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Comparison of Contingent Valuation and Travel Cost Method in Estimating the Recreational Values of a Forest Park in Iran

ABSTRACT

Today, countries that focus more on economic development considers the tourism industry as a major contributor to it. As one of the major field of tourism, ecotourism is seriously promoted. Estimating monetary value of environmental resources of ecosystem function is a method for understanding if the investments for conservation, improvement or revival of the environmental resources earned social welfare improvements. In this study, The recreational value of Bamo National Park (BNP) was estimated and measured using two methods of Contingent Value Method (CVM) and Travel Cost Method (TCM). The variables, inhabitance, distance from park, first visit, number of visit, deontologist, education, travel cost, visitors income, museum existence and existence of animal species were the effective variables on willingness to pay (WTP) of visitors in 2015. Monthly expected willingness to pay of Consequentialist and Deontologist visitors was US$ 2.08 and 2.47, respectively. Finally, the recreational value of Bamu Park, which were estimated in two methods was equivalent US$ 43940.47 and 79959.25, respectively, in 2015. The travel cost method used the market price information and it revealed there is willingness to pay and 90.7% of visitors have zone inhabitance. Further, travel cost function was ideal for the econometrics theoretical aspect and preferred using the travel cost method instead of contingent value method to valuating the Bamo National Park.

Key words: *Contingent Valuation Method, Double Bounded Dichotomous Choice, Travel Cost Method, Bamo National Park*

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INTRODUCTION

Valuation of environmental non-market functions and services such as cognition and understand the ecological benefits by humans, presentation of environmental issues to the planners and decision makers, providing a linkage between economic policies and natural incomes, measurement of the role and importance of environmental resources in support of human well-being and sustainable development, adjustment and correction of national accounting for instance Gross Domestic Production (GDP) and prevention of natural resources degradation and overexploitation, is significant (*Guo et al. 2001; Ashim 2000*). Nowadays, tourism industry is considered as a necessity in societies that economic development is more contemplated. Since ecotourism is a significant branch of the industry, it is seriously considered (*Ashim 2009*). Despite the lack of market and prices for many of environmental services, it is an obvious fact that such services are valuable and their economic and financial values are taken into accounts (*Brower 2010*). Appreciation of such economic value is very essential for local, national and global policy and decision making (*Turner et al. 2010*). So far, extensive studies have been conducted on the benefits provided by visiting recreational areas using CV and TC (*Hashemi 2011; Yamazaki et al. 2011). Nilsson et al* (*2005*) estimated the value of US$ 250825 yr^{-1} for recreation climbing in the Bellenden Ker National Park in Australia choosing the inverted form of the function of travel production and using the zonal travel cost method (ZTC). *Jabarin and Damhoureyeh* (*2006*), applied the travel cost method, estimated a daily average value of US$ 100 per person and annual value of US$ 19.2 B for Dibin National Park in Jordan. *Rafiqh and Bangash* (*2007*), using the ZTC, put a value of 5225190 Rupee on tourist visiting of Chitral Valley in Pakistan. *Rolfe and Prayaga* (*2007*), in their investigation, determined the value of recreational fishing for two groups of permanent and temporary fishermen in the lakes of Queensland's dams, using Individual Travel Cost (ITC) method. The results of their research showed significant differences of recreational values among various groups and places. *Fleming and Cook* (*2008*), through estimation of logarithmic travel function and

using ZTC, calculated a recreational value of $ billion 31.8 and 191.8, respectively, for McKenzie Lake and Fraser Island in Australia. *Grooluck and Rahbar* (*2008*) choosing a linear form of the production function trip, estimated a value of US$ 103 B, for recreational value that provided by bird watching at Manyas Lake in Turkey.

In Iran, both CV and TC are commonly used for determination of recreational values. *Nikouei and Zibaei* (*2012*) estimated the recreational value of Zayandehrood River flows in Isfahan through applying Double-Bounded (DB) choice method. When respondents are faced with a subsequent price suggestion after the first one, they reorganize the responses depending on their income and education levels. Such behavior resulted to the average willingness to pay for utilization of riparian parks, at 11400 Rials per month for each household that live inside or outside of the city. In a research estimating the recreational value of Fadak Park in Khoy town, the study appiled individual TCM and utilizing Random Utility Function and Trip Production Function with different linear function, logarithmic, linear-logarithmic, logarithmic-linear and inverted patterns (*Hayati et al. 2011*). Based on the results, consumer surplus for each person per average of 17 visits in a year (or 51460 Rials per a visit time) was calculated equal with 874883 Rials and the annual recreational value of the park, considering 5000 people as an average visit per a year, was approximately estimated of 258 million Rials.

