

The process of estimating the recreational value of Sarein spas using visitors' welfare changes

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ABSTRACT: Sarein spas as one of the ecotourism and geotourism attractions in Ardabil Province are among important tourism areas in Iran. An analysis of the recreational value of this attraction can be useful in the prediction of the needs, overcoming the deficiencies, and the development of tourism in the region. The present study aims to estimate the recreational value of Sarein spas using the Contingent Valuation Technique. In order to examine the factors affecting the willingness to pay, the logit model was estimated by the use of the maximum likelihood method. The needed data were collected through questionnaires and face-to-face interviews with 230 tourists visiting the area under study. The results of the study indicated that 93.03% of the visitors were willing to pay in order to use this tourist site. In addition, it was noted that variables such as visitors' income, level of education, and their age have a positive and significant effect on the visitors' willingness to pay. The average willingness to pay was 29430 Rials and the annual recreational value of the spas was estimated as 88290 millions Rials. Given the estimated value of the willingness to pay, the difference between the current entrance fee and the average willingness to pay was 16430 Rials. As a result, there is a possibility of increasing the entrance fee for the recreational place.

Key words: Sarein spas, recreational value, Contingent Valuation Technique, willingness to pay

INTRODUCTION

One of the factors affecting sustainable development is the value given to natural capitals and resources. The valuation of natural resources inevitably directs us to some questions about the quality and the level of the valuation of the environmental resources (Imami Meybodi and Ghazi, 2008). Although environmental economists are being criticized for attaching a price tag to the nature, they believe that the valuation process is essential to the nonmarket environmental functions and goods and services and their denial will result in negative and undesirable consequences for the community in the long term. The estimation of the economic value of environmental services is a complicated and difficult task. However, such estimation seems necessary for the wise management of the environment (Amir Nejad, 2007). The valuation of the nonmarket environmental functions and goods and services is important for a number of reasons such as the recognition of environmental and ecological resources by human beings, the conveying environmental problems to decision makers and planners, creating a link between economic policies and natural earnings, the measurement of the role and the significance of the environmental resources in the support of human welfare and sustainable development, the modification of the national audits and estimations such as GDP, and prevention of the destruction and the immethodical use of natural resources. In addition, the creation of a healthy and constructive community for the continuation of the progress and the economic development requires the establishment, development, and preservation of resorts and tourist areas to respond the increasing needs of human beings (Khodavardi Zadeh et al., 2008). During the recent decades, major advances are made in the development of valuation techniques and the determination of environmental resources. Economic

valuation techniques used for environmental resources can be divided into three groups according to the market view: the valuation through the use of normal markets, the valuation through the use of implicit markets, and the valuation through the use of artificial markets. A normal market refers to a type of market in which the prices are set via demand and supply. The valuation through the use of implicit markets is based on the assumption that there is a link between the consumption of normal goods sold in the markets and the consumption of nonmarket goods such as environmental values. Since there is no market for the benefits gained through natural and environmental resources, attempts are made to value these benefits through artificial markets in the absence of normal markets. This technique is directly dependent on willingness to pay. The most common technique of this type is the Contingent Valuation Method for measuring environmental benefits (Dashti and Sohrabi, 2008). This technique is often considered a good approach for valuing changes in environmental conditions. The main theory behind the technique is the individual utility is maximized or the payable costs are minimized based on the utility constraint (Cooper et al., 2004). Extensive studies have been performed to examine and value recreational and tourist places. Tamass and Christopher (1997) used the above method and concluded that to protect groundwater resources against the chemical pollutant; the U.S. citizens are willing to pay 0 to \$325 annually. Amigos et al., (2002) estimated the protective value of the coastal habitat of Garoun River in France through linear, tobit, semi-logarithmic, and two-step models equal to 66, 67, 13, and 133 francs, respectively. In another study, Collin et al., (2002) estimated the household willingness to pay for the drinking water in desert areas in Mali. To do so, they estimated the willingness to pay through the logit model equal to about 7.8 Francs. Birol et al., (2006) used the Contingent Valuation Method to estimate people's willingness to pay to improve the quality of using water supplies in Chimeditidi Plain in Greece as equal to \$22.3. Wang et al., (2008) measured the price paid for domestic water consumption of Chinese households using multifaceted single selection technique as equal to 2.37 Yuans/ton. Monica et al., (2008) estimated the economic value of the environmental services resulting from the increased quality of water streams in Mexico using the contingent valuation technique. The results of estimation indicated that the household willingness to pay is about 73 pesos a month.

