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Preservative Value of Rudkhan Castle: Protest, Uncertainty, and Unwillingness Behaviors

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Abstract

Economic appraisal of historical sites is the key to planning rural development for their management, preservation, and protection. This study aimed to estimate the preservation use value accrued to visitors to Rudkhan Castle in the northwest Guilan Province, Iran. The visitors' willingness to pay (WTP) was measured by using the contingent valuation method (CVM) and the one-and-one-half-bound (OOHB) model's dichotomous choice (DC) questionnaire. Throughout the research, we stressed that indifference, uncertainty, and protest behavior can and do occur simultaneously in contingent valuation (CV) studies. The results showed that 75 percent of the people in the protection program of Ghaleh RudKhan Castle are willing to pay. The rest are not willing to contribute and are divided into three groups: unwilling to pay (4%), protests (20%), and uncertain (1%). Using the OOHB bid function, an expected WTP recreational value of US$ 0.566 per visit per household was estimated in 2019, and the annual welfare surplus of visitors was estimated at US$ 96250000. The average WTP in the ethical and consequentialist groups was estimated at US$ 0.643 and 0.67325, respectively. Also, the group unwilling to pay or true zeros was composed of seven respondents who explained their reasons as personal budget restrictions (86%) and the unnecessity of the program (14%). The protests group was also composed of 33 respondents and argued that it is only the task of the government (38%), only rural residents should pay (3%), only nonresidents should pay (56%), and not enough information is given on the proposal (3%).

Keywords:
Sacksar Castle; one-and-one-half-bound; protests group; moralistic; consequentialist

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INTRODUCTION

Evaluating non-market functions and services of the environment due to human knowledge and understanding of environmental and ecological benefits, presenting the country's environmental issues to decision-makers and planners, providing a link between economic policies and natural incomes, and assessing the role and importance of environmental resources are important in supporting human well-being and sustainable development, reforming national accounts such as GDP, and preventing the degradation and misuse of natural resources (Guo et al., 2001).

It is difficult and complex but essential for wise management to estimate the economic value of natural resources and environmental services. It is very difficult to obtain quantitative figures of environmental values due to the components that make up the total economic value. Also, if these services are valued in units that are incomparable to other goods' units, humans will often have no idea of environmental goods and services other than taking them as granted. Therefore, inattention to their prices at the decision level leads to the adoption of unsustainable policies (Amirnejad, 2007). At the micro level, valuation studies provide information on the structure and function of ecosystems and their diverse and complex roles in supporting human well-being (Howarth & Farber, 2002).

Preservation of historical monuments was initially an important task as they are legacies for the future. Also, due to their important role in attracting tourists, they contribute to regional growth and development. The historical Rudkhan Castle (Saxar Fortress) is of great importance due to its pristine nature in the ancient broad-leaved forests of Northern Iran and is attractive to both the fans of historical buildings and eco-tourists, thereby contributing to booming the tourism industry in the region. The construction of the castle on the top of two peaks at the heights of 670 and 715 meters is an incentive for mountaineers and athletes to enjoy the beauties of this eye-catching complex and historical monument in addition to mountaineering and climbing. What is obvious is the existence of this historical fortress (Saxar fortress) in the village of Qalehroodkhan (Qaleh Rokhon), and also the forest park complex that has been created due to the existence of this ancient historical monument next to this castle plays a very special role in attracting tourists. Many investments in tourism services have been made in this village, resulting in its rapid development compared to other villages in the province. The existence of this gift has led to a significant increase in the value of the land, property, and assets of villagers and has created numerous job opportunities, e.g., parking lots, resorts,

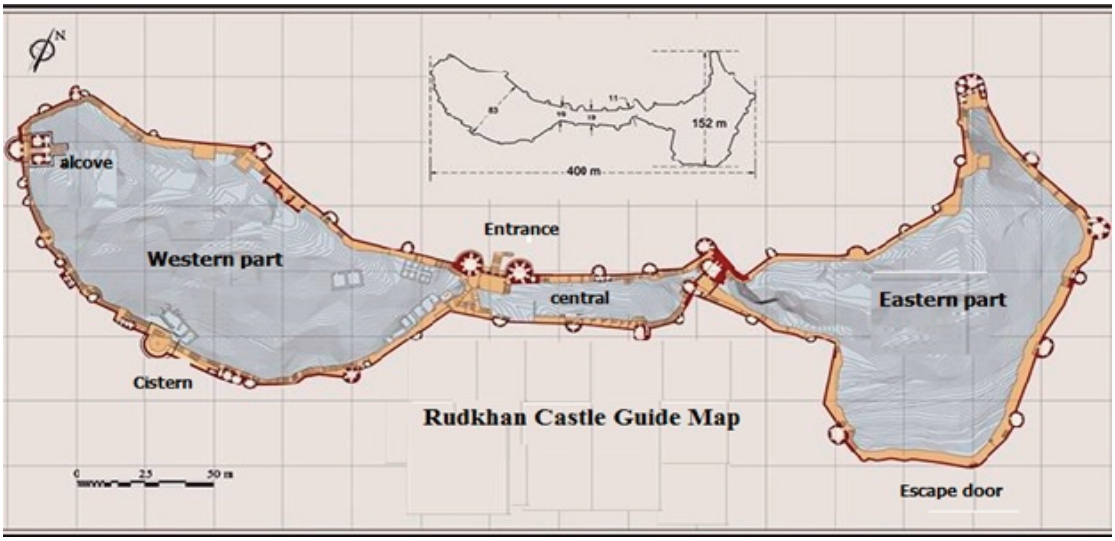

Figure 1. Rudkhan Castle's Guide Map
(General Directorate of Cultural Heritage, Handicrafts and Tourism of Guilan Province, 2015)

restaurants, parks, recreation centers, and shops selling agricultural products, including tea, rice, handicraft, local attire, and local food in this village. Furthermore, Since the city of Fuman will soon become a special economic zone, this historical monument can attract more invethe stors in tourism industry to the region and lead to more economic growth for the region.