Few studies have been done comparing the methods applied in economic valuation of the environmental services. *Amirnejad and Azhdari* (*2011*) compared the application of Logit, Probit and Tobit patterns for economic valuation of environmental resources and estimation of the recreational value of Behest-e-Gomshode region in Fars province of Iran. However, TC and CV have widely been used for valuation of environmental and recreational amenities in open space. In this study, the CV (Survey or Expressed Willingness to Pay) and TC (Market Prices or Revealed Willingness to Pay) methods were used simultaneously, using a set of given data for determination of aesthetic value of BNP. In other words, comparison between of the results that will be provided by the research is an innovation and on the other hand, the aesthetic function of the park is addressed which has not previously conducted.

MATERIALS AND METHODS

Considering widespread internal and external studies presented in this research, the methods of CV and Market Prices (TC) were used to determine the recreational value of ecosystem functions. In CV, the WTP of individuals were determined under a given hypothetical market scenario. This approach is often used to measure the total value of a good or service which consists both use and non-use values. The CV was based on expressed preferences of people and the calculated value is based on the responses to specific questions in a hypothetical situation. The respondents are asked about their WTP for protection of natural resources or the goods or services they provide for instance for recreational use (*Amirnejad and Ataei Solout 2011; Amirnejad et al. 2006*). In economic theories, changes in the consumer's welfare are measured through the estimation of consumer surplus and compensatory changes, which are also an expression for WTP for goods (*Bocksteal and McConnell 2007*). For such measurement, this study applied the Utility Difference Model, in the framework of Discrete method, using data provided by Dichotomous Choice questionnaires that respondent is faced with two choices (Yes or No) about a suggestive fee or Double Bounded Dichotomous Choice (DB) that respondent is faced with several suggestive fees (*Hunman 1984*). In an evaluation using DB choices, the first and second responses to suggestive fees could be different for each respondent. Therefore, such responses have different covariance or consistent covariance but with different reply vectors and random component. Thus, assuming that the mean WTP is the same for all individuals, the actual or maximum observation is delineated as the following general econometric pattern (*Haab and McConnell 2005*):

$$WTP_{ij} = X_{ij}\beta + \varepsilon_{ij} \quad (1)$$

Where, WTP_{ij} expresses the WTP for the jth respondent and (i=1, 2). I, indicates the first and second responses. Also, x, is a vector of socio-economic characteristics and recreational leanings of the respondents, β is a vector of estimated coefficient and ε is the random error component. Considering B^1 and B^2, respectively, as initial suggestion and the follow one to respondents, identified areas for WTP are as the equations of (2) to (5):

$$B^1 \leq WTP < B^2 \quad \forall WTP_{1j} = YES \;\&WTP_{2j} = NO(YN) \quad (2)$$
$$B^1 > WTP \geq B^2 \quad \forall WTP_{1j} = NO \;\&WTP_{2j} = YES(NY) \quad (3)$$
$$WTP \geq B^2 \quad \forall WTP_{1j} = YES \;\&WTP_{2j} = YES(YY) \quad (4)$$
$$WTP \geq B^2 \quad \forall WTP_{1j} = YES \;\&WTP_{2j} = YES(YY) \quad (5)$$

Extracting the probability of the observation of possible periodic responses (Equations 2 to 5) the j^{th} Likelihood Function distribution will be specified on this equation (*Hub and Mac Channel 2002*):

$$L_i(\mu|B) = Pr(\mu_1 + \varepsilon_{1j} \geq B^1, \mu_2 + \varepsilon_{2j} < B^2)^{YN} \times Pr(\mu_1 + \varepsilon_{1j} > B^1, \mu_2 + \varepsilon_{2j} \geq B^2)^{YY} \times Pr(\mu_1 + \varepsilon_{1j} < B^1, \mu_2 + \varepsilon_{2j} < B^2)^{NN} \times Pr(\mu_1 + \varepsilon_{1j} < B^1, \mu_2 + \varepsilon_{2j} > B^2)^{NY} \quad (6)$$

