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RESEARCH PAPER

Estimating the recreational value of a forest area using contingent valuation and individual travel cost methods (case study: Kahman forest area, Iran)

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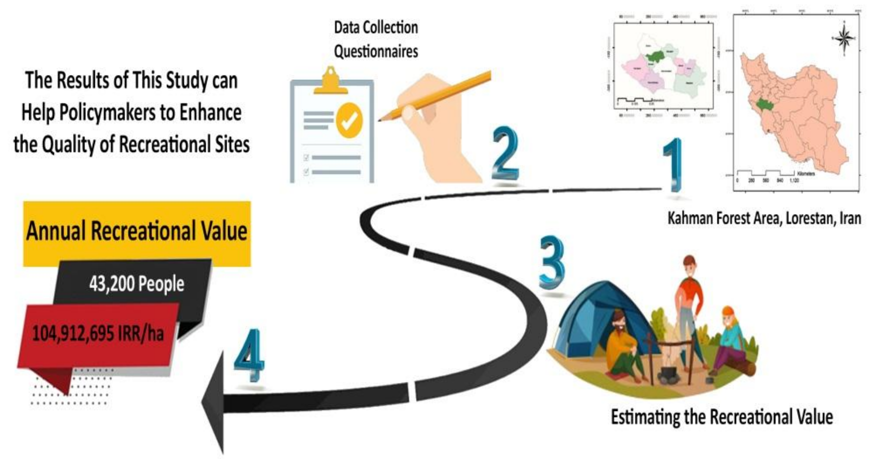
Highlights

- The individual travel cost and contingent valuation methods were used to estimate the recreational value of the Kahman forest area.
- The estimated recreational value in the individual travel cost method was higher than the contingent valuation method.
- The results of this study can be a suitable tool for policymakers for appropriate decisions to protect the study area or similar areas.

Graphical Abstract



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Abstract

This paper aims to estimate the recreational value of a forest area using contingent valuation and individual travel cost methods. Questionnaires were used for collecting the required data. The logit model was used to investigate the effect of explanatory variables on individuals' willingness to pay in the contingent valuation method. Furthermore, the values of the parameters in the contingent valuation method were estimated based on the maximum likelihood method. The linear regression model was applied to study the effects of explanatory variables on the number of trips in the individual travel cost method. In addition, the parameters' values in the individual travel cost method were estimated based on the ordinary least squares method. Results of contingent valuation method indicated that the mean value of willingness to pay for recreational value in the study area was 19,983 IRR per visit and the annual recreational value was 1,807,415 IRR/ha. Furthermore, the results of individual travel cost method showed that the consumer surplus was 322,004 IRR per visit and the annual recreational value of 43,200 people who annually visit the area was 104,912,695 IRR/ha. The results of this study can help policymakers to enhance the quality of recreational sites according to the willingness to pay for ecosystem services.

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1. Introduction

Outdoor recreation is an activity that increases visitors' relaxation and its demand has been increasing with the increasing of the population despite the limitation of natural resources. Hence, estimating the monetary value of natural resources such as forests, rivers, etc. is important for the optimal allocation of these scarce resources for recreational purposes.

Environmental valuation, based on utility theory in economics, tries to reflect the well-being of people as a function of environmental goods and services. However, measuring monetary values related to the environmental benefits can be very difficult, especially in the case of little-known resources, such as biodiversity. In addition to the limitations of existing knowledge about the relationship between environmental performance and economic benefits, there are fundamental methodological limitations. For example, most economic studies related to the value of ecosystem services only look at their contribution to welfare (Brito, 2005). However, attributing economic values to environmental resources is beneficial because it creates social and economic issues that the ecological criterion alone is not capable too. By identifying the distribution of profits and losses in society, the public manager can find ways of reconciling alternative resource uses (Adams et al., 2008; Bakhshi et al., 2021).