According to the statistics obtained from the Management Office of the Qaleh Rudkhan complex, 1,700,000 tourists visited this historical complex in 2018. Currently, tourists should pay US$ 0.5 per person and US$ 2 per vehicle to enter the complex. This high volume of visitors shows the importance of this historical complex in Guilan province and neighboring cities, especially in Mazandaran, Tehran, and Alborz provinces. Studies on the value of the economic function of this complex should have a more realistic view to help plan for the maintenance and development of the recreational and welfare services of the Qaleh Rudkhan complex and increase the general welfare of this unique complex in Iran.

This study estimates the protective value of the historical Qaleh Rudkhan monument from visitors' perspectives according to their WTP. Estimating the economic value of this complex can be a good guide for policymakers and planners of cultural heritage and management of this historical place to determine the appropriate entrance price to visit this recreational and historical complex, provide maintenance costs, build infrastructure and tourist services, and evaluate protection and maintenance policies for the complex. Also, the valuation of this complex can lead to the economic growth of the region, increase the level of employment and income of the residents of this village and its suburbs, and boost the prosperity of ecotourism and tourism in this tourist region.

Many studies have been conducted in different parts of the world to determine the economic value of recreational areas. Researchers in various studies have tried to highlight the importance of conserving natural resources and ecosystems because of the benefits and services they provide to society. Studies conducted in France, Austria, Switzerland, the United Kingdom, Ireland, Thailand, and Japan show that rural tourism has grown rapidly in the rural economy and has complemented agricultural activities (Roknaddin Eftekhari & Ghaderi, 2002).

Methods of stated preferences, such as the contingent valuation method, are highly dependent on empirical programs that involve people who are not interested in the product or service being valued, such as the studies of An and Ayala (1996), Kriström (1997), and Werner (1999); or the opponents of some valuation proposals as mentioned by Brouwer and Martín-Ortega (2012), Calia and Strazzera, (1999), Halstead et al. (1992), and Strazzera et al. (2003). In fact, in many studies, both the willingness and unwillingness to pay are likely to occur simultaneously (Domínguez-Torreiro & Soliño, 2016).

Participants in conditional valuation studies can have different responses to evaluation questions: willingness to pay, objection, unwillingness to pay, uncertainty, and so on. All of these behaviors are possible and the focus of the valuation literature is conditional. Because they can skew the payoff results, researchers have proposed methods that can simultaneously control the above. The following are some studies on the valuation of natural resources, ecosystems, and tourist sites. Mousavi (2015) estimated the ecotourism value of *Khafr* waterfall and historical site and determined the factors affecting WTP using the conditional valuation method. The results showed that 75 percent of visitors were willing to pay for the use of the waterfall. Also, the variables of age, household size, level of education, environmental tendencies, income, and bid price had a significant effect on the probability of willingness to pay, and the variables of gender and distance were not statistically significant but had the expected signs. The average WTP was estimated at 6758.8 IRR. Nakhaei et al. (2010) determined the protective value of *Noor Forest Park* and

measured people's WTP to protect this park. The study used the conditional valuation method and a two-dimensional two-part selection questionnaire. The results revealed that 70 percent of the studied people were willing to pay a sum to protect this complex. The average willingness of each household to pay for the protection of the park was 12646 IRR/month. In other words, each household is willing to pay 151752 IRR of its annual income to protect this park. Also, the annual conservation value of the park was estimated at 229707314 IRR/hectare.

Sabouhy and Ataie Solout (2014) used the one-and-one-half-bound dichotomous choice (OOHB) in conditional valuation to determine the consumer surplus of tourists in *Si Sangan Forest Park*. In this study, the willingness to pay was calculated for people with ethical and consequential tendencies separately. Based on the research findings, the variables of offer amount, household size, number of annual visits, ethics, and monthly household income showed a significant effect on WTP. Among households that had goal-oriented tendencies, the average WTP/person/household was 11,751 IRR, and it was 13,409 IRR for individuals with moralistic tendencies. The average willingness of households to pay was estimated at 12201 IRR, the total recreational value of the park using OOHB was 11.32 billion IRR, and the value of each hectare was estimated at 377 million IRR in 1991. Ana (2017) examined the status of ecotourism, agricultural tourism, and rural tourism in the European Union (EU). According to the results, the EU is very active in supporting agricultural tourism and sustainable development, and many policies, programs, and initiatives are focused on these three types of tourism, which have positive effects on economic, social, and environmental indicators. As well, they have increased investment and attracted more tourists to the area.

Schuhmann et al. (2019) examined visitors' WTP for the protection of the *Barbados* Sea. In this study, parametric and non-parametric methods were used to investigate the factors affecting visitors' WTP for coastal and marine protection. The results showed that the average WTP for each trip to *Barbados* was between US$ 36 and US$ 52. It was suggested that such payments should be allocated to a protection fund if realized. Also, local visitors were not willing to pay such a fee. In a study on a rural development program, Domínguez-Torreiro and Soliño (2016) presented an economic approach to modeling uncertainty, unwillingness to pay, and protest behaviors in conditional valuation studies. The results show that a simple analytical approach that excludes opponents from the analysis tends to make people more interested in running the program.

The present study used the one-and-one-half-bound dichotomous choice conditional valuation to estimate the protective value of the historical *Rudkhan Castle* and calculate the willingness of different groups of visitors, including moralists, consequentialists, and opponents, to visit this historical monument. It is worth mentioning that so far no study has been done on the conservation value of this historical monument. The bid amounts were selected by Cooper's method, which results in providing a range of bid amounts that, while fully covering the hypothetical statistical distribution curve, minimize the squares of error in calculating WTP. In most studies in Iran, the bid amounts are individual and do not provide a complete design of the bid amounts, resulting in a skewed estimation of people's WTP. The visitors' WTP was calculated by estimating the multivariate likelihood function. The study calculated WTP for ethical and consequential groups separately and listed the reasons for protesters' unwillingness to pay. The results can provide a more accurate management perspective to the authorities to attract more investors in providing tourism services in this region and attracting visitors to this historical complex.