Sarein is a small town located 28 km far from Ardabil to the west. The town is well-known for its countless spas and thus is considered as one of the tourist areas in Ardabil Province. This tourist town with an area of about 1280000 square meters is located at 48° 5' E and 38° 15' N. the town is 28 km far from Ardabil, 230 km from Tabriz, and 619 km from Tehran. The town is on the average about 1650 meters high from the sea level. The average of its maximum temperature is 25 °C and the average of its minimum temperature is – 8.7 °C. As a result, these features give Sarein a high potential for attracting tourists. On the average, about 3 millions tourists use Sarein spas each year. Accordingly, the present study tries to examine the factors affecting the visitors' willingness to pay in order to estimate the recreational value of these spas.

MATERIALS AND METHODS

Many services of natural ecosystems are not traded in the market so people are not able to show their willingness to pay to receive these services. Here the estimation technique is used based on a hypothetical scenario to measure people's willingness to pay in order to benefit from a service provided by the natural ecosystem (Amir Nezhad and Rafei, 2007). Generally, the Contingent Valuation Method is employed as a standard and flexible tool to measure non-consumptive values and nonmarket consumptive values of environmental benefits. This technique is one of the most controversial methods among those used to value environmental endowments (Venkatachalam, 2003). Contingent Valuation (CV) Method tries to determine willingness to pay (WTP) in a particular hypothetical market scenario. In other words, contingent valuation method is essentially attempting to determine how the respondents in a hypothetical market scenario are willing to pay (Imami and Ghazi, 2008). Dichotomous Choice and Double-Bounded Dichotomous Choice questionnaires are employed in this method (Amir Nezhad and Khalilian, 2006). Based on this approach, an amount is presented to respondents. If the respondents respond negatively to the proposed amount, a higher amount will be suggested but if their response is positive a smaller amount will be suggested.

The Logit model was used in the present study to examine the effects of different explanatory (independent) variables on the visitors' willingness to pay to determine the recreational-environmental value of Sarein spas in Ardabil. To determine willingness to pay estimation model, it was assumed that a visitor accepts the suggested amount as the entrance fee to benefit from environmental benefits of Sarein spas based on his utility maximization under the following conditions or reject it otherwise.

The maximum amount a person is willing to pay is the amount that whose utility is the same whether person is willing or unwilling to pay such amount (Hahnemann, 1984 and Lee and Han, 2002). Therefore, we have the following equation:

$$u(1, y - a; s) = u(0, y; s) \tag{1}$$

$$v(1, y - a; s) + \varepsilon_1 = v(0, y; s) + \varepsilon_0 \tag{2}$$

$$\Delta v = 0 \tag{3}$$

If the utility function is linear and considering the indirect utility function to be also linear, the difference between indirect utilities can be obtained as follows:

$$v(h, y - a; s) = \alpha_h + \beta y + \varepsilon_h, \quad \beta > 0, \quad h = 0, 1 \tag{4}$$

$$v(1, y - a; s) = \alpha_1 + \beta(y - a) + \varepsilon_1 \tag{5}$$

$$v(0, y; s) = \alpha_0 + \beta y + \varepsilon_0 \tag{6}$$

$$\Delta v = v(0, y; s) + \varepsilon_0 - v(1, y - a; s) - \varepsilon_1 = (\alpha_0 - \alpha_1) + \beta a + \eta \tag{7}$$

As the mean of η is zero, the function (7) will be written as follows:

$$\Delta v = v(0, y; s) - v(1, y - a; s) = (\alpha_0 - \alpha_1) + \beta a \tag{8}$$