Where, μ_1 and μ_2 are average responses to the primary and secondary questions. *YY*, for {yes-yes} responses is equal with one and if not[1], is equal with zero, NY for {no-yes} responses is equal with one and if not, equal with zero and so are considered for YN and NN. The formula refers to a pattern of limited selection. If it is assumed a normal distribution for the error component as $\varepsilon_i \sim (N, \delta_i^2)$

$$L_j(\mu|B) = \varphi_{\varepsilon_1 \varepsilon_2}\left(d_{1j}\left(\frac{B^1-\mu_1}{\sigma_1}\right), d_{1j}\left(\frac{B^2-\mu_2}{\sigma_2}\right), d_{1j}d_{2j}\rho\right) \quad (7)$$

Where Y_{1j}, is equal with one, provided that the response to the first question is yes and if not, equal with zero. If the response to the second question is yes, Y_{2j} is equal with one and if not, equal with zero. In this case, $d_{2j} = 2Y_{2j}-1$ and $d_{1j} = 2Y_{1j}-1$. In this research, the definition of Logarithmic- Linear econometric for two-dimensional binary data on this equation:

$$Ln(WTP_{ij}) = X_{ij}\beta' + \varepsilon_{ij} \quad (8)$$

The factors of expressed pattern have been estimated through applying the method of maximum likelihood which is available in Shazam software. The TC is applied for estimation of economic use value of ecosystems or places where used for recreation. The rationale of the method is that, the time and costs which people are suffered to visit a place, indicates its recreational value. According the method, it is assumed that the recreational value of a place, reflects the peoples' WTP to visit it. In this method, the preferences of individuals associated with environmental utility are specified through calculating the time and money that the visitors cost to visit a place (*Amirnejad and Ataei Solout 2011*). In this regard, the information associated to the visitors, should be extracted through interview via questionnaires and then the relationships between the numbers of visits, the travel cost and the other variables are determined using regression analysis. The estimated equation, delivers demand function for visitors of a given place and the area under the demand curve, indicates the personal consumer surplus. Then the consumer surplus is multiplied by the total population (the population of the region where the visitors come from) to calculate the total consumer surpluses for a recreational place. The demand curve shows that for a given visitor, considering a given price for visit, how many times of visit will be occurred (*Salami and Rafiei 2011*):

$$V_{ii} = f(C_{ii}, X_i) \quad (9)$$

Where, V_{ij} is the number of visits by the i person in j place in every year, C_{ij} is the travel cost for i person to visit j place and is all socio-economic factors of i person such as income, time, gender, education etc. the value of the slightly services will be calculated using consumer surplus and is equal with the area under the demand curve and above the price line. The total consumer surpluses for concerned service is calculated through multiplying the under area of V_{ij} curve by the annual number of visitors. N_j, is the number of annual visitors of j recreational place:

$$C.S. = N_j \int f(C_{ij}, X_i) dc_{ij} \quad (10)$$

The required data in this study was provided from the survey of visitors of intensive recreational zone of BNP. The method for determination of samples in this study has been simple random sampling. Cochran's formula was used to calculate the number of required samples. According the extracted information from the provincial directory of environmental protection of Fars province, 5955 people have visited the park in 2014. In this regard a pre-question was asked from respondent as below:

"Are you ready to pay a fee to visit and for the recreational use of Bamo National Park or not?"

Actually, the question is the variable under investigation to determine sample volume according its responding variance. The variance of the responses was calculated 0.216 for 50 completed pre- questionnaires. Then the appropriate volume of sample using Cochran's formula was estimated as 315 numbers and finally according to 323 questionnaires, investigation of preferences and associated analysis were done. Also respondents include people who have visited at least once BNP and enjoyed its benefits.

RESULTS AND DISCUSSIONS

Two hundred twenty seven respondents (70.3%) visited the BNP during the holidays and 96 (29.7%) took a leave to visit the park (**Table 1**). Hence, they had gone to the park even working days. Based on the estimated average WTP, the first and the second groups WTP were 2.08 and 2.47 US$, respectively, [All monetary values convert from Rials to US$ (24700 Rials= US$ 1)]. It properly indicated that the people who have taken

[1]The other situations are included the responses of: "yes-no", "no-yes" and "no-no".

Table 1. Status of Respondents.