METHODOLOGY

Resource valuation methods are divided

into two categories: the revealed preferences and the stated (or expressed) preferences categories. The former category includes market price methods, production function method, hedonic method, and travel cost method, and the latter includes conditional valuation methods and multi-attribute valuation such as conditional selection test and ranking. In the resource valuation literature, the conditional valuation method uses a survey to extract WTP for access to a recreational environment or other non-market commodities (Kanninen, 1993). The conditional valuation method is generally used as a standard and flexible tool to calculate non-consumption and non-market consumption values of environmental resources (Hanemann, 1984). We first provide information on conditional valuation methods and then, describe the method used in the research.

To calculate people's WTP, the one-bound method was first used and it was, then, transformed into another double-bound method. A new form of conditional valuation called the one-half-bound method was introduced by Cooper et al. (2002). Based on studies by Cooper et al. (2002), Cooper and Loomis (1992), and Cooper and Signorello (2008), the conditional valuation method that uses a one-half-bound questionnaire has increased the efficiency of its estimators compared to the single-bound dichotomous method. On the other hand, it eliminates the inconsistency between the first and second proposition (follower) in the double-bound method.

Single bound dichotomous choice

The single bound dichotomous choice method was first introduced by Bishop and Herberlin (1979). In this method, only one amount is offered to each respondent. Respondents answer with only "Yes" or "No" when faced with a bid in a hypothetical market situation. The probability of yes and yes answers is summarized in the following relationships (Cooper et al., 2002).

$$\pi_i^N \equiv \Pr\{No\ to\ B_i^*\} \equiv Pr\{B_i^* > C_i\} = G(B_i^*, \theta) \quad (1)$$

$$\pi_i^y \equiv \Pr\{Yes\ to\ B_i^*\} \equiv Pr\{B_i^* \leq C_i\} = 1 - G(B_i^*, \theta) \quad (2)$$

Assume that C_i is the maximum willingness of a p actually pay for the subject, which can be a function of the socio-economic characteristics of the person, such as income and the price of substitute or complement goods related to the subject. Behavioral variables include age, gender, environmental support, and more. Also, according to the feature of the random utility function, individual WTP is a random variable that indicates changes in individual preferences plus unobserved variables or the amount of error in the observed variables. Therefore, while one knows the amount of WTP (C_i), this value represents a random variable with a definite cumulative distribution function (cdf), which is expressed as in which θ represents the distribution parameter based on the method. The conditional valuation can be estimated. These parameters are a function of the Xi vector variables that are implicit in (Cooper et al., 2002). G represents the cumulative density function for the distribution of the dual response variable. The likelihood function about dichotomous answers single-bound method is described in Equation (3) and it is obvious that the model parameters are obtained from estimating this relationship.

$$LnL^{SB}(\theta) = \sum_{i=1}^{N} \{d_i^Y \ln[1 - G(B_i^*, \theta)] + d_i^N \ln[G(B_i^*, \theta)]\} \quad (3)$$

in which if the i-th answer is "yes" and otherwise it is zero. Similarly, if the i-th answer is "no" and otherwise it is zero.

Double bound dichotomous choice

According to Kanninen (1993), Carson and Hahnemann modified the single-bound dichotomous choice method in 1985 and proposed the double-bound dichotomous choice method (DBDC). This method requires the determination and selection of a bid more than the initial bid so that the bid depends more on the answer "Yes" or "No" or the response of the respondent to the first bid (Reynisdottir et al., 2008; Samdaliry et al.,

2014). In the DBDC method, the evaluation begins with the initial presentation of B_i^0. If the answer of the respondent to this value is positive, then the second bid is suggested to be , and if the answer to the first bid is negative, another price is offered which is . In this case, we see four results: (Yes, Yes), (Yes, No), (No, Yes), and (No, No). In the (Yes) state, the visitor responds positively to both the initial and the higher bid (Cooper et al., 2002).

$$\pi_i^{YY} \equiv Pr\{B_i^U \le C_i\} = 1 - G(B_i^U, \theta) \quad (4)$$

$$\pi_i^{YN} \equiv Pr\{B_i^0 \le C_i \le B_i^U\} \equiv G(B_i^U, \theta) - G(B_i^0, \theta) \quad (5)$$

$$\pi_i^{NY} \equiv Pr\{B_i^D \le C_i \le B_i^0\} \equiv G(B_i^0, \theta) - G(B_i^D, \theta) \quad (6)$$

$$\pi_i^{NN} \equiv Pr\{C_i \le B_i^D\} \equiv 1 - G(B_i^D, \theta) \quad (7)$$

The likelihood function in relation to the dichotomous choice responses considering a statistical distribution is as follows, from which the model parameters are obtained (Cooper & Loomis, 1992):

$$LnL^{DB}(\theta) = \sum_{i=1}^{N} \{d_i^{YY} \ln[1 - G(B_i^u, \theta)] + d_i^{YN} \ln[G(B_i^u, \theta) - G(B_i^0, \theta)] + d_i^{NY} \ln[G(B_i^0, \theta) - G(B_i^D, \theta)] + d_i^{NN} lnG(B_i^D, \theta)\} \quad (8)$$

$d_i^{YY}=1$ Is If i is the best answer (yes, yes) and otherwise it is zero.
$d_i^{YN}=1$ Is If the i answer is (yes, no) and otherwise it is zero.
$d_i^{NY}=1$ Is if the i answer is (no, yes) and otherwise it is zero.
$d_i^{NN}=1$ Is if the i answer is (no, no) and otherwise it is zero.

Maximum Likelihood Estimator (MLE) We denote by , Related information matrix, Equivalent to the negative is the logarithmic Maximum Likelihood function of the expected equation (8), (Cooper et al., 2002).

