# Study on the Willingness to Pay the Tourists in the Ecological Environment Protection of Huashan Scenic Spot

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**Abstract:** In this paper, CVM method (conditional value evaluation method, also known as willingness investigation method) is used to investigate the willingness to pay about the ecological environment protection cost of Shaanxi Huashan scenic spot in July and August, 2013. By establishing the Logistic regression model, the per capita willingness to pay (WTP) of the tourists is calculated to be 79.2 yuan / person. The results show that the tourists' awareness of environmental protection is increasing day by day, and the visitors are fully aware of the importance of protecting the ecological environment. 57.85% of the tourists will be willing to pay, including civil servants, self-employed persons, college degree or above, family monthly income in the 8000-10000 yuan visitors will pay higher. This provides a reference for the sustainable development and development of ecotourism in Huashan Scenic Spot.

**Keywords:** CVM; willingness to pay; Huashan scenic area; ecological environment protection

## 1. Introduction

The ecological environment is of great significance to the survival and reproduction of mankind, in addition to ecological functions, but also both economic functions and sustainable use and other functions. Xiyue Huashan known as "odd risk the world's first mountain," said, with its unique natural landscape and cultural landscape to attract a large number of Chinese and foreign tourists, and the number of tourists was increasing year by year trend. Which undoubtedly greatly promoted the local economic and social development. However, the surge in the number of tourists, the excessive invasion of mankind will inevitably cause a great threat to the local ecological environment. Although Huashan scenic management authorities are constantly taking measures to carry out scientific and rational ecological environment construction, but due to Huashan scenic area of its own eco-tourism carrying capacity constraints, along with the rapid economic development of the ecological environment problems cannot be ignored.[1] In order to reduce the many adverse impacts of tourism on the ecological environment of Huashan scenic area, this paper has carried on a series of research on the willingness of tourists to pay about the ecological and environmental protection cost of scenic area, so as to provide the protection policy of ecotourism resources and environment in Huashan scenic area some reference.

## 2. The Area of the Study

Huashan is located in the eastern part of Shaanxi Prov-

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ince, Weinan City, with a total area of 148.4 square kilometers. Since ancient times, Huashan on its Xiongjun odd dangerous natural landscape is famous, but also because of its deep cultural heritage into the worship of the Chinese nation Worship Mountains. In 1982, Huashan was promulgated by the State Council of the People's Republic of China as the first batch of national scenic spots.

Huashan scenic area is still one of China's rich biodiversity areas, in the study of bio-geographical distribution, succession and biological evolution has important value. According to the survey in recent years, Huashan scenic plant species up to more than 1,200 species, animal species is huge, many of which are rare in the world of rare things. From the perspective of tourism value, Huashan's "5A-class tourist attractions," the title to the real return. Huashan famous scenic spots as many as 210, cliffs clinging to the sky along the cliff, three sides without the kite stand up, as well as cliffs in the cliffs cut out of thousands of feet, hundred feet gap and other landscapes are breathtaking. Among them, the Huayue deity palm is listed as "The first in Guanzhong Eight King".[2] According to statistics, Huashan scenic area in 2012 the total number of tourism exceeded 2 million people, an increase of 6%, tourism comprehensive income reached more than 30 billion yuan.

## 3. Research Theory and Research Method

### 3.1 Research Theory
### 3.1.1 Analysis of the Value of Scenic Tourism Resources from Economics
Economic penetration into all aspects of real life. We can analyze the value of tourism resources in Huashan scenic area from the perspective of welfare economics and environmental economics, that is, the theory of utility value and the theory of consumer surplus in economics are the most direct theoretical support. The value of a consumer's measure of an item depends on the size of its marginal utility, and at the same time the welfare economist thinks that the most complete expression of the value of a thing is willingness to pay the value, specifically that people are willing to acquire a product, the amount of money to enjoy and voluntarily pay. Huashan scenic eco-tourism economic value can be expressed in terms of consumer surplus, according to the definition of consumer surplus in microeconomics explained that the consumer surplus is the consumer willing to pay the price and the actual price paid by consumers.[3] Based on this, we have to explore the Huashan scenic ecotourism resource value assessment is the key to determine the willingness of consumers to pay, that is, this article to study the content.