Row	Description of the question	Option	Number	%	Average WTP (US$)
1	Yes: visit during holidays	Yes	227	70.3	2.08
	No: in working days	No	96	29.7	2.47
2	Residence in the Fars province	Yes	293	90.7	1.84
		No	30	9.3	1.7
3	Membership in NGOs	Yes	84	26	2.55
		No	239	74	1.58

a leave of absence put more value on recreational use (leisure, tourist and aesthetic) of the park. Also, 293 respondents (90.7%) were residents of Mazandaran Province and 30 people (9.3%) had gone to the park for recreation from other provinces of Iran.

The average WTP of visitors from the Fars Province and from other provinces were US$ 0.18 and 1.7, respectively. wIt indicated that the provincial residents have more WTP than non-indigenous visitors. About 84 respondents (26%) were the members of non-governmental organizations (NGOs). Members of NGOs expressed more average WTP (US$ 2.55) than the those who have no such membership (US$ 1.58). In order to identify the causes of the preference of the visitors for the conservation of the BNP, respondents were asked two propositions:

1) Because of the tremendous benefits of environment for humans, a fee should be paid.
2) Environmental protection is an ethical duty of all humans and they should pay a fee to conserve it, even if there is no benefit for them.

The group which chooses the first proposition, believed that if the environmental protection of the national park is supported, overfilled benefits will be gained. On the other hand, if there is no benefit, the respondents won't probably have a willingness to conserve the environment. This group is idiomatically called consequence-oriented (target-oriented) group. On the other hand, the group which selects the second proposition- not for the personal benefits that they will gain for themselves, but has a moral duty of humans which is recommended in many religions and schools of thought, is idiomatically called ethical group. In terms of views on environmental protection, 31% (101) have been consequence-oriented and 69% (222) had an ethical point of view. The average WTP for consequence-oriented and ethical visitors are US$ 1.58 and 1.97, respectively. A key question that arises in CV questionnaires is related to the acceptance or rejection of the proposed fee. Based on the information from primary questionnaires, three proposed fees have been specified to determine the recreational value (leisure, tourist and aesthetic values) of the BNP. In the pre-questionnaire, the respondents were asked about the maximum WTP for recreation in the park. The proposals to respondents include:

1) The first suggestion (or median suggestion): US$ 0.8 were asked.
2) The second suggestion which is included in the upper suggestion (for people who have accepted the first suggestion) and lower suggestion (for people who have not accepted the first suggestion). The upper suggestion has been determined as two times of the median one and equal with US$ 1.62 and the lower suggestion is half of median suggestion and equal with US$ 0.4.

One hundred thirty-two people (40.86%) have only accepted the first suggestion, while an additional 15 visitors also accepted the second suggestion, thus, the number reached 147 (45.51%) (**Table 2**). Among the 44 respondents (13.62%) who have not accepted the first suggestion (0.8 US$), 42 (13%) accepted the second one (lower suggestion) and 2 (61%) even rejected the lower suggestion.

The variable of the suggestion is significant at 1% and its effect on the probability of WTP is negative based on demand theory (**Table 3**). This implies that 1% increase in suggestion variable causes a reduction as 0.14% of the probability acceptance of the proposed fee. Also the estimated marginal effect indicates that a one unit increase two proposed fees, will decrease the acceptance likelihood as much 0.482×10^{-4} unit. In addition, the variable of residence in the Fars provinceis positive and significant at the 5% level. Indeed, the residences of the province have more WTP for recreation in the BNP. The result of estimated marginal effects indicated that the acceptance likelihood of proposed fees is more as much 0.232 unit among the provincial residents compared to visitors from other provinces. It should be noted that in this case, the tensile test will not be interpreted.

Table 2. Descriptive statistics of responses to proposals.

Response to first suggestion		Response to second suggestion		Total
		Acceptance the proposed fee	Rejection the proposed fee	
Acceptance the proposed fee	Number	147	132	279
	%	45.51	40.86	86.37
Rejection the proposed fee	Number	42	2	44
	%	13	0.61	13.62
Total	Number	189	134	323
	%	58.52	41.48	100

Table 3. Results of recreational value estimation (leisure, tourist and aesthetic) using CVM.