One and one half bound dichotomous choice

This method was proposed by Cooper et al. (2002) following the discrepancy between the amounts of the second bid and the first bid in the double-bound method in order to increase the efficiency of calculating the willingness of individuals to pay in the conditional valuation method. In the one and one half bound dichotomous choice (OOHB) method, the respondent is initially faced with a range of proposed amounts $[B_i^-, B_i^+]$ so that $[B_i^- < B_i^+]$. First, one of these two prices is randomly selected and the person is asked to express his/her WTP in comparison with the offered price. The second bid price will be raised only if it matches the answer to the first question. That is, if a lower price (B_i^-) is randomly selected as the initial bid, the results are (No), (Yes, No), and (Yes, Yes), and if a higher price (B_i^+) is randomly selected as the initial bid, the results will be (Yes), (No, Yes), and (No, No). In this case, the probability functions corresponding to the above answers are as follows (Cooper et al., 2002).

$$\pi_i^N = \pi_i^{NN} = pr\{c_i \le B_i^-\} = G(B_i^-, \theta) \quad (9)$$

$$\pi_i^{YN} = \pi_i^{NY} = pr\{B_i^- \le c_i \le B_i^+\} = G(B_i^+, \theta) - G(B_i^-, \theta) \quad (10)$$

$$\pi_i^{YY} = \pi_i^Y = pr\{B_i^+ \le c_i\} = 1 - (B_i^+, \theta) \quad (11)$$

Therefore, the logarithm of the likelihood function based on the above answers in OOHB format will be as follows (Cooper et al., 2002).

$$LnL^{OOHB}(\theta) = \sum_{i=1}^{N} \{d_i^Y \ln[1 - G(B_i^+, \theta)] + d_i^{YN} \ln[G(B_i^+, \theta) - G(B_i^-, \theta)] + d_i^N \ln[G(B_i^-, \theta)]\} \quad (12)$$

$d_i^N=1$ if if it starts with (B_i^-) and the answer is (no) or if it starts with (B_i^+) and the answer is (no, no), otherwise it becomes zero.
$d_i^{YN}=1$ if it starts with (B_i^-) and the answer is (yes, no) or if it starts with (B_i^+) and the answer is (no, yes) and otherwise it becomes zero.
$d_i^{YY}=1$ if it starts with (B_i^-) and the answer is (yes, yes) or if it starts with (B_i^+) and the answer is (yes) and otherwise it becomes zero.

In the OOHB format evaluation method, be-

cause the respondent is faced with the cost spectrum at the very beginning of the evaluation, it is believed that the possibility of incorrect cost expectations and entering into bargaining will be minimized. For this reason, it is proved that according to the stated advantages and according to practical experience, the probability of conflict and incompatibility between the first and second answers in the OOHB format is much less than that in the DBDC format (Cooper et al., 2002).

To estimate Equation (12), a disruption component is added to the right side of the equation and five statistical distributions (normal, logistic, Weibull, normal log, logistic log) are predicted by default for it. Each of these statistical distributions for the error component is selected by trial and error and finally, the researcher decides on the selection of the final form of the likelihood function based on the values of the logarithm of the likelihood and the number of significant coefficients of the explanatory variables[1].

In experimental research, the variable of WTP behaves like an unknown random variable, which according to Hanemann (1984), the mathematical expectation (or conditional mean of compensating variation) of this random variable is estimated by calculating the following integral numerically.

$$E(WTP) = \int_0^{\infty} [1 - F(b)]db - \int_{-\infty}^{0} F(b)db \qquad (13)$$

in which F(b) is the cumulative density function (CDF), and the random variable is WTP in proportion to the assumed statistical distribution, which has a probability value equal to WTP≤b.

We assume that in most cases, WTP is a non-negative random variable (in other words, we are dealing with goods that offer positive utility) in which case its mathematical expectation is reduced to the following formula (Cooper, 1993):

$$E(WTP) = \int_0^{\infty} [1 - F(b)]db \qquad (14)$$

How to extract the proposed amounts

In Cooper's (1993) study on bid distribution with equal area bid selection, the bids are determined. This method is an iterative two-step model. In the first stage, a number of unique bid amounts (m), total sample size (N), and a default probability distribution based on the pre-test questionnaire for WTP are considered. Proposals are then divided into small intervals with equal probability ready (in other words, the area under the probability density function is divided into equal areas). Proposals are, then, divided into small intervals with equal probability ready (in other words, the area under the probability distribution function is divided into equal areas). In step 2, to adjust the amounts proposed in step 1 and the total number of preset samples and the prior probability distribution, the variance of the allocation minimization is determined as n1,..., nm. This step is repeated for m values from 1 to N to find the value of m^* that minimizes mean squared error (MSE) and the allocation is calculated. This procedure provides a systematic and controllable solution for designing proposed amounts in contingent valuation (Cooper, 1993). Therefore, the number of proposed values (m) is equal to the number of areas under the curve minus one, and the p_i command corresponding to b_i is defined as follows:

$$P_i = \left(\frac{1}{m+1}\right) \times I, \qquad \text{for } i = 1, \dots, m \qquad (15)$$

In the Cooper method, half of the proposed amounts are allocated to each side from the middle. Structurally, this method is designed to compare the information received from the concentration of bids in the distribution center and the information received from the placement of bids in various and complete domains of distribution. To find the optimal bids, we must minimize MSE (Cooper, 1993; Molaei, 2013):

[1] It has been used to estimate the DC choice software package under scripting in R software.

$$MSE\left(\widehat{WTP}\right) = \left(WTP - \widehat{WTP}\right)^2 + var\left(\widehat{WTP}\right) \quad (16)$$

Subject to:

$$\sum_{i=1}^{m} n_i = n \qquad where\ n_i \geq 0 \quad for \quad i = 1, \dots, n \quad (17)$$

$$\widehat{WTP} = \sum_{i=1}^{m} \Delta b_i q_i \quad (18)$$

$$\Delta b_i = \frac{b_{i+1} - b_i}{2} \qquad for \quad i = 1, \dots, m-1 \quad (19)$$

$$Var\left(\widehat{WTP}\right) = \frac{\sum_{i=1}^{m} (\Delta b_i)^2 q_i (1 - q_i)}{n_i} \quad (20)$$

in which represents the estimated WTP, represents the average minimum squares error of the estimated WTP, represents the variance of WTP. The result of this minimization gives the optimal value of n_i as follows (Cooper, 1993):

$$n_i^* = \frac{\Delta b_i [q_i(1 - q_i)]^{1/2}}{\sum_{j=1}^{m} \Delta b_j [q_j(1 - q_j)]^{1/2}} n \qquad i = 1, \dots, m \quad (21)$$