### 3.1.2 Analysis of the Value of Tourism Resources from the Ecology
The continuous development of the whole society to promote the pursuit of people's living standards is from quantitative to qualitative change, which is obvious that tourism is watching the rapid development of many industries in the trend of continuous expansion of tourism because of its environment closely related to lead to a series of problems, natural scenic tourism resources is particularly prominent.[4] How to coordinate the relationship between the two in the process of tourism development and realize the sustainable development of tourism has always been a hot topic in tourism research.

The pursuit of anything is not subject to the constraints of a certain condition, but the Earth's ecological environment is the greatest capacity to have a specific limit, so the health of the ecological environment will be from all aspects of the threat, this basic barrier of human survival has finally aroused the constant attention of mankind, but also raised the issue of ecological compensation. Ecological compensation is the compensation for the (and potentially) damage caused by human social and economic activities to natural resources and the ecological environment through the investment of funds, technology, labor and other forms for the purpose of ecosystem services. The most important and effective means of ecological compensation is to pay the cost of the ecological environment, and pay a certain amount of protection costs, which is the content of this article to be studied.

### 3.2 Research method
### 3.2.1 Contingent Valuation Method (CVM)
According to the theoretical framework, we use the most widely used, but also the most popular willingness survey method, the Contingent Valuation Method (CVM) to carry out the study of visitors' willingness to pay. CVM is a typical statement of preference assessment method, in the case of hypothetical market, the use of questionnaires in the form of direct investigation and ask people to improve the environmental benefits or a measure of the willingness to pay (willingness to pay, WTP), according to people's WTP to carry out value assessment [7]. In 1963, R.K. Davis [8] first used the CVM method in the study of the value of recreation in Maine. Today, the CVM approach is one of the most widely used non-use value assessments of natural resources in the world, particularly in the ecosystem services valuation. Since the 1990s, CVM has been accepted by Chinese researchers, has been used in environmental resources, and has made a breakthrough in the valuation of government decision-making.[5]

Conditional value assessment method, according to the theory of utility in western economics, that is, consumers

in the consumer goods are feeling the degree of moral satisfaction, the use of consumers to maximize the pursuit of utility psychology, to explore the amount of a commodity is willing to pay the highest price, that is, under different conditions of the willingness to pay, in order to reveal the respondents of environmental goods and services preferences, and ultimately get public goods non-use of economic value.

### 3.2.2 Data Sources

In July 2013, the study was conducted in the Huashan Scenic Area to fill the questionnaire with the domestic tourists. After the formal questionnaire survey was conducted in August. A total of 600 questionnaires were distributed to domestic tourists. The number of questionnaires was about 56.5, and the recovery rate was 94.5%. The number of issuers and recycle questionnaires met the requirements of CVM survey.

The questionnaire uses a combination of open-ended questions and closed-ended questions. The questionnaire is divided into three parts: the first part is the basic information of the visitors which including its basic social information and basic economic information; the second part of the tourists to the Huashan scenic area of travel satisfaction which including the degree of understanding of the scenic area, the overall satisfaction and the satisfaction of the scenic areas such as air quality, natural landscape characteristics, infrastructure, public health, noise pollution, service attitude, security situation and local cultural characteristics; The third part inquired about the willingness, payment motive and acceptable payment method of tourists' compensation for the ecological environment protection fee of Huashan Scenic Spot.[6]

### 3.2.3 Regression and Correlation Analysis

In this paper, SPSS 19. 0 statistical software and binary logistic model were used to analyze and analyze the survey data to get the relationship between each variable and whether the tourists were willing to pay the environmental protection expenses.

In the binary logistic regression model, it is assumed that y is a binary categorical variable of 0 or 1, that is, the "willing" assignment is 1 and the "unwilling" assignment is 0. (K) is the probability that y is 1 under the covariate xi condition. Let k have the k covariates $x_1$, $x_2$, ..., $x_k$, then $P(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k$. The corresponding Logistic linear regression model is:

$$\text{logit}(p) = \log_e(\frac{p}{1-p}) = \ln(\frac{p}{1-p}) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k,$$

$$\text{Where } p = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k)}$$

### 3.2.4 Estimation of Per Capita Willingness to Pay (WTP)

In this paper, the average individual willingness to pay the same type of tourists, that is, WTP, is calculated by the sample survey. The formula is as follows:

$$Y = \sum_{i=1}^{n} (P_i \times \frac{N_i}{M})$$

Where n indicates that the total number of visitors to be visited is divided into n types, Y represents the average willingness to pay for environmental costs, and Pi indicates the different willingness to pay for that type of tourists, and Ni indicates that the type has the same willingness to pay of the number of visitors, and M represents the total number of visitors visited in this type.