The total economic value of a natural resource such as a forest is the sum of its direct, indirect, option and existence values. Direct use values are obtained from ecosystem services that are used directly by humans such as harvesting food products, timber for fuel, etc. Indirect use values are also derived from ecosystem services that provide benefits outside the ecosystem, including wetland natural water filtration function, the storm protection function of coastal mangrove forests and carbon sequestration. Option values are derived from preserving the option to use services in the future, which may not be used at present, either by oneself in which case it is named option value or by others or heirs named by bequest value. Non-use values refer to the value that people can know that a resource exists even if they never use that resource directly. This type of value is commonly known as existence value or sometimes passive use value (Torras, 2000; Amjadian et al., 2021).

Some methods have been developed for valuing non-market forest goods and services such as recreational use. Travel Cost Method (TCM) and Contingent Valuation Method (CVM) are the most widely used methods in determining the value of recreational use value of forests around the world (Pak and Fehmi, 2006). The TCM is an economic valuation used to calculate the value of certain goods or services that cannot be obtained through market prices such as forest parks, ecosystems, beaches, etc. (Mohammadi Limaei et al., 2014). The CVM is called a "stated preference" approach as it asks visitors to directly state their values, rather than inferring values from actual choices, as is done in "revealed preference" methods (Siow et al., 2015; Chaghakaboodi et al., 2021).

Several studied deals are using combined TCM and CVM to estimate the recreational values of the recreational sites such as other studies (Pak and Fehmi, 2006; Chaudhry and Tewari, 2006; Amirnejad and Jahanifar, 2018).

Each method has its strengths and weaknesses for estimating the monetary value of recreational sites, while both use and non-use can be estimated by CVM, but TCM only estimates the use-value of recreational sites. Hence, despite the previous research and efforts, there is still lacking insight as to what extent policymakers and planners can accept the estimated monetary values of environmental services for appropriate management of a recreational site. We have not also found any research using integrated TCM and CVM in the study area and there is still a lack of knowledge concerning the combined implementation of TCM and CVM as a suitable tool for evaluation of the environmental and economic values of a recreational site. The lack of this kind of recreational valuation can lead to serious damage to the environment and the degradation of forests.

The study area is the Kahman forest area as one of the most attractive tourist sites in the Lorestan province of Iran. Unfortunately, in recent years, there was not much attention about the value of this forest park' services and the region has been degraded and there is a serious threat to the pristine nature of this area. It is expected that, in addition to destroying its beautiful nature, environmental damage is also irreparable for the region. It undeniably leads to widespread degradation in the near future. Therefore, the valuation of this area justifies policymakers and planners to be aware of visitors' sights and consider the protection of natural resources to prevent it from deterioration. Hence, regarding the importance of economic value of natural resorts and green spaces to improve the tourism industry and environmental policies, this research was carried out as a first attempt to determine the economic value of the Kahman forest zone using the Individual Travel Cost Method (ITCM) and CVM as well as to compare their results. The research hypotheses are as follows:

1) The value of the Kahman forest area can be determined by the willingness to pay of visitors.
2) Socio-economic factors affect the willingness to pay of visitors.
3) There are differences between the economics values of CVM and TCM methods for estimating the recreational value.

2. Materials and Methods

2.1. Study area

Kahman forest zone: Kahman valley is located at geographical position with latitude and longitude of 33°59'01" north, 48°21'02" east. The altitude is 1580 m and the area is about 1729 ha. This valley is 15 km away from Alashtar city in Lorestan province, west of Iran (Fig. 1). It is the most attractive tourist area of Alashtar, which is located on the hillside of Garrin mountain, and Kahman river is flowing in it. The maximum recorded temperature is 38°. The number of frost days is 133 per year. The average annual rainfall is 850 mm. The weather is cold and snowy in winters, and temperate in summers. The pristine nature of this area turn this place into a wonderful location that attracts many tourists annually due to the special geographical location, pleasant climate, the Kahman river, the various species of trees and shrubs, and the facilities available in this area.