After is calculated by Equation (21) and the value (WTP)ˆis obtained from Equation 18, these values are placed in Equation 16. Because the true amount of WTP is not known, the average WTP values obtained from the pre-test of the open-ended questionnaire are used instead of WTP. In this study, the pre-test data related to estimating the conservation value of the historical Rudkhan monument (Saxar fort) were used. To do this, by designing a questionnaire for socio-economic variables and an open-ended question from visitors, WTP for each visit was asked. For this purpose, 42 pre-test questionnaires were randomly completed by visitors on different days of the week in 1997. Equations 16 to 21 were then calculated iteratively for different values of m from 1 to n to obtain the optimal value of m that would minimize MSE (WTP)ˆ, and then bi* was calculated. The results of calculating the proposed amounts are presented in Table 1. As can be seen, the lowest bid was zero and the highest was US$ 2.5. The highest frequency was related to the offer range [1.25-1.5] and the lowest frequency to the range of [0-0.0375]. It should be noted that the bid amounts were rounded to an integer. It is worth mentioning that the information from the pre-test questionnaire was used only to calculate the bid amounts and sample size. Michel and Carson's (1989) formula was used as follows to determine the sample size required for the main research questionnaire.

$$N = \left(Z\hat{V}/\delta\right)^2, \quad V = \sigma/TWTP \quad (22)$$

in which N is the required sample size, d is the difference between the actual WTP and its estimated average value (or error percentage), Z is the critical value for the student's t-distribution statistic (1.96 and 1.69 for the 95% and 90% confidence levels, respectively), and s is the WTP standard deviation value based on the values obtained from the pre-test questionnaire. Also, reasonable values of s from 0.05 to 0.3 are based on the researcher's choice and sampling costs.

$$V = 2502.6/2280 = 1.097$$

$$N = (1.96 \times 1.097/0.17)^2 \cong 162$$

The total number of required samples at the 95% confidence level and 17% difference percentage is equal to 162. The statistical results related to the completion of questionnaires are presented in Table 1.

RESULTS AND DISCUSSION

The results showed that the mean age of the respondents was 36.6 years and 108 respondents (66.6%) were male and 54 (33.4%) were female. In terms of educational level, 96 people (59.26%) had an academic education, 53 people (32.72%) had a diploma, and 13 people (8.02%) had a postgraduate degree. Also, 38 people (23.46%) were single, 28 people (17.28%) had a family of 2, 56 people (34.57%) had a family of 3, and 40 people (24.69%) had a family of 4 or more. In terms of the residential area, 129 people (79.63%)

Table 1

Summary of the responses to the OOHB questions on willingness to pay for protection

Sample size	Upper bound bid offered first			Lower bound bid offered first			Bid [BL, BU] $
	No. of 'no-no' responses	No. of 'no-yes' responses	No. of 'yes' responses	No. of 'yes-yes' responses	No. of 'yes-no' responses	No. of 'no' responses	
2	0	0	2	0	0	0	[0-0.0375]
7	0	1	3	3	0	0	[0.0375-0.1625]
12	3	1	3	4	1	0	[0.1625-0.25]
11	0	0	7	4	1	0	[0.25-0.35]
10	0	3	2	2	1	2	[0.35-0.425]
10	3	2	0	3	0	2	[0.425-0.5]
10	2	3	0	1	3	1	[0.5-0.575]
10	1	2	2	1	2	2	[0.575-0.65]
10	0	2	3	3	1	1	[0.65-0.725]
10	1	3	1	1	2	2	[0.725-0.8125]
10	5	0	0	0	0	5	[0.8125-0.9]
11	6	0	0	2	1	2	[0.9-1]
12	5	1	0	0	0	6	[1-1.125]
13	5	1	0	0	0	7	[1.125-1.25]
17	8	1	0	0	4	4	[1.25-1.5]
7	4	0	0	0	0	3	[1.5-2.5]

were native to Guilan province, 32 people (19.75%) were living in other provinces, and one participant was living abroad. Also, 121 people (74.7%) were willing to pay to visit this historic castle and 41 people (25.3%) weren't, out of who 40 were natives of Guilan province and 19 of them did not want to pay the entrance fee because they were natives of *Fooman* city.

Regarding the opposition group, as shown in Figure 2, the respondents who do not answer "definitely yes" to the bids fall into two general categories. The first group includes those who are willing to pay but the offered amounts are higher than what they want, and the second group includes those who, for some reason, are not willing to pay. The second category includes two groups of protesters and absolute zeros. Protesters have expressed four different views on the unwillingness to pay. 38.3 percent of these people consider this to be the duty of the government and believe that the government should use other tax sources to protect this monument. 2.9 percent of the visitors believe that the residents of the village should pay tolls to protect this historical monument because preserving this monument is a very good economic opportunity for the natives of the village and due to its high talent in attracting tourists, it causes prosperity and rural development. 55.9 percent of the protesters, who are natives of *Fooman* city, believe in receiving entrance fees from non-native tourists and have a sense of land ownership and consider the free use of this tourist complex as their inalienable right. 2.9 percent also referred to insufficient information on how to pay these fees to protect the collection as a reason for their unwillingness to pay. Also, a group is willing to pay zero, which means that they are not against the nature of the entrance program to visit this fort, but due to restrictions, they are not willing to pay. According to the information obtained, 85.7 percent of this group, whose WTP is absolute zero, referred to their limited personal budget, and 14.3 percent of them are reluctant to pay entrance fees to protect this collection due to the lack of a program (Figure 2).

