Willingness to pay for tourism ecological compensation and its influencing factors——Taking the best spring in the world in Ji'nan as an example

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Abstract. Tourism activities have a certain impact on the ecological environment of scenic spots, and ecological compensation is an effective economic means to protect the ecological environment. Taking the best spring in the world scenic spot in Jinan as an example, based on the contingent valuation method (CVM) and the establishment of binary logistic regression model, this paper studies the willingness to pay and the influencing factors of tourist ecological compensation. The results show that: 75.2% of tourists are willing to make ecological compensation, and the average willingness to pay is 3.99 yuan/person time; the main factors influencing the willingness to pay are gender, income level, tourist satisfaction, and tourists' cognition of ecological protection; besides paying compensation, tourists are willing to participate in environmental protection publicity and clean the scenic area environment as volunteers Environment.

1. Introduction
The development of tourism depends on the good natural environment to a certain extent. Tourism brings benefits to the local economic development, but also has a certain impact on the ecological environment. In some areas, even the deterioration of the environment restrains the development of tourism. In recent years, the state has been advocating the protection of the ecological environment, ecological compensation as an economic means to promote the protection of the ecological environment, plays a vital role. Ecological compensation, also known as payment of environmental service in the world, can protect the tourism ecosystem and promote the development of tourism economy.

A small number of scholars have carried out research on tourism ecological compensation, which is mainly reflected in the construction of tourism ecological compensation mechanism[1-2], the willingness of tourists to pay[3-4], the attitude and willingness of community residents to ecological compensation[5-6], and the standards of tourism ecological compensation[7-8]. Most of the existing literature takes specific cases as the research object, and obtains data in the form of questionnaire survey and interview. The main research methods used are ecological footprint component method and conditional value assessment method. For example, Xu X M and Zheng Y (2017) used the tourism ecological footprint research method to analyze the tourism ecological carrying capacity and tourism ecological compensation standard of Cijiaolin in Lhasa, and introduced the ecological footprint
efficiency into the analysis of the tourism ecological compensation standard. Hu H (2017) and others used questionnaire survey and contingent valuation method to study the willingness of tourists to pay tourism ecological compensation and its influencing factors with Huangshan Scenic Area as an example.

From the above research, we can find that most scholars made research on tourism ecological compensation of rural areas or scenic spots, although some scholars have discussed the urban tourism ecological compensation, they lack empirical analysis. Based on the theory of ecological compensation at home and abroad, this paper takes the best spring in the world scenic spot in Jinan as the research object and adopts Contingent Valuation Method (CVM) to investigate the willingness of tourists to pay for ecological compensation, and then analyzes the factors influencing the willingness to pay. At last, the paper provides suggestions for Jinan City to explore tourism ecological compensation strategies, and supply theoretical support for the harmonious unity of local tourism development and ecological environment protection.

2. Theoretical analysis and research hypothesis

2.1. Theoretical analysis

The purpose of tourist ecological compensation is to protect the ecological environment and promote the sustainable development of tourism destination. It needs to pay a certain amount of capital, technology and labor to remedy the damage to natural resources caused by tourism activities. In tourism activities, tourists’ willingness to compensate for the natural resources and ecological environment needs to be measured by scientific methods. At present, the common method to obtain tourists' willingness to pay is mainly through questionnaire survey, so as to indirectly express the ecological compensation standard.

Contingent valuation method (CVM), which is known as willingness survey method, directly investigates and inquires people's willingness to pay (WTP) or willingness to accept compensation (WTA) for environmental benefit improvement or resource protection measures under the condition of hypothetical market. It is one of the most widely used evaluation methods in ecosystem service value evaluation. It is suitable for the value evaluation of goods exchanged in the absence of actual market and alternative market.

In this study, the best spring in the world scenic spot, which is located in the center of Jinan City, Shandong Province is selected as the case. It is a national 5A tourist attraction. The scenic area covers an area of 3.1 square kilometers, which is composed of "one river (moat), one lake (Daming Lake), three springs (Baotu Spring, Heihu spring and Wulongtan spring group), and four gardens (Baotu Spring Park, Huancheng Park, Wulongtan Park, Daming Lake scenic spot)". The best spring in the world is the most representative scenic spot in Jinan City. The moat cruise ship and scenic spot tour are tourist attractions. This paper chooses the best spring in the world scenic spot as a case study to study the tourists' willingness of ecological compensation, which has a certain representative significance in the study of ecological compensation of urban natural scenic spots.

2.2. Research hypothesis

This study uses payment card questionnaire to investigate tourists' willingness to pay, and discusses the factors influencing the willingness to pay. The influencing factors of willingness to pay for ecological compensation have been studied in relevant literature. Yang Z Q (2015) found that the willingness to pay for ecological compensation of tourists in Yangshuo, Guilin was mainly affected by education background and monthly income level; Guan H L (2016) found that the main factors influencing tourists' ecological compensation in Wutai Mountain National Forest Park were the income level of tourists, tourism preference, environmental protection awareness, and whether to take them into the scenic spot [9]. According to Hu H (2017), the gender, age, revisit intention and compensation necessity of tourists have significant influence on tourists' willingness to pay for ecological compensation. Therefore, seven variables, including gender, age, education level, income
level, occupation, awareness of ecological compensation and willingness to revisit are introduced in this study.

3. Sample, variable and model design

3.1. Sample

3.1.1. Questionnaire design.
The content design of the questionnaire is mainly divided into three parts: The first part is about the basic cognition and psychological perception of the tourist ecological compensation; The second part is mainly about Tourists' willingness to pay and bid value; The third part is the basic information of tourists, mainly including gender, age, occupation, family monthly income, tourist source, tourism satisfaction, etc, which is mainly to understand whether there is an obvious relationship between the basic information of tourists and the willingness to pay ecological compensation.