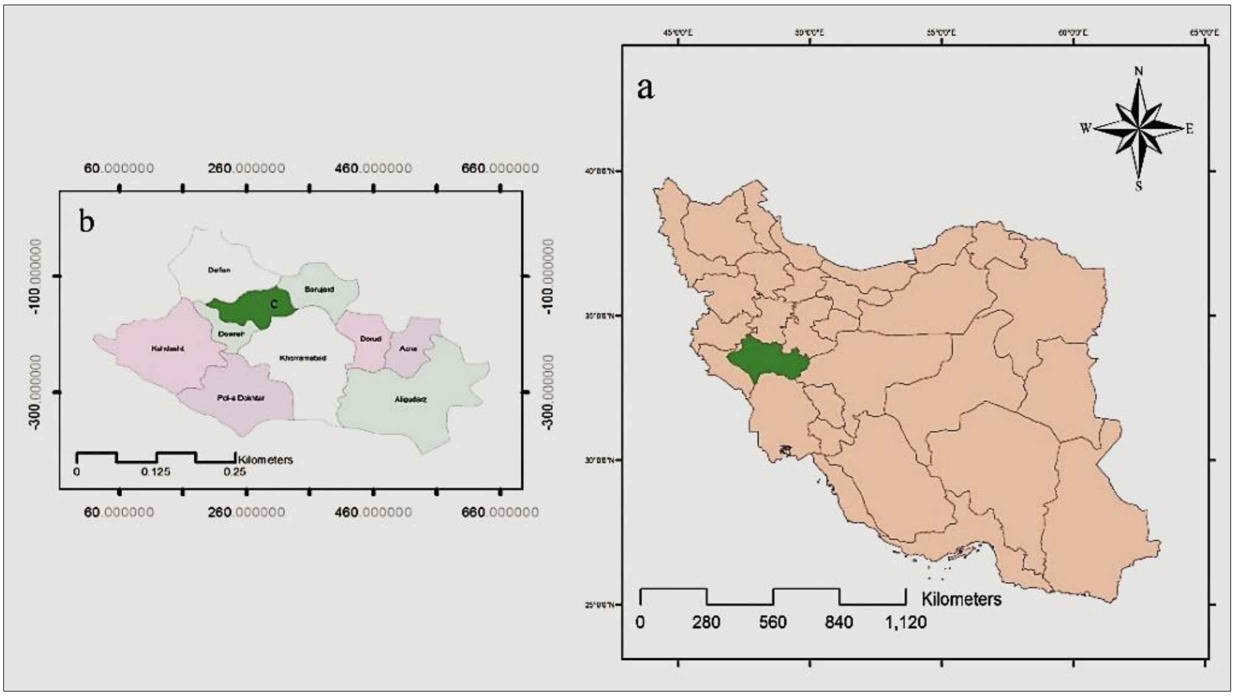

Fig. 1. The map of the study area: (a) Iran, (b) Lorestan, (c) Kahman forest area.

There are various trees and shrubs species in this region such as walnut (*Juglans regia* L.), plum (*Prunus subg*. Padus), quince (*Cydonia oblonga*), hawthorn (*Crataegus aronia*), raspberries (*Rubus idaeus*), wild pistachios (*Pistacia atlantica*) and oak (*Quercus brantii*).

2.2. Methods

2.2.1. Travel cost method (TCM)

The TCM is a non-market procedure, which seeks to place a value on recreational sites using consumption behavior in related markets (Fleming and Cook, 2008; Farokhian et al., 2021).