## 4. Investigation and Analysis on Willingness to Pay for Ecological Environment Protection of Tourist Attractions in Huashan Scenic Spot

### 4.1 Analysis of the Basic Characteristics of Tourists and Their Willingness to Pay

In the process of calculating the WTP, we counted the social properties of the tourists, that is, according to the data in Table 1, the proportion of men and women in the respondents accounted for 56% and 44%, the majority of tourists to occupy the largest proportion, almost half Is the teacher / researcher. At that time during the summer vacation, these two parts of the tourists are also in the holiday period, so the largest proportion. The number of soldiers and peasants is the least, and because of the limited freedom of the military and the limited economic conditions of the peasants, these are in line with our expectations. Second, it is not difficult to find a simple law, with the education level from junior high school and below to college undergraduate education, the proportion of tourists also increased, while the graduate students and above 567 visitors only 36 people; family Monthly income shows the higher the number of tourists, but the less the number of tourists do not rule out the reasons for the deviation, but also reflects the higher income of the crowd is often not too much play time.

From the intuitive data of Table 1, the willingness of men to pay is higher than that of women. In the occupational distribution, although the students occupy half, the WTP of individual operators and civil servants is generally higher than that of other occupations. The seven soldiers Willing to pay a certain environmental protection costs, that is, the payment rate of 100%. The level of education in the college or higher, have a higher level of payment. In addition, visitors with the family monthly income increases, WTP value also increases with the trend. In the study of WTP in other related scholars' literature, we can estimate the non-use value of Huashan scenic resources by calculating the WTP, which is of great significance to

the protection of Huashan scenic resource value.[7]

**Table 1.** The statistical result of the samples and the average WTP

| Investigate List | | Sample (person) | Payment rate (%) | WTP mean (yuan / year) |
|---|---|---|---|---|
| Gender | Male | 321 | 57.63 | 59.13 |
| | Female | 246 | 58.13 | 52.34 |
| Career | Vocational teachers/researchers | 70 | 57.14 | 44.07 |
| | Enterprise management staff | 56 | 44.64 | 27.59 |
| | Civil servants | 34 | 58.82 | 81.47 |
| | Professional technical staff | 40 | 67.50 | 71.2 |
| | Health care workers | 19 | 36.84 | 16.58 |
| | Self - employed | 29 | 62.07 | 92.62 |
| | Retirees | 9 | 55.56 | 28.44 |
| | Soldier | 7 | 100.00 | 66.43 |
| | Students | 225 | 63.11 | 60.18 |
| | Workers | 15 | 40.00 | 26.67 |
| | Farmer | 7 | 14.29 | 71.43 |
| | Other | 56 | 53.57 | 50.97 |
| Cultural level | Junior high school and below | 49 | 61.22 | 48.96 |
| | High school/secondary school | 123 | 56.10 | 50.97 |
| | University College | 113 | 56.64 | 54.72 |
| | Undergraduate | 246 | 58.97 | 59.2 |
| | Graduate and above | 36 | 61.11 | 58.67 |
| Family monthly income | less than 4,000 yuan | 172 | 54.07 | 50.42 |
| | 4001-6000 yuan | 170 | 57.65 | 52.68 |
| | 6001-8000 yuan | 98 | 59.18 | 54.69 |
| | 8001-10,000 yuan | 61 | 63.93 | 62.07 |
| | More than 10,000 yuan | 66 | 56.06 | 65.88 |

## 4.2 Analysis of the Motivations and Payment Methods of Tourists' Eco-Environmental Protection Expenses

In the survey, we also made the corresponding statistical analysis on the motivations and methods of paying the ecological environmental protection expenses of the scenic spots, and drawn the bar graphs accordingly. The meaning of the coding in the chart is shown in Table 2.