If the value of Δv is equal to zero, the maximum value of willingness to pay will be $-\frac{\alpha_0 - \alpha_1}{\beta}$. Here, U stands for the indirect utility gained by the visitor, y and a are the income of the visitor who suggests the amount or the entrance fee and s shows other socioeconomic features affected by the visitor's taste. Accordingly, ε_0 and ε_1 are random variables with the mean of zero that are distributed equally and independently. Finally, P_i is the possibility of acceptance of a suggestion by the visitor that is obtained by the logit model shown as Eq. (9) (Hahnemann, 1984; Lee and Han, 2002; Haworth and Farber, 2002; and Amir Nezhad and Rafei, 2006):

$$P_i = F_\eta(\Delta U) = \frac{1}{1 + \exp\{-\Delta U\}} \tag{9}$$

$$= \frac{1}{\exp\{-(\alpha - \beta_1 X_1 + \beta_2 X_2 + \theta S)\}}$$

Where, $F_\eta(\Delta U)$ is the accumulative distribution function with one logistic standard difference that includes a number of socioeconomic variables used in the present study. U is the indirect utility gained by the visitor from the Golestan National Park and ΔU is the utility difference derived from willingness or unwillingness to pay for the conservation value of the park. Other socioeconomic variables are represented by S. Finally, the expected value of willingness to pay is measured through the numerical integration technique with the limit of zero to the highest amount suggested as shown in Eq. (10):

$$E(WTP) = \int_0^{Max} F_\eta(\Delta U) dA = \tag{10}$$

$$\int_0^{Max} \left(\frac{1}{1 + \exp[-(\alpha^* + \beta A)]} \right) dA, \quad \alpha^* = (\alpha + \gamma Y + \theta S)$$

Where, E(WTP) is the expected value of willingness to pay and α^* is the adjusted intercept that has been added by the socioeconomic term (a) to the original intercept. Logit models may be estimated in the form of linear

of logarithmic functions. However, the linear function are easier than the logarithmic function to be used to estimate the average E(WTP) and thus has been used in most studies. The parameters of the logit model were estimated through the maximum likelihood method by SHAZAM Software. The elasticity of nth explanatory variable in the logit model can be determined by the following equation (Judge et al., 1982):

$$E = \frac{\partial(B'X_k)}{\partial X_k} \cdot \frac{X_k}{B'X_k} = \frac{e^{B'X_k}}{1+e^{B'X_k}} \cdot B_k \cdot \frac{X_k}{B'X_k} \quad (11)$$

The elasticity of each explanatory variable shows that for a one percent change in X_k how much change will occur in the possible success of the dependent variable $Y_i = 1$. Given the nature of the explanatory variable, there are two separate methods to estimate the marginal effect in the logit model:

1. If X_k is a quantitative variable the changes in the possible success of the dependent variable $Y_i = 1$ due to for a one percent change in X_k called the marginal effect is estimated through the following equation:

$$ME = \frac{\partial P_i}{\partial X_k} = \frac{\exp(B'X)}{(1 + \exp(B'X))'} \cdot B_k \quad (12)$$

As can be seen, the changes in the probability in this model are dependent on the initial values of all independent variables and their coefficients.

If the X_k is a dummy variable its marginal effect is equal to the change in the probability of success of dependent variable $Y_i = 1$ when the value of X_k changes from zero to one, while the other variables are held constant. The value of the marginal effect of the explanatory dummy variable ME_D is estimated via the following equation:

$$P(Y = 1 | X_k = 1, X^*) - P(Y = 1 | X_k = 0, X^*) = ME_D \quad (13)$$

The constants of other variables (X^*) are called the sample mode. The value of the sample mode for dummy variables is equal to their mode and for other variables is equal to their means (Judge et al., 1982).

The needed data were collected in 2009 through researcher made questionnaires filled in by the visitors of Sarein spas who had an independent source of income. The sample under study included 230 persons selected by the use of the Cochran formula and random sampling technique. To measure the participants' willingness to pay, the dichotomous choice questionnaire was used. The questionnaire had two parts: The first part addressed the respondents' demographic information and their socioeconomic features and the second part contained items dealing with their willingness to pay including three prices of 15000, 30000, and 45000 Rials that were selected based on the results of a pretest.

RESULTS AND DISCUSSION

Table 1 shows the respondents' socioeconomic position. The study shows. The mean of the respondents' age, years of education, the family size, and their monthly income are 38 years, 13.5 years, 3.6 persons, and 4630000 Rials, respectively.

As shown in Table 2, workers accounted for 56.95% of the people who visited Sarein spas more frequently than other respondents which is probably due to joint damages resulting from hard physical work. Self-employed people occupied the second position. They comprised 17.39% of the people who visited the spas. Besides, professionals were those who visited the spas least frequently and they were 5.21% of the visitors. Table 3 shows the participants' level of education. The majority of the visitors had an associate degree while the number of illiterate visitors was less than the literate.

