been developed, whether to include or how to include the value of time in travel costs are open to debate. Therefore, the value of time was not considered in this research.

Another question in the calculation of travel costs is whether to include entrance fees and other expenditures associated with the visit (e.g. photographic films). Theoretically, if there is an entrance fee, it must be included in the travel costs. However, when entrance fees were included in the travel costs in this research, the explanatory power of the model was reduced. A similar thing happened when entrance fees and other expenditures were included in the travel costs. For these reasons, entrance fees and other expenditures were not included in the travel costs.

In conclusion, the ITCM was found to be a method that can be used in the estimation of the recreational use values of the natural areas in Turkey. However, some points, as discussed above, must be clarified in detail and some standards should be developed according to the conditions in Turkey.

For future studies on this subject, the calculation of travel costs and the determination of the prices for certain factors are of importance. In particular, standard values for full car running costs and for the value of time should be developed.

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