The following linear function (Eq. 1) was used to estimate the travel relation and the effects of socio-economics variables, and eventually to estimate the recreational value of the forest area.

$$V_i = f(TC_i + P), X_{1i}, \dots, X_{ni} \quad (1)$$

Whereas TC is travel cost, P is the hypothetical 'entry price' paid by visitors to the park and $X_{1i}. \dots . X_{ni}$ is economic and social variables such as income, education, age, preferences and proximate substitutions which may be considered in the model (Lansdell and Gangadharan, 2003). You can see the detail of equations demand function and the consumer's economic in the other studies (Lansdell and Gangadharan, 2003; Gurluk and Rehber, 2008). In this study, the total travel cost of each respondent is determined from the total cost of travel to the recreational site, the opportunity cost of time and the cost spent in the recreational site (Gurluk and Rehber, 2008). The obtained total travel cost is the cost of the group. Hence, in order to determine the cost of individual travel, the group cost is divided by the number of members in a group (Pirikiya et al., 2016). The Excel and Eviews software were used for data analysis.

2.2.2. Contingent valuation method (CVM)

In this method, given the offered price in a hypothetical market condition, respondents choose a single choice from certain predetermined choices: "yes" or "no". Identified respondents are asked about their maximum willingness to pay (WTP) and this will be more helpful in the subsequent analyses to classify the remaining effect. The reasons given for the respondent's WTP for conservation or recreational use include several applied values and environmental and ecological issues. To provide a model for measuring the WTP, it is assumed that an individual accepts the proposed price for the existing value and the preservation of the forests according to the maximum acceptability or reject it in another way (Hanemann, 1984).

The probability that the *i*th person accepts one of the proposed fees (A) for recreational values is calculated by a logit model (Scutariu et al., 2017). The parameters of the logit model are estimated using the maximum likelihood method, which is the most common way to estimate the logit model (Lehtonen et al., 2003). The expected willingness to pay [E(WTP)] is estimated using the numerical integration from zero to the maximum amount.

Log it models can be estimated with linear or logarithmic functional forms to measure usage and preservation values. However, the linear logit models were used in this study because the linear function form was much easier to calculate the E(WTP). The CVM is a well-known method and the related equations are not presented in this paper. SHAZAM and Excel software were used for statistical analysis of variables and mathematical calculations to estimate the parameters of the logit model (Ghasemi et al., 2021).

2.3. Data Collection

Questionnaires were used for data collection. The questionnaires were distributed randomly among the visitors from March until August 2017, on Fridays (weekends in Iran). Different questionnaires were used in CVM and TCM methods. Face-to-face questionnaire delivery was chosen. The sample size was selected using a random method. First, 50 preliminary questionnaires were used. Then the variances of questions were determined. The Cochran relation was used to determine the sample size. Finally, the sample size was determined, as it was 219 questionnaires.

The questionnaire was structured as follows. The first part enquired about the demographic information of the visitors including age, sex, level of education, and locality of residence, household size and occupation. The second part enquired about the visitation patterns of the participant and this included the number of attendances, time of attendance and preferred seasons. The third part was about the visitor's perception about the importance of the environment on their quality of life. In addition, an open-ended question provided space for the participant to explain briefly the reason for their answers. In the fourth part of the questionnaire, the participants asked their WTP to use the amenity and their comments to improve the quality of recreational site (the Kahman forest area). The questionnaires in the CVM were initially completed base on open questions. The visitors asked how much they are willing to pay without identifying any proposed prices. Thus, according to the preliminary obtained information from these questionnaires, the proposed prices such as 10,000 Iranian Rials (IRR), 5,000 IRR and 20,000 IRR were determined for middle, lower and higher WTP, respectively.

3. Results and Discussion

3.1. Individual travel cost method (ITCM)

The questionnaires were used in order to determine the recreational value of the study area consisting of two parts, the first part includes the social-economics status of the visitors and the second part is related to questions about the travel distance, the type of vehicle, period and cost spent in the forest area. This analysis is done by using the data of 219 questionnaires filled by site visitors in 2017. Analyzing the socio-economic features of the visitors shows that the average visitors' age, household size, education and monthly household income were 36.04 years, 4.04 people, 15.72 years and 16,031,964 IRR, respectively. In addition, the average annual visit was 13.04 times and the mean of the spent cost was 426,392 IRR. The average distance from the park was 21.8311 km and most of the respondents stayed at the Kahman forest area between 7 and 12 hours (Table 1).