Table 4 shows the effects of Sarein spas on the visitors' health. About 45.21% of the visitors believed that the spa water had a positive effect on the treatment of their illness, 33.91% considered this effect as positive, and 4.34% believed the spa water had an excellent effect on the treatment of their illness. And only a small number of the respondents said that the treatment by the spa water was not considerable.

Table 5 shows the participants' willingness to pay to use Sarein spas. As shown in the table, 106 respondents (about 46.08%) did not accept the proposed entrance fee. However, when a lower fee was proposed

43 of them accepted the lower fee. Finally, a higher fee was proposed to 59 visitors who had accepted the initial fee of whom only 17 persons (about 15.45%) accepted the higher fee.

The results of the logit model estimation are presented in Table 6. ANOVA test was used to examine the existence or inexistence of collinearity of the variables used in the present study. The results indicated that there is no collinearity between the exploratory variables.

To check for the variance heterogeneity in the logit and probit models, the Daividsen and Mackinon's (1984) method was used. They introduced LM2 statistics which is based on an artificial regression which has been formed by the estimation of the logit and probit models. This regression was used to test the variance homogeneity. The value of LM2 is 2.69 and since the probability value of LM2 is 0.37 the existence of the variance homogeneity in the model is confirmed.

The logit model in question was estimated in the form of linear and logarithmic functions. The results of the estimation of the two models indicated that the value of the likelihood ratio and the Mc Fadden R-Square for the linear function is higher than that of logarithmic function and thus the linear function was employed. The likelihood ratio was used to check for the overall significance of the estimated regression. The likelihood ratio value was 69.04 for 4 the degrees of freedom. Since this value is higher than the probability value so the whole estimated model is statistically significant at 1% significance level. The values of Estrella R-Square, Maddala R-Square, Cragg-Uhler R-Square, and Mc Fadden R-Square are 58, 46, 66, and 51%, respectively. Given the number of observations of the dependent variable, these are desirable values. Besides, the estimated model was predicted correctly with over 88% precision and as the acceptable level of the correct prediction for logit and probit models is 70% so the value of correct prediction in this model is desirable and the model is highly reliable for subsequent analysis. As shown in Table 6, the estimated coefficients for the participants' age, indigenouness, the income level, recovery from illness, and the suggest fee are statistically significant at 10% significance level. Besides, the respondents' age, the income level, and recovery from illness have a positive effect on their willingness to pay. On the other hand, indigenouness, gender, and the proposed fee have a negative impact on the willingness to pay. This finding was predictable because with an increase in the income level, the willingness to pay to use and preserve Sarein spas will rise sharply. In addition, when the effect of the spa water on recovery from diseases increases, the respondents are more willingness to use spas and even to establish more facilities in the place. Finally, aging along with lower physical ability and the aggravation of joint and bone disorders will increase the willingness to use the spas.

The initial estimated coefficients in the logit model only show the effects of explanatory variables on the possible acceptance of the dependent variable but they do not have any interpretive value. They are rather tractions and marginal effects that are interpreted. Since the tractions are nonlinear functions of the observed values there is no guarantee that logit functions pass through the samples. So there is no limitation in using the traction in the means. Therefore, weighted tractions should be used (Hensher and Johnson, 1981). The weight used to estimate the weighted average is the same as the predicted probability for each observation (Wister, 1999). This traction called the total weight traction has been used to analyze the results of the present study.

The total weight traction for the participants' age, indigenouness, the income level, recovery from illness, and the suggest fee is 0.28, -0.11, 0.41, -0.67, and -0.28, respectively. This traction suggests that a one percent increase in each of the above variables will lead to an increase in the visitors' willingness to pay equal to the above values when other factors being constant. Since the increase in the income level will enhance per capita liquidity for daily activities it will naturally increase the visitors' willingness to pay. Accordingly, the results of studies done by Khodavardi Zadeh et al., (2008), Kavooosi et al., (2008), and Hayati et al., (2010) confirm the positive effect of the income level on the willingness to pay. Besides, a one percent increase in the visitors' age will lead to a 0.28% increase in the visitors' willingness to pay when other things being constant which is contradictory to the findings by Khodavardi Zadeh et al., (2008), Amigos et al., (2002), Rinisdatire et al., (2008) due to old people's willingness to pay to use Sarein spas. The direct relationship between the recovery from illness and the probability of acceptance is due to most people's awareness of the healthy effects of using the spa water with the side effects of chemical medicines which is in line with observations by Amir Nezhad and Rafei (2009) and Satot et al., (2007). The value of the traction for the suggested fee is -0.28 indicating that a one percent increase in the suggested fee will lead to a 0.28% reduction in the visitors' willingness to pay.