**Table 2.** The variables and the codes

| Variable | Encoding |
|---|---|
| Payment motive | 1 For the next time I can enjoy the better scenery and enjoy a better environment |
| | 2 In order to this valuable eco-tourism resources left to future generations, so that they can enjoy the beautiful ecological environment |
| | 3 Do not want beautiful natural scenery and valuable tourism resources disappear |
| | 4 Other reasons |
| Payment method | 1 Direct donation to the official protection of the area dedicated |
| | 2 Donated directly to the Environmental Protection Fund and commissioned by its dedicated |
| | 3 In the form of tax to the national unified domination |
| | 4 Willing to include in the tourist attractions tickets to pay |
| | 5 Other ways |

Figure 1 shows that most of the tourists on the scenic area of environmental protection costs is out of the second kind of payment motive, which is also consistent with sustainable development does not harm the descendants of the content requirements, which for the sustainable development of sustainable operation has laid a strong , Which shows that people are fundamentally consistent with sustainable development. There are still very few tourists due to the need for scenic areas of the lack of knowledge of environmental protection and do not know their specific payment motive,
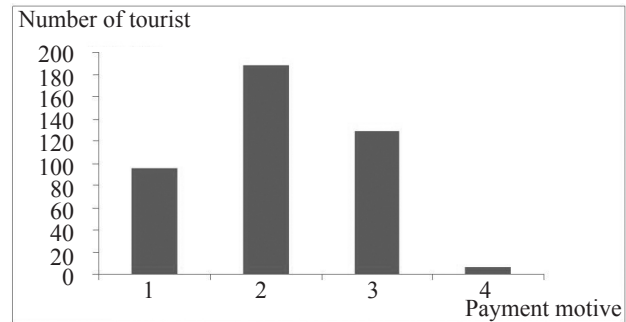


**Figure 1.** The statistics of the visitor with different payment motivations

Figure 2 is the tourist environmental protection fees to pay the way statistics, tourists generally believe that the cost should be included in the tourist attractions tickets, such a payment method is more convenient, and will think that donated to other departments may not really earn to environmental protection. Some visitors can also accept the other three payment methods, and the number of visitors is almost close. It was also learned that most people did not understand the significance of the measure to cover environmental costs and did not realize that the environment could be protected by payment.
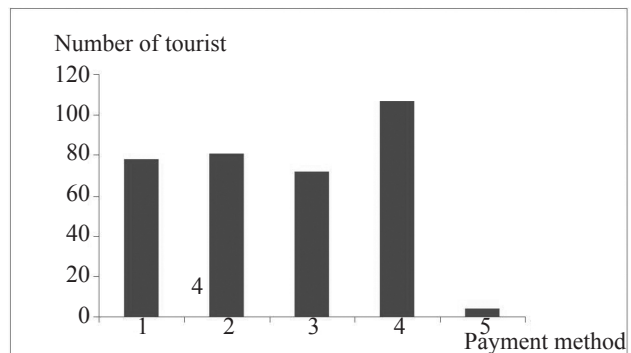


**Figure 2.** the number of visitors to the different payment methods statistics

## 4.3 Regression and Correlation Analysis
### 4.3.1 Related Analysis

According to the data show and correlation analysis of each chart in the preceding article, there is a close rela-

**Table 3.** The correlation between the basic information of the interviewers and their willingness to pay

| | | Age | Gender | Occupation | Education | Monthly income | Marriage |
|---|---|---|---|---|---|---|---|
| | Pearson correlation | .026 | -.005 | -.099* | -.025 | -.098* | -.093* |
| Willingness to pay | Significant (bilateral) | .542 | .906 | .019 | .545 | .020 | .050 |
| | N | 567 | 567 | 567 | 567 | 567 | 567 |

*\* Significant correlation at 0.05 level (bilateral).*

*\*\* Significant correlation at .01 level (bilateral).*

**Table 4.** Analysis of willingness to pay and visitor satisfaction

| | | Scenic spot natural resources | Scenic spot public health | Service attitude | Local culture characteristics | Traffic | Accommodation | Catering |
|---|---|---|---|---|---|---|---|---|
| | Pearson correlation | .139** | .080 | .087* | .154** | .071 | .064 | .101* |
| Willingness to pay | Significant (bilateral) | .001 | .058 | .039 | .000 | .090 | .126 | .016 |
| | N | 567 | 567 | 567 | 567 | 567 | 567 | 567 |

*\* Significant correlation at 0.05 level (bilateral).*

tionship between the willingness to pay and the subjective and objective factors. In order to exclude the information deviation of the data in the above figure, further correlation analysis results are shown in Table 3 and Table 4. That is, in Table 3, the occupation, monthly income and marriage and willingness to pay shown a significant correlation, the interview learned that unmarried people are more willing to pay the cost of environmental protection, married people because of the family more spending do not want pay. Table 4 is based on the tourist area of the various aspects of satisfaction and willingness to pay the relevant analysis. There is a significant positive correlation between natural resources and willingness to pay, that is, visitors only show that only the scenic resources are sufficient to make them willing to pay the environmental protection fee, followed by the local cultural characteristics, catering and service attitude satisfaction and willingness to pay is also different The degree of correlation, the results are consistent with the actual situation. The results also reflect the tourists are more concerned about the situation is still scenic resources.