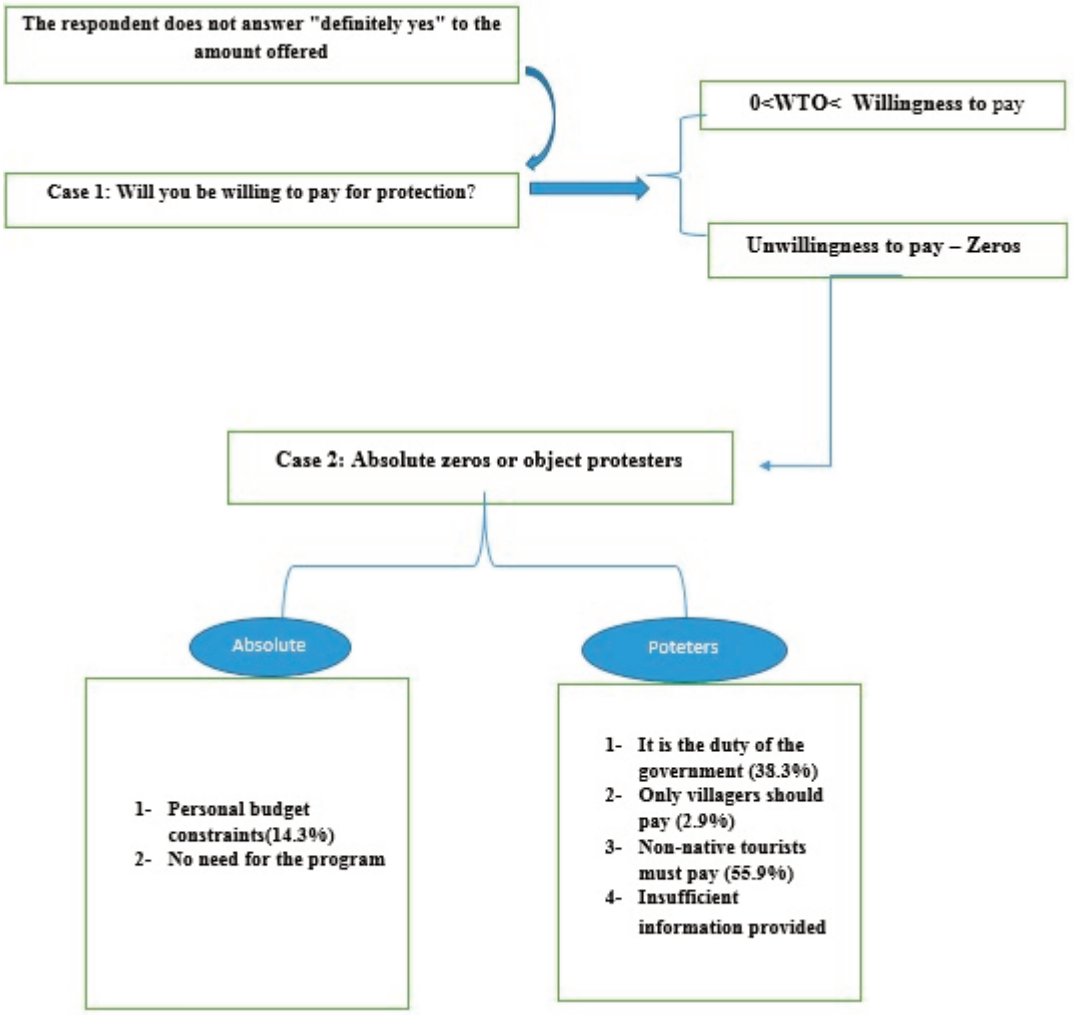

Figure 2. Reaction of Visitors Opposed to Payment

The results of estimating the maximum likelihood of Equation (12) are presented in Table 2. Based on the results, the average willingness to pay Hanemann (1984) adjusted based on relation number (14), for each visit, the amount of 0.56625 $ was calculated.

As can be seen in Table 2, the age variable has a positive effect on WTP. In other words, older people have shown more WTP than younger ones to protect this historic fortress, which indicates their greater responsibility to preserve ancient artifacts and pass them on to future generations. There is also a tendency to preserve nature in this group. The gender variable has a negative effect on WTP and indicates that men tend to pay more than women, but this difference between women and men is not significant. The variable of the number of years of study has a positive and significant effect on visitors' WTP. This means that the more education there is, the more people will be willing to pay. In fact, with the increase in education and awareness of the value of natural resources in maintaining public health and the value of historic buildings as a relic of the past and their great role in attracting tourism and economic prosperity of the region, WTP to preserve these monuments increases. Household size also has a significant negative effect on WTP, which means that as the number of household members increases, WTP decreases, which can be due to the lower level of welfare in

Table 2

Results of Estimation of Willingness to Pay for the Protection of the Historical Fort of Castle Rudkhan

Variables	Coefficients	Standard error	Z Statistics
Intercept	16.91	2.05	8.22***
Age	0.038	0.01	1.99
gender	-0.40	0.26	-1.54
Education	0.11	0.04	2.71**
Family size	-0.6	0.14	-4.16***
Log-Bid	-2.28	0.23	-9.68***
Mean WTP at the maximum bid ($) 0.56625			
Mean WTP at the maximum bid with Adjustment ($)			0.56625
Log-likelihood: -139			LR statistic: 33.616 on 4 Df
		AIC: 290.7	BIC: 309.24

***p<0.01, **p<0.05, *p<0.1

densely populated areas compared to low-income households. The logarithm variable of the bid amount also showed a negative and significant effect on WTP, which indicates that the higher the bid amount to pay, the lower the willingness of respondents to pay, which is consistent with the demand theory.

One of the applications of the optimal method of selecting the proposed amounts, which is a complete design, is to calculate WTP protection separately for the jobs referred to Rudkhan Castle. Considering that there were different strata in the research samples, for these special strata, the orthogonality function related to the one-and-a-half-dimensional selection was estimated separately for the specific strata and the most appropriate form of statistical distribution was selected. WTP for protection in different occupational groups is presented in Table 3.

As can be seen in Table 3, the relationship between the bid and WTP is significant for the freelance group and employees at the 1% level and for the group of housewives at the 5% level. In other words, determining the entrance fee for all classes has a strong and negative relationship with their WTP. This means that the lower the entrance fee, the more likely the WTP will be and the demand will be to visit Rudkhan Castle. Among the groups visiting the historical fort of Qaleh Rudkhan, the highest WTP is related to the group of employees (US$ 0.5225) and the lowest is related to the group of self-employed people (US$ 0.475). Housewives' WTP was estimated at US$ 0.4825. Therefore, it can be

Table 3

Results of Estimating the Willingness to Pay for Protection by Occupation

Mean WTP at the Adjustment ($)	**Distribution**	**Model coefficients**						**Visitor groups**
		Number of households	**Education level**	**Age**	**sex**	**bid**	**Intercept**	
0.4825	Log-Normal	-	-	-	-	-4.24**	31.962**	House wives
0.475	Log-Normal	-0.382*	0.196**	0.026	0.32	-1.66***	9.31***	Self-employed
0.5225	Log-Normal	-1.03***	-	0.04-	-	-2.28***	18.437***	Employees

***p<0.01, **p<0.05, *p<0.1

concluded that employees, more than other classes of society, tend to create and develop recreational spaces in forest parks and are willing to pay more than other classes to visit parks and monuments.