Table 1. Descriptive Statistics of the study area in the ITCM.

Variable	Units	Minimum	Maximum	Mean	Std. deviation
Age	years	20	70	36.04	11.35
Distance	km	1	100	21.83	23.86
Education	years	9	22	15.72	2.07
Native	nominal	0	1	0.75	0.43
Income	IRR	8000000	30000000	16031963	4316745
Household size	number	1	11	4.04	1.98
Length of stay	hour	2	12	6.81	2.34
Travel cost	IRR	120000	2000000	426392	287589
Number of visit	number	1.00	24.00	13.04	6.18

The economic theories provide little information about choosing the suitable functional form of travel cost. Hence, the statistical method was used to determine the functional form of the travel cost (Table 2). Generally, to evaluate different functional forms, log-likelihood values, adjusted R-squared and F-statistic are used (Nillesen et al., 2005). The most famous test of distinguishing serial autocorrelation is expanded by the test statistic of Durbin-Watson. In this study, the Durbin-Watson value was about 2 in linear-log and log-linear models which shows the lack of autocorrelation in these models. Since the significance of variables in the linear model was higher than the other models, the linear model is used to estimate the travel function. In the linear model, the F-statistic was significant at the level of 1% (Haghshenas and Ghanbari Malidarreh, 2021).

The statistic value of adjusted R-squared in the linear model is 0.84. This indicates that the explanatory variables of the model could explain 84% of changes in dependent variables of the model that is the number of visitors in the study area. In addition, the Durbin-Watson value is 1.68, which shows there is no evidence of autocorrelation in the residual of the estimated model. F-statistic is significant at the level of 1%, which shows that the model in overall is significant at the level of 1%. The results of estimated coefficients, the significance level of variables and the effectiveness of explanatory variables in regression model on dependent variable are obtained by Ordinary Least Squares (OLS) method (Table 2).

As is shown in Table 2, it is clear that from 10 variables in the regression model, travel cost, income, distance, education, native, household size, quality of area and length of stay are statistically significant at the level of 1%

and they have an effect on the number of respondents visiting to the study area. Other variables such as age and gender were not statistically significant, and they did not affect the number of visits to the forest area.

Table 2. The results of estimating different travel function forms.

Model type	Model variables	Coefficient	Prob.	Statistics
Linear	C	2.201988	0.4328	Log likelihood =-499.94
	Age	-0.014	0.3537	Adjusted R-squared =0.84
	Distance	-0.058	0.0000	F-statistic = 119.64
	Education	0.24	0.0063	Durbin-Watson =1.68
	Native	2.004	0.0000	Prob (F-statistic) = 0.000000
	Household size	-0.39	0.0000	
	Gender	0.15	0.6664	
	Income	4.72E-07	0.0000	
	Quality	0.32	0.0022	
	Length of stay	-0.4	0.0004	
	Travel cost	-3.73E-06	0.0001	
Linear-log	C	-20.36	0.1778	Log likelihood = -438.12
	Age	-0.56	0.1657	Adjusted R-squared = 0.91
	Distance	-1.44	0.0000	F-statistic = 226.169
	Education	2.49	0.0147	Durbin-Watson = 1.79
	Native	1.24	0.0004	Prob (F-statistic) = 0.000000
	Household size	-0.53	0.0739	
	Gender	0.11	0.7593	
	Income	4.58	0.0000	
	Quality	3.14	0.0182	
	Length of stay	-2.47	0.0000	
	Travel cost	-3.8	0.0000	
Log-linear	C	2.13	0.0000	Log likelihood = -64.69
	Age	-0.0009	0.4473	Adjusted R- squared = 0.91
	Distance	-0.006	0.0000	F-statistic = 225.94
	Education	0.012	0.0765	Durbin-Watson = 1.81
	Native	0.17	0.0000	Prob (F-statistic) = 0.000000
	Household size	-0.008	0.2158	
	Gender	0.025	0.3284	
	Income	2.53E-08	0.0000	
	Quality	0.02	0.0091	
	Length of stay	-0.029	0.0009	
	Travel cost	-1.00E-06	0.0000	
Log-log	C	-0.29	0.8794	Log likelihood = -13.49
	Age	-0.04	0.4284	Adjusted R-squared = 0.86
	Distance	-0.08	0.0001	F-statistic = 133.79
	Education	0.1	0.4220	Durbin-Watson = 1.63
	Native	0.16	0.0002	Prob (F-statistic) = 0.000000
	Household size	-0.02	0.6311	
	Gender	0.009	0.8488	
	Income	0.52	0.0000	
	Quality	0.27	0.1088	
	Length of stay	-0.23	0.0014	
	Travel cost	-0.49	0.0000	