Variables	Coefficient of estimation	T - statistics	Tensile in average	Marginal effect
Suggestion	-0.0012***	-5.33	-0.14	-0.482×10^{-4}
Settlement in the province	5.89**	2.54	0.26	0.232
Membership in NGOs	-1.61**	-2.63	-0.11	-0.633×10^{-1}
Distance to the park per KM	-0.04***	-6.49	-0.081	-0.139×10^{-2}
Number of visitors per a household in every visit time	-1.2×10^{-4}	-0.003	-0.6×10^{-4}	-0.458×10^{-5}
The first visit	1.24**	2.20	0.08	0.489×10^{-1}
The visit numbers for each person	-0.20**	-1.97	-0.03	-0.809×10^{-2}
Visit reason- spare time	0.24	0.45	0.005	0.963×10^{-2}
Visit reason- wildlife watching	1.43*	1.73	0.05	0.565×10^{-1}
Visit reason-pleasant air, spring, aqueduct	-0.48	-0.37	-0.02	0.189×10^{-1}
Visit reason- museum	-1.16**	-2.00	-0.02	-0.458×10^{-1}
Vegetation quality	0.40	0.65	0.024	0.157×10^{-1}
Wildlife quality	-0.188	-0.56	-0.02	-0.741×10^{-2}
Attraction- deer	1.59***	6.85	0.15	0.627×10^{-1}
Attraction-wolf	-1.096***	-6.61	-0.19	-0.432×10^{-1}
Attraction- forest cat	-0.04	-0.25	-0.009	-0.165×10^{-2}
Attraction- panther	0.69	0.58	0.17	0.271×10^{-1}
Attraction- pagan	0.07	0.38	0.008	0.286×10^{-2}
Attraction- wild sheep	0.43	2.49	0.062	0.168×10^{-1}
Attraction- vulture	-0.18	-0.66	-0.025	-0.697×10^{-2}
Attraction- cinereous vulture	0.44**	2.13	0.05	0.174×10^{-1}
Attraction-eagle	0.28	0.97	0.02	0.109×10^{-1}
Willingness to visit again	0.56	0.47	0.02	0.219×10^{-1}
Ethical- consequence oriented	-1.18**	-2.17	-0.08	-0.465×10^{-1}
Age	-0.02	-0.39	-0.03	-0.727×10^{-3}
Gender	0.36	0.48	0.016	0.139×10^{-1}
Education	0.86***	3.99	0.08	0.340×10^{-1}
Individual number of households	-0.10	-0.40	-0.015	-0.401×10^{-2}
Household income per month	2.93×10^{-6}	0.56	0.005	0.115×10^{-6}
The minimum expected income	-2.19×10^{-6}	-0.41	-0.009	-0.862×10^{-7}
Travel cost	6.96×10-5***	3.43	0.06	0.274×10^{-5}
Constant factor	7.55***	7.94	---	---
Mandala R-Square= 0.50142		McFadden R-Square= 0.60536		
Percentage Of Right Predictions = 0. 93827		Likelihood Ratio Test = 259.738		
D.F. 32		P-Value= 0.00		

*, **, *** indicate significance respectively in 1, 5 and 10 %

If the respondents are members of non-governmental organizations, the WTP for recreational use of the park will be increased. The estimated marginal effect indicated that the households with individuals who were members of NGOs, the acceptance likelihood will be more than others as much 0.633×10^{-1} unit. It is essential to mention that in this case, the tensile test will not be interpreted. The variable of visitors distance to the national park (per km) has been significant at the 1% level. Indeed, the households located far from the park have had

a less WTP. With a 1% increase in visitors distance to the park, the likely acceptance of proposed fees will decrease as 0.081%. The estimated marginal effect indicated that per 1 km increase of visitors distance, proposed fees acceptance will likely reduced as 0.139×10^{-2} unit. The variability of the first visit has been significant at 5% level. Indeed, the households that visit the park for the first time are more willing to pay for it. The estimated marginal effect demonstrated that these households accepted the proposed fees as 0.489×10^{-1} unit, which is more than other people.

Also, the variable of the number of visits affect negatively and significantly on WTP as entrance fees. The result is significant at 5% level. The tensile test in this case indicated that with a 1% increase of visit of a given person, the likelihood of acceptance of proposed fees will decrease as 0.809×10^{-2} unit. In terms of reasons to visit the park, the households that expressed the reason as wildlife watching, have more WTP than those with a bundle of objectives. The result of the estimated marginal effect showed more WTP for such households as 0.565×10^{-1} unit. Also, the households that expressed their reason as only the visit of the museum have less WTP than households with a bundle of objectives. The result of the estimated marginal effect indicates less WTP for such households as 0.485×10^{-1} units. The households that expressed that animals such as deers, are an attraction, thus, these housholds have a higher WTP, than households that give equal importance to all wildlife. The probable acceptance of proposed fees for such households will have as high as 0.627×10^{-1} units and the result is significant at the 1% level.