### 4.3.2 Regression Analysis

In order to further find out the relevant models of willingness and willingness to pay, according to the description and elaboration of Logistic model in the previous paragraph, the following is a specific logistic regression test and analysis of satisfaction degree and willingness to pay. As "whether the tourists are willing to continue paying for the existence of the scenic area to pay a certain amount of environmental protection costs," independent variables for the "scenic travel satisfaction." The correlation coefficients between the two variables in Table 5 and the other reference coefficients demonstrate the significant regression relationship between the variables, and Figure 3 further visualizes the regression trend between the two variables, as described above, with the satisfaction of the visitor. The decline in the degree of tourists willingness to pay for the scenic area also showed a weakening trend.

This process provides a strong proof and support for the degree of visitor satisfaction and willingness to pay.[8]

**Table 5.** Regression results between the WTP and the satisfactions

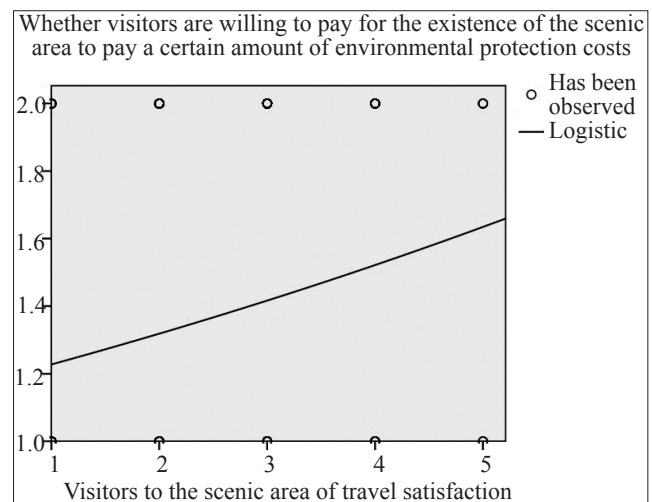| Equation | Model summarizes | | | | | The estimated values | |
|---|---|---|---|---|---|---|---|
| | R2 | F | df1 | df2 | Sig. | Constant | b1 |
| Logistic | .026 | 15.239 | 1 | 565 | .000 | .875 | .931 |



**Figure 3**. Logistic model

## 5. Conclusion and Discussion

Good environment is the foundation of the tourism industry, Huashan scenic area must pay attention to the tourism resources and ecological environment protection and sustainable development. In some cases, the conflict between the development of the tourism economy and the protection of the ecological environment will stimulate and promote the tourism destination to take scientific and rational measures to protect the fragile environmental ecosystem. But often to be aware of the need to protect the environment, the damage has reached a difficult level to save.

In this paper, the value evaluation method (CVM) is used to investigate the willingness to pay about the ecological environment protection cost of Huashan scenic spot in Shaanxi Province. The results show that: (1) According to

Pearson correlation analysis, visitors' willingness to pay is closely related to their occupation and monthly income. (2) Civil servants, professional and technical personnel, individual operators, some high-income farmers and soldiers (3) Through the logistic regression model, there is a significant correlation between the willingness to pay and the satisfaction degree of the tourists, especially the natural resources of the scenic area, the local cultural characteristics and the local cultural characteristics, and the willingness to pay (WTP) is 79.2 yuan / person; (4) Visitors have realized the importance of the ecological environment, people's awareness of environmental protection is growing. 57.9% of the respondents are willing to pay for environmental protection, of which 57.3% of the respondents pay the motive is "in order to the precious eco-tourism resources left to future generations, so that they can enjoy the beautiful ecological environment" 32.6% of visitors said they can accept the payment method for the environmental costs included in the ticket to pay a unified payment.

In the process of correlation analysis, it is found that the use of CVM method to calculate the willingness to pay will be affected by the number of samples and the random error, how to improve the quality of the questionnaire survey data and reduce the impact of errors in the future questionnaire design and questionnaire research process to consider problem. It also shows that the CVM method plays an important role in the non - market value evaluation of ecotourism resources.

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