Equation (2) is the travel cost function according to the findings of this study, which is shown in Table 2. Whereas, TC is travel cost and N is the number of visits:

$$N = 2.201988 - 0.00000373 \times TC \quad (2)$$

By numerical integrating of travel cost function from zero to the maximum travel cost of respondents (the maximum cost is a price that the number of visits becomes zero, which is 590345 IRR) and this amount is considered for a family. Based on the average household size (4.037 people), this amount for each person is 146234 IRR. Hence, the consumer surplus for each respondent in the Kahman forest area is obtained as follow:

$$\text{The average of consumer surplus} = \int_0^{146234} 2.201988 - 0.00000373TC = 322004 \quad (3)$$

The number of total visits to the study area was 43,200 people in 2017 and the average number of annual visits per person was 13.04 in the studied samples. Hence, the annual recreational value in the Kahman forest area is estimated and it was 181,394,049,577 IRR using ITCM. In addition, the recreational value per ha of Kahman forest area is estimated and it was about 104912695 IRR considering the area of the recreational site as it is 1,729 ha.

3.2. Contingent valuation method (CVM)

Investigating the social-economic features of visitors show that the average age, education per year, size of the household and its monthly income are respectively 36.5 years, 14.13 education years, 3.62 people and 16,275 thousand IRR (Table 3).

Table 3. Statistical results of the socio-economic characteristics of the respondents in the CVM.

Variable	Units	Minimum	Maximum	Mean	Std. deviation
Age	years	20	70	36.5	11.86
Gender	nominal	1	2	1.24	0.43
Marital	nominal	1	2	1.74	0.44
Education	years	9	22	14.13	3.02
Household size	number	2	6	3.62	1.04
Income	IRR	8000000	30000000	16274600	5295.11
Offer for WTP	IRR	5000	20000	13349.21	6036.4
WTP (Y)	nominal	0	1	0.56	0.5
Native	nominal	0	1	0.64	0.48

Table 4 shows the respondents' WTP in the study area. Out of 219 respondents, 149 people accepted the initial offer of 10,000 IRR and 70 people rejected it. Out of the 70 people who rejected the initial offer (10,000 IRR), 57 of them expressed the most willing to pay up to 5,000 IRR and 13 people were reluctant to pay (Table 4). Out of 149 people who accepted the initial offer of 10,000 IRR, 38 of them accepted the offer of 20,000 IRR and 111 people rejected it (Table 4). Out of the 219 respondents, 206 including 149 and 57 (94%) were willing to pay a fee for using the recreational values of the forest zone and 13(6%) was reluctant to pay.

In order to estimate the recreational value of the study area, some questionnaires were chosen in which the respondents had a monthly independent income. Therefore, 219 of the total distributed questionnaires were selected and analyzed. The respondents were offered prices they are willing to pay for the recreational value of the Kahmann forest area from their monthly income.

Table 4. The respondent's WTP.