The households that expressed wolves as an attraction to watch in comparison with the households that give equal importance to all wildlife, have had lesser WTP. The probable acceptance of proposed fees for them will be less as 0.432×10^{-1} units. The households that selected wild sheep among the mammals as more as an attraction have had more WTP than households that give equal importance to all wildlife. The likelihood of acceptance of proposed fees for such households will be more as 0.168×10^{-1} units. The result has been significant at the 1% level. Also the households that expressed that the cinereous vulture is more of an attraction had more WTP than the households that give equal importance to all wildlife. For these households, the probable acceptance of the proposed fees will be more as 0.174×10^{-1} units. The result is significant at the 5% level. The variable of ethic with negative coefficient is significant at the 5% level. The ethical households had more WTP for recreational use of the BNP. In contrast, the consequence-oriented households have expressed less WTP. In this case, the estimated marginal effect indicates that in consequence-oriented households, the probable acceptance of proposed fees will be less than ethical households as 0.465×10^{-1} units. It should be noted that due to the virtual nature of this variable, the tensile test will not be interpreted from it.

If a head of a household is well-educated, he or she has more WTP for recreational use of the BNP. The result is also significant at the 1% level. The estimated tensile in this variable shows that with a 1% increase in the education level of the person, the likelihood of acceptance of proposed fees will be increased by 0.08%. Also considering the marginal effect statistics, with a 1 unit increase in education, the acceptance probability will be increased as 0.34×10^{-1} units.

Finally, the TC has negatively and high significantly affected on acceptance of the proposed fees. The estimation of tensile in the case of this variable shows that with a 1% increase in the amount of travel cost of the park, the likelihood of acceptance of proposed fees will be decreased as 0.06%. The coefficient of determination of McFadden and Madla beside of the Likelihood Ratio Test with 1% significance indicates that the model is suitable and the significance level is appropriate. Percentage of correct prediction in estimated model is 93.8%. Thus, the estimated model has been able to predict an acceptable percentage of dependent amounts with reference to the explanatory variables. Finally, using integral equation, the average recreational value (leisure, tourism and aesthetic) for each ethical and consequence-oriented household has been estimated based on these mathematical relationships:

$$WTP = \int_0^{40000} \frac{1}{1+\exp\{(-(-..0012)BID+6.289)\}} = 5139.71$$

Consequence- oriented (11)

$$WTP = \int_0^{40000} \frac{1}{1+\exp\{(-(-..0012)BID+7.470)\}} = 6102.88$$

Ethical (12)

Among households with ethical interests, the monthly average WTP per person for each visit time was US$ 2.47; as well the estimated value for individuals with objective interests was US$ 2.08. As expected, individuals with ethical interests, pay US$ 0.38 more for each visit to the park. Ultimately, the following equation, through the calculation of weighted average, the monthly WTP for each person for each visit of the BNP will be US$ 2.03:

The average WTP per a visit time =
0.51× 2.08 + 0.49× 2.47 = 2.03 (13)

Considering 5,955 visitors in 2013 with attention to the average annual visit time for each person which is equal to 3.14, the total recreational value of the Bamu Park was US$ 43940.47 in 2013. Also, the recreational value (leisure, tourism and aesthetic values) of the park has been estimated using the TC parallel to the CV method. The variable of being an indigenous visitor, with negative coefficient is significant at the 10% level. It means that aboriginal individuals have had more visits to the park. Based on research findings, the coefficient of travel cost variable for visiting the place was calculated as -0.00023 at 1% level which shows that with each US$4.0 increase in travel cost, the visit times will be decreased at two times and negative mark of coefficient is also coincident with theoretical principles (**Table 4**). The ethical variable has been significant with positive coefficients at 10% level. Ethical households have less interest to visit the park. The consequence-oriented households versus the last group have expressed more willingness to pay. It is also consistent with the theory and consequence-oriented individuals should first understand the benefits and recreational values of the environment and then they will be ready to pay for it. The variable of education has been significant at the 10% level. It means that people with higher education are less frequent visitors and most of the time, these visits are related to research-educational interests. With the increase in the education level of individuals each year, the visits were averagely reduced twice. The variable of income of the respondent has been significant with positive coefficients at 5% level. Based on calculated coefficient, with US$ 40 increase of income, the visits are increased as much as 0.00002 units (or two times). The variable of gender is avoided to be interpreted because is not significant. The calculated amount of coefficient of determination is equal to 0.71, which shows that 71% of changes in the dependent variable. In other words, the number of visits could be explained by included variables in the model.