For all groups visiting Rudkhan Castle, the relationship between WTP and the amount offered is negative and very significant. In the group of housewives, the sensitivity between the amount offered and WTP is more than about twice as high as in other groups. In other words, with a slight increase in the bid amount, WTP decreases further, while this sensitivity is much less for freelancers. In other words, the self-employed group is less sensitive to the increase in the bid amount. Employees are between the two groups of freelancers and housewives in terms of sensitivity to the bid. This indicates that the demand for recreation in Qala-e-Rudkhan is very elastic for the group of housewives and low-elastic for the group of freelancers, and the price elasticity of demand is moderate for the group of employees.

In the employee group, the relationship between age and WTP was positive but not significant. In other words, among employees, older people tend to pay more and this shows the importance of a forest park to fill employees' leisure time. This situation is also seen in the group of freelancers. In other words, the relationship between the age of this group and WTP is positive and significant at the level of 10%. This implies that older people are more willing to pay than younger people. Also, the relationship between the household dimension and WTP in the group of employees and freelance jobs is negative and significant. However, this coefficient is about three times as greater for employees as for the self-employed group (ratio 1.03 to 0.382).

One of the applications of the optimal method of selecting the proposed amounts is to calculate WTP for protection separately for ethical and consequentialist groups. As can be seen in Table 4, the relationship between the amount of the offer and WTP is very significant and has become significant for both ethical and consequential groups at a level of less than 1%. In other words, determining the entrance fee for both groups has a strong and negative relationship with their WTP. In other words, the lower the entry fee, the more likely you are to pay to protect the historic fort of Rudkhan Castle.

WTP in the consequentialist group with an average of US$ 0.67325 is more than the ethical group, which shows the strategic value of this historic fortress in the economic growth of this village and region in terms of attracting investors in tourism, construction of accommodation, recreation, and prosperity of local businesses. In other words, people whose inclinations are based on recreational outcomes and visits to antiquities tend to pay more.

The average WTP of the ethical group is US$ 0.643. In both consequence and ethical groups, education has a positive and strong statistical relationship with WTP, especially in the ethical group, where this statistical relationship has become significant at a level of less than 1%. In the ethical group, the rela-

Table 4

Results of Estimating the Willingness to Pay for Protection among the Ethical and Consequentialist Group

Visiting groups	Intercept	Coefficients					Disturbance distribution	WTP
		Age	gender	Education	size of the household	Log(bid)		
Ethical	22.7***	0.04	-1.1*	0.14*	-0.97***	-2.91***	Weibull	0.643
Consequence	17.49***	0.02	-0.32	0.13**	-0.37*	-2.42***	Log-Normal	0.67325

***p<0.01, **p<0.05, *p<0.1

tionship between gender and the tendency to pay is negative and statistically significant at the level of less than 10%. In other words, the ethical group with a male gender is more willing to pay for protection. Also, in both groups, WTP has a statistically significant negative relationship with the number of household members, but in the group of ethicists, this relationship is statistically very significant.

In both groups (ethical and consequentialist), the relationship between age and WTP was positive but not statistically significant. In other words, in both groups, as age increases, WTP to protect this collection increases, reflecting the importance of preserving this historic fortress for future generations from the perspective of older people. The variable of gender in both groups had a negative effect on WTP and this effect was significant for the ethical group at the level of 10% and not significant for the consequentialist group.

The results of this study are in some cases consistent with the results of previous similar studies, The positive effects of education on WTP has also been reported by Raheli et al. (2013), Sahabi et al. (2011), Mousavi (2015), and Khaksar Astaneh et al. (2011). Also, the negative effect of the bid on WTP has bene observed by Mousavi (2015) and Khaksar Astaneh et al. (2011), and the negative effect of family size on WTP has been obtained by Khaksar Astaneh et al. (2011). The effect of gender varied in different studies, which seems to depend on the employment status and income of the interviewees.

CONCLUSION

Management and valuation of environmental resources and tourist sites, especially in rural areas, are very important to prevent the destruction and damage to these resources. It also paves the way for rural development and provides local residents with access to more amenities. The development of rural tourist attractions paves the way for the creation of sustainable employment in rural areas and not only prevents the migration of villagers to urban areas but also leads to reverse migration from cities to villages. Therefore, to keep rural and economic development of these areas, we need to maintain and improve the welfare facilities and tourist attractions. Therefore, it is suggested that the tolls obtained from the entrance of Qaleh Rudkhan historical fort (Saksar fort), which is collected directly by the Cultural Heritage Office of Fooman city, be based on the priority first to strengthen and repair the destroyed parts of the fort and maintain this valuable historical monument. Provision of amenities, sanitary services of the complex, accommodation for travelers, and interior beautification of this historic fortress will be allocated and then allocated and spent to hold programs to promote environmental protection and historic buildings.

The following recommendations can be made based on research on this historical collection:

- Considering that the relationship between the bid and WTP in the groups visiting Qaleh Rudkhan Forest Park is negative but statistically significant, it is recommended to have the necessary variety in determining the entrance rate and use different bids for different groups based on their WTP. Among these groups, special attention should be paid to housewives, employees, and retirees, and special facilities should be provided for them (such as allocating special hours for women and children to use or equipping the park with sports and recreational facilities for women) to increase the demand of these groups for this collection. Estimated amounts for these groups are also a good guide for determining entry in this regard.

- Due to the fact that the relationship between the number of household members and WTP is negative and statistically significant, to increase the demand for groups visiting the forest park, a special discount (e.g., half price) can be considered for children and adolescents to encourage the inclusion of children and adolescents in the complex and

to promote a culture of environmental protection and the protection of natural resources and recreational areas in the community.

- Also, considering that education has a positive and significant effect on visitors' WTP, it is recommended for students from primary school to the end of secondary education, continuing education in recognizing environmental values, preservation of natural resources and recreational areas, the importance of historic buildings, The economic value of ecosystems and natural and historical recreation areas should be included in the school curriculum. Also, programs should be defined and implemented in the national media to educate the public in this regard.