Offered price Acceptance status	The first offer (10,000 IRR)	The second offer (5000 IRR)	The third offer (20,000 IRR)
Abundance Percentage	149 68%	57 26%	38 17%
Abundance Percentage	70 32%	13 6%	111 51%
Abundance (total) Percentage	219 100%	70 32%	149 68%

The results of coefficients of the explanatory variable in the logit model, their significant levels and the effect of these variables on the dependent variables using the maximum likelihood method for the recreational value of the site are shown in Table 5. Out of 7 explanatory variables, the variables such as offered prices, income, household size, and the native were statistically significant at a significance level of 1% by acceptance of the offered prices for recreational value of the study area. In contrast, the variables such as education, age and gender did not have a significant effect on the acceptance of offered prices for the recreational value of the forest area.

The statistics in Table 5 show the explanatory power of the model. The likelihood ratio test of 183.74 shows that the model used is significant at the significance level of 1%. The McFadden ratio of 0.43 shows that the explanatory variables of the model adequately explain the changes in the dependent variable of the model and the percent of correct prediction (81%) indicates that according to the explanatory variables, the model predicts a high percentage of the dependent variable (Table 5).

Table 5. The results of the logit model for the recreational value of the Kahman forest area.

Variable name	Estimated coefficient	Asymptotic standard error	t-ratio	Elasticity at means	Weighted aggregate elasticity
Constant	2.7	1.75	1.54	0.9	0.62
Age	0.25E-01	0.14E-01	1.77	0.3	0.21
Offer for WTP	-0.57E-03**	0.75E-04	-7.58	-2.53	-1.81
Education	0.7E-01	0.58E-01	1.2	0.33	0.23
Income	0.27E-03**	0.42E-04	6.28	1.44	0.99
Household size	-1.06**	0.21	-5.003	-1.28	-0.88
Native	5.61**	0.93	6.05	1.19	0.73
Gender	-0.26	0.4	-0.64	-0.11	-0.74E-01

Mean dependent var: 0.56	S.D. dependent var: 0.5
S.E. of regression: 0.36	Akaike info criterion: 0.84
Sum squared resid: 40.68	Schwarz criterion: 0.94
Log likelihood: -124.29	Hannan-Quinn criter: 0.88
Restr. log likelihood: -216.16	Avg. log likelihood: -0.39
LR statistic (7 df): 183.74	McFadden R-squared: 0.43
Probability (LR stat): 0.00	Percentage of correct predictions: 0.81

** Statistical significance at 1% level. * Statistical significance at 5% level.

The average of expected WTP (parameters values of the logit model) which is equal to the recreational value of the Kahman forest area was estimated through the maximum likelihood method and using numerical integration from zero to the maximum WTP (20,000 IRR). According to the Equation (4), the average WTP for the recreational value is estimated and it was 19,983 IRR for each respondent annually.

$$E(WTP) = \int_0^{20000} \left(\frac{1}{1+exp^{\{-(7.08313337-0.00057147)\}}}\right) dA = 19983 \tag{4}$$

The total number of the respondents of the Kahman forest area is 43,200 people and according to the average amount of the WTP in Eq. (4), the total number of the respondent and the area, the recreational value per ha of the site can be estimated using the following relation (Eq. 5):

(The total number of the respondents × the average of the WTP × average of the visit)/area = the recreational value per ha of the site. (5)

Therefore, the recreational value per ha of Kahman forest area is 1,807,415 IRR and 3,125,021,472 IRR per year. This paper aims to estimate the recreational value of a forest area using the contingent valuation method (CVM) and Individual Travel Cost Methods (ITCM).

Results of this study indicated that there is a clear difference between the estimation of recreational value using CVM and ITCM. In the ITCM, the recreational value per ha of the Kahman forest zone is 104,912,695 IRR and in the CVM with two-dimensional dual format is 1,807,415 IRR. In the other study, was investigated the recreational values of Saravan forest park in the north of Iran using CVM, the results showed that the recreational value per ha of the forest park is 15,307,061 IRR, which was higher than the results of this study (Mohammadi Limaei et al., 2016). In the other study, estimated the recreational value of Bamo national park in Iran using TCM in 2018 (Amirnejad and Jahanifar, 2018). Their results showed that the recreational value per ha was US$ 2.1 or 51,870 IRR, according to the currency rate in 2015. Hence, the results of their study were lower than the estimated value in this research using ITCM (Zeidali et al., 2021).