Equation of travel cost has been estimated based on the findings of where TC is travel cost and N shows the visit numbers (**Table 4**). Through calculation of integral equations of travel cost in a range between 0 to the maximum travel cost (US$ 159218), the surplus welfare for each visitor has been specified.

N= 36.351- 0.00022831×TC (14)

Considering that the total number of visitors of the park in 2013 was 5,955 and the average visit time for each person is annually equal with 3.14, the recreational value of the park has been estimated US$ 79959.25, using TC method (through multiplying the visitor numbers by the average annual visit times and surplus welfare of each visitors). Also considering the total area of the park which is 38,000 ha, the recreational value per hectare has been determined as US$ 2.1.

CONCLUSIONS AND RECOMMENDATIONS

The recreational value of the park using CV method was estimated as US$ 43940.47. In other words, the valuation of the park using TC has been estimated 1.82 times more than estimated value by CV in 2015. Given that the estimated models are theoretically different, it is not possible to compare them through econometric methods. But considering the characteristics of each model, it could be expressed that the travel cost model is more suitable because it has been determined based on market prices and individual's WTP which are totally realistic. Also the results of TC model are more accurate because in this case, the purpose of travel is only to visit the study area and the visitor has not considered different objectives for the trip and according to research findings, 90.7% of visitors were aboriginal and they selected the BNP only for recreation. Also, the significance level and coefficient of determination of travel cost model and the other

Table 4. The estimation of the recreational value of the Bamo National park using TCM.

Variable	Estimated coefficient	T statistics	Tensile in average
Settlement in Fars province	-10.052	-1.735*	-0.367
Travel cost	-0.00023	-2.993***	-0.159
Ethicalism	4.579	1.77*	0.087
Age	0.221	1.867*	0.064
Gender	-3.214	-0.76	-0.122
Education	-2.009	-1.715*	-0.158
Income	0.00002	2.541**	0.14
Constant factor	35.928	2.879***	-
R-Square=1. 9145 Durbin-Watson=0. 71108			

***, ** and * are respectively significant at 1, 5 and 10 % levels.

estimated statistics imply that the estimated model is ideal from the viewpoint of econometric theory. The variables of being indigenous, distance of visitors' residence from the park, first visit, the number of visits, respondent's moralization, education, travel cost, museum availability and also existence of species including deer, wolf, wild sheep and vulture, have been influential on visitors WTP in the CV method in 2011. It is obvious that the value that each person put on the BNP for recreation is very considerable (US$ 2.34). But due to infrequent number of visitors, the total recreational value of the park will be a small. It means that the park should be noticed by more people. For example, if only 1% of Iranian households (US$ 8.38) visit the park, its recreational value will be US$ 1511336.03. Thus, developing policies to attract visitors and tourists will provide very valuable benefits. Because of its importance, it is suggested that the intensive recreational zone of the park should be outfitted with welfare and residential facilities, transportation facilities to increase citizens' access to the park and such policies can economically provide visit possibility for them. In order to develop tourism and increase interests among visitors who come from far distances particularly foreign tourists, appropriate resting places for daily or nightly inhabitancy should be constructed because it can have very good influence on visitors attraction.

One of the issues presented in the park was the requirement of a permit which is issued by provincial directory of the environmental protection of the Fars province. The process of permit issuance is a barrier against the interests of the people to visit the park. To improve administrative processes, it is suggested that essential permits should be delivered at the environmental monitoring stations which are situated in place. For continuing visitors, discounts maybe given and must be issued special periodical identity cards. Also, as the visitors have expressed their interests about specific species through their WTP, it is suggested that confined spaces to be created in intensive or buffer zones for keeping such species and with this, the visitors can see their favorite animals much easier and with more incentives during their next returns. Variable of education has been influential using both CV and TC. So it is suggested that NGO activities should be strengthen and public awareness about conservation of environmental functions and restoring natural resources should be empowered through media, including radio and TV advertisements.

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