3.1.2. Investigation and Implementation.
The questionnaire survey was conducted from April 1 to April 15, 2019. The questionnaire survey was conducted by random sampling on the spot. Three undergraduates visited Daming Lake, Baotu Spring and Wulongtan scenic spots to conduct face-to-face survey on tourists. Before the survey, the investigators were trained uniformly. For group guests, 2-3 people were sampled in teams with less than 10 people, and 4-7 people were surveyed in teams with 10 to 30 people. For family tourists, each family chooses one tourist for investigation[10]; other individual tourists are randomly sampled. In order to ensure the accuracy of the questionnaire survey, the one-to-one explanatory interview model is adopted in the survey of tourists.

3.1.3. Basic information of samples.
A total of 400 questionnaires were distributed and 385 valid questionnaires were collected. Among them, 243 questionnaires and 142 online questionnaires were obtained. According to the basic situation of the sample, 58.7% of the respondents are male and 41.3% are female; most of them are 18-40 years old; the majority of them are from enterprises and institutions, followed by students; the monthly family income is 4001-6000 yuan, followed by 2001-4000 yuan, and 2000 yuan or less; most of the tourists come from Shandong Province, especially Jinan local tourists, Only 13.87% of the respondents came from outside the province.

3.2. Model design
Since the willingness to pay for ecological compensation is a binary variable, this paper chooses binary logistic regression model to analyze the relationship between it and the influencing factors. Logistic regression analysis is often used in regression fitting when the dependent variable is dichotomous variable. Tourists' willingness to pay for ecological compensation only has two values of "yes" and "no".

The meaning of the value is: “1” means the respondents are willing to pay a certain fee for environmental protection; “0” means that the respondents are not willing to pay certain fees for environmental protection.

The specific form of the model is as follows:

\[
\ln \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \mu
\]

In the equation, \( \beta_0 \) is a constant term, \( \beta_i \) is the regression coefficient of the logistic equation, \( x_1 \) is the gender of the respondents, \( x_2 \) is the age of the respondents, \( x_3 \) is the educational level of the respondents, \( x_4 \) is the occupation of the respondents, \( x_5 \) is the monthly household income of the respondents, \( x_6 \) is the tourists' satisfaction, \( x_7 \) is the cognition of the
importance of the ecological environment, \( x_8 \) is the understanding of the ecological compensation policy, \( \mu \) is random error term.

4. Empirical results and analysis

4.1. Analysis of tourists' willingness to pay ecological compensation

4.1.1. Payment amount of ecological compensation.
According to the survey results, 72.5% of the tourists are willing to pay some ecological compensation for the best spring scenic spot in the world, and 27.5% of the tourists are not willing to pay, which indicates that the tourists have a strong awareness of ecological compensation.

The formula of tourists' willingness to pay: 
\[
E(WTP) = \sum_{i=1}^{n} p_i \cdot V_i
\]  
where \( V_i \) is the i-th bid value (payment amount) selected by the respondents; \( p_i \) is the proportion of the number of respondents choosing the ith bid value in the total number of tourists surveyed.

According to formula (1), the average amount of ecological compensation that tourists are willing to pay is 3.99 yuan per person.

4.1.2. Forms of payment that tourists are willing to pay.
66.2% of the tourists are willing to pay the ticket price for ecological compensation. For the three forms of vehicle toll / parking fee, special fund for ecological compensation, and some products indicating a certain proportion of income for ecological compensation, the proportion of tourists choose is 48%, 49.8% and 48.4% respectively. This shows that the collection form of ecological compensation can be diversified.

4.1.3. Ways to use ecological compensation.
In terms of the use of ecological compensation, tourists mainly tend to restore soil and vegetation, protect water resources and dispose and recycle garbage. In addition, ecological compensation can also improve the environmental protection of tourism facilities, environmental protection publicity and other aspects, such as the improvement of vehicle environmental protection performance, the ecological improvement of hotel restaurants, etc. tourists hope that the ecological compensation can improve the ecological environment of the scenic spot through these ways.
4.1.4. Reasons for not willing to pay.
Among the 385 valid samples, 27.5% of the tourists are not willing to make ecological compensation for the scenic spots. There are three main reasons why they are not willing to make compensation. The main reason is "worried about the lack of a transparent system for the use of compensation funds, which will be used for other purposes". The main reason is that tourists are worried that the ecological compensation funds they have paid are useless, which can really play a role in restoring and protecting the ecology. Therefore, the information disclosure of ecological compensation funds is very important. Secondly, 32% of the tourists think that they have paid taxes as taxpayers, and they do not need to pay extra ecological compensation to compensate the scenic spots. From this point of view, tourists think that the ecological protection of scenic spots should be paid by the national tax, since they have paid the taxes, there is no need for ecological compensation. 24.4% of tourists have willingness to pay ecological compensation, but limited to income level, they have no ability to pay.

### Table 2. Results of binary logistic regression analysis

|                             | B    | S.E. | Wals  | df | Sig. | Exp (B) |
|-----------------------------|------|------|-------|----|------|---------|
| Tourists' cognition         | -0.776 | 0.272 | 8.138 | 1  | 0.004 | 0.460   |
| Understanding of ecological compensation policy | 1.084 | 0.180 | 36.105 | 1  | 0.000 | 2.957   |
| Gender                      | -0.581 | 0.287 | 4.109 | 1  | 0.043 | 0.559   |
| Age                         | -0.269 | 0.199 | 1.819 | 1  | 0.177 | 0.764   |
| Education                   | -0.287 | 0.184 | 2.425 | 1  | 0.119 | 0.751   |
| Occupation                  