Mansouri et al., (2016) investigated the recreational values of Hassan Gavyar forest park in Lorestan province using ITCM and CVM in 2013 (Mansouri et al., 2016). Their results showed that the recreational values in ITCM and CVM are 995,343 IRR and 53,553 IRR per ha, respectively. Their study area was close to this study area, but their estimated recreational values were much lower than the results of this study even by considering the adjusted monetary values using consumer price index in Iran. Based on the above-mentioned discussion, we may conclude that the estimated recreational value in this study area is high.

In addition, the differences between the two estimation methods (CVM and TCM) were observed in the previous studies (Pak and Fahmi, 2006; Pirikiya et al., 2016; Chaudhry and Tewarl, 2006; Zandi et al., 2018; Matthew et al., 2019). Accordingly, the estimation of recreational values using CVM is less than TCM. The higher estimated cost in TCM than CVM can be attributed to the fact that the visitor has more than one travel decision during a trip that is consistent with the findings of Hanley (1989) and Cropper and Oates (1992) (Cropper and Oates, 1992; Hanley, 1989). The ITCM is one of the methods of market price and valuation is based on the observed behavior of respondents, while in a CVM, valuation is based on a hypothetical market. Thus observing the behavior and priorities declared by respondents in the CVM is complicated. In the CVM, most native visitors declared that it is their natural right to use their local forest zone. Although native people tended to pay more than non-native people in CVM, but they were less willing to pay compared to the TCM, which could be another reason to estimate the recreational value in TCM higher than CVM (Cropper and Oates, 1992). These results are consistent with the findings of Hanley (1989), Pirikiya et al., (2016), Cropper and Oates (1992). The difference between the two evaluated amounts by TCM and CVM is more in developing countries than developed countries (Hanley, 1989; Pirikiya et al., 2016; Chaudhry and Tewari, 2006).

In this study, there is a significant difference between the estimation of valuations by CVM than by ITCM, which this difference is observed in Chaudhry and Tewari (2006) studies in India as well as Pak and Fehmi (2006) in Turkey (Chaudhry and Tewari, 2006; Pak and Fehmi, 2006). According to some of study, the CVM cannot always afford a proper valuation of recreational values of an environmental resource considering the big size of the economy involving different categories of middle to upper income group families which have the capacity to move as tourists (Chaudhry and Tewari, 2006; Modanlo et al., 2021; Rabbani and Safdary, 2021). Therefore, it would be biased to evaluate the recreational value of a recreational site based on CVM results and estimating the consumer surplus per visit through ITCM seems more realistic because some possible sources of bias have been considered during the survey stage itself.

The results of this study can be a suitable tool for policymakers for appropriate decisions to protect the study area or similar areas. The outcome of this study can be utilized for various planning aspects of the studied recreational site and tourism development related to policy implementation (Carlo, 2014; Shin et al., 2017).

4. Conclusion

The ITCM combined with CVM methods is used to estimate the recreational value of the Kahman forest area to find out the economic value of the recreational site based on the average WTP by tourists for the economic benefits provided by the forest area and the consumer surplus. The estimated recreational value of the study area using CVM may be high compare to the ITCM. The reason is that in ITCM, the travel cost of visitors is estimated to visit a recreational site, but in the CVM, the WTP is considered based on hypothetical market condition. However, the results of this study can help the policymakers and managers to enhance the quality of recreational sites according to the WTP and consumer surplus of the visitors. The expectations of the visitors will have a positive effect on the number of visitors and the environmental quality of the recreational site as well as to increase its economic values.

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