- Considering that Rudkhan Castle is registered as a national monument, it is suggested that the traditional texture of the complex be preserved in the design of shops that are being built inside this tourism complex and that the Ministry of Tourism and Cultural Heritage be in charge of preserving historical sites. Traditional tourism prevented the construction of buildings with foreign and non-indigenous styles by complex management.

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RESOURCES

Amirnejad, H. (2007). Estimating the Preservation value of Golestan National Park of Iran by using individual's willingness to pay. Journal?Vol?PP?

An, M. Y., & Ayala, R. A. (1996). A mixture model of willingness to pay distributions. Available at SSRN 15524. ??????

Ana, M.-I. (2017). Ecotourism, agro-tourism and rural tourism in the European Union. *Cactus Tourism Journal, 15*(2), 6-14.

Brouwer, R., & Martín-Ortega, J. (2012). Modeling self-censoring of polluter pays protest votes in stated preference research to support resource damage estimations in environmental liability. *Resource and Energy Economics, 34*(1), 151-166.

Calia, P., & Strazzera, E. (1999). Sample selection model for protest votes in contingent valuation analyses. Available at SSRN 200620. ??????

Cooper, J., & Loomis, J. (1992). Sensitivity of willingness-to-pay estimates to bid design in dichotomous choice contingent valuation models. *Land Economics,* Vol? 211-224.

Cooper, J. C. (1993). Optimal bid selection for dichotomous choice contingent valuation surveys. *Journal of Environmental Economics and Management, 24*(1), 25-40.

Cooper, J. C., Hanemann, M., & Signorello, G. (2002). One-and-one-half-bound dichotomous choice contingent valuation. *Review of Economics and Statistics, 84*(4), 742-750.

Cooper, J. C., & Signorello, G. (2008). Farmer premiums for the voluntary adoption of conservation plans. *Journal of Environmental Planning and Management, 51*(1), 1-14.

Domínguez-Torreiro, M., & Soliño, M. (2016). Pricing a rural development program: uncertainty, indifference, and protest behaviors. *Agricultural Economics, 47*(5), 559-569.

Guo, Z., Xiao, X., Gan, Y., & Zheng, Y. (2001). Ecosystem functions, services and their values–a case study in Xingshan County of China. *Ecological Economics, 38*(1), 141-154.

Halstead, J. M., Luloff, A., & Stevens, T. H. (1992). Protest bidders in contingent valuation. Northeastern *Journal of Agricultural and Resource Economics, 21*(2), 160-169.

Hanemann, W. M. (1984). Welfare evaluations in contingent valuation experiments with discrete responses. American Journal of Agricultural Economics, 66(3), 332-341.

Howarth, R. B., & Farber, S. (2002). Accounting for the value of ecosystem services. *Ecological Economics, 41*(3), 421-429.

Kanninen, B. J. (1993). Optimal experimental design for double-bounded dichotomous choice contingent valuation. Land Economics, Vol???138-146.

Khaksar Astaneh, H., Daneshvar, M., Kalateh Arabi, V., & Akbari, S. (2011). Estimating recreation value of Forest Parks of Mashhad: Application of conditional valuation method. *Agricultural Economics Research, 3*(10), 61-78.

Kriström, B. (1997). Spike models in contingent valuation. *American Journal of Agricultural Economics, 79*(3), 1013-1023.

Molaei, M. (2013). Comparison of optimal bid design in single bounded dichotomous choice contingent valuation method. *Journal of Agricultural Economics and Development 21*(81), 131-152.

Mousavi, S. N. (2015). Estimation of economic-resort valuation of Khafr Waterfall and recreational area by determining effective factors on willingness to pay by using CVM. *Regional Planning, 5*(18), 157-170.

Nakhaei, N., Mortazavi, S. A., Amirnejad, H., & Navazi, M. A. (2010). Estimating preservation value of Nour forest park using a contingent valuation method. *Agricultural Economics, 4*(1), 171-189.

Raheli, H., Heidari, R., & Khodaverdizadeh, M. (2013). Estimating the outdoor recreation value and investigating effective variables on willingness to pay of individuals from Asiyabkharabe Waterfall using contingent valuation method. *Geography and Planning, 17*(44), 95-117.

Reynisdottir, M., Song, H., & Agrusa, J. (2008). Willingness to pay entrance fees to natural attractions: An Icelandic case study. *Tourism Management, 29*(6), 1076-1083.

Roknaddin Eftekhari, A., & Ghaderi, E. (2002). The Rule of rural tourism in rural development (theoretical analysis). *Journal of Spatial Planning, 6*(2), 23-41.

Sabouhy, M., & Ataie Solout, K. (2014). The application of one and one-half bound (oohb) choices in the contingent valuation to determine tourists consumer surplus of Sisangan Forest Park. *Journal of Environmental Studies, 40*(2), 439-450.

Sahabi, B., Hajian, M., & Javaheri, B. (2011). Assessment of factors affecting on the visitors' wtp and evaluating recreational importance of Jajroud Area. *Economic Modeling, 6*(17), 111-126.

Samdaliry, A., amirnejad, H., & Mortazavi, S. A. (2014). Residents' willingness-to-pay (WTP) for preservation of Valasht Lake of Chalous City by using one-and-one-half-bound dichotomous choice contingent valuation method. *Iranian Journal of Applied Ecology, 2*(5), 1-13.

Schuhmann, P. W., Skeete, R., Waite, R., Lorde, T., Bangwayo-Skeete, P., Oxenford, H. A., Gill, D., Moore, W., & Spencer, F. (2019). Visitors' willingness to pay marine conservation fees in Barbados. *Tourism Management, 71*, 315-326.

Strazzera, E., Genius, M., Scarpa, R., & Hutchinson, G. (2003). The effect of protest votes on the estimates of WTP for use values of recreational sites. *Environmental and resource economics, 25*(4), 461-476.

Werner, M. (1999). Allowing for zeros in dichotomous-choice contingent-valuation models. *Journal of Business & Economic Statistics, 17*(4), 479-486.

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