The marginal effect for the recovery from illness and the income level is 0.1 and -0.00021, respectively. In other words, a unit increase in the income level will lead to 10% increase in willingness to pay. The marginal effect for the entrance fee is -0.00021, suggesting that a unit increase in the proposed fee will lead to -0.21% decrease in the willingness to pay.

The willingness to pay is 29430 Rials for each visitor according to Eq. 10. Consequently, the annual recreational value of Sarein spas is measured via the following equation:

The annual recreational value of Sarein spas = The average willingness to pay (29430 Rials) × Number of visitors in a year (3000000) = 88290000000 Rials.

Given that the entrance fee for Sarein spas is collected from the visitors and the users, the difference between the willingness to pay and the actual received fee can be determined. At present, the entrance fee for each visitor is 13000 rials and since the willingness to pay is 29430 Rials, the difference between the two values is 16430 Rials showing that the visitors are willing to pay an additional 16430 Rials in order to use better facilities.

Summary and suggestions

Sarein as a tourist and mountainous area has a plenty of spas that are useful for the treatment of skin, muscle, and bone diseases and even psychological disorders. According to experts and practitioners, the effect of the treatment will appear within at least 20 days. So to cure their diseases completely, tourists have to spend a lot of time in Sarein. Therefore, it is very difficult for visitors to meet their basic needs and to find suitable accommodation. Accordingly, the government and the private sector should do their best in order to construct cheap lodging houses and hotels in the area in question.

The sign of the coefficient for the participants' and its value is significantly high, suggesting that old people's willingness to pay is high. In other words, the willingness to pay increases for the older ages. Therefore, the provision of needed amenities such as transportation can be effective in attracting more people.

The results of the present study suggest that the income level is the most important variable affecting the probability of willingness to pay. Since the use of resorts is considered as a luxurious product so demand for such places is high. Besides, the willingness to pay to use tourist area is correlated with high income level. As a result, the policy of increasing the income level of poor families and improving their living conditions can be a good solution in order for people to use resort areas more frequently.

Finally, as the visitors' willingness to pay to use more facilities is higher than the current entrance fee the official can increase the entrance fee to provide more and better facilities so that visitors could spend their time more efficiently and have great time in resort areas.

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Appendixes

Table 1. Socioeconomic characteristics of the sample under study

Variables	Mean	Max	Min	SD
Age	38	65	18	12/8
Academic years	13/5	22	5	3/85
Number of household members	3/6	11	1	1/97
Monthly income.	4630000	10000000	2000000	1690000

Table 2. Frequency of the participants

Job	Professional	Worker	Self-employed	Employee	Retired	Total
Number	12	131	40	34	13	230
Percentage	5/21	56/95	17/39	14/78	5/65	100

Table 3. Participants' level of education

Education	M.A	B.A	Associate	Diploma	High school	Illiterate	Total
Number	9	30	83	72	32	4	230
Percentage	3/91	13/04	36/08	31/30	13/91	1/17	100

Table 4. Affects of Sarein waters on the treatment of diseases

Treatment of diseases	Very low	Low	Average	Good	Excellent	Sum
Number	16	22	104	78	104	230
Percentage	6/95	9/56	45/21	33/91	4/34	100

Table 5. Responses given to three proposed amount to estimate the recreational value of Sarein spas

Acceptance	The initial fee (30000 Rials)		The low fee (15000 Rials)		The high fee (45000 Rials)	
	Number	124	88	36		
Agreement	Percentage	53/91	38/26	15/65		
Disagreement	Percentage	106	16	90		

Table 6. Estimation of the logit model

Variables	Coefficient	t-value	Total weight traction	Marginal effect
Intercept	3.-5	27**.-2	7.-0	-
Indigenoussness	64.-1	29**.-2	11.-0	23.-0
Recovery from illness	74.0	3*	67.0	1.0
The offered fee	0014.-0	52**.-3	28.-0	00021.-0

*: Significance level of 5%
 **: Significance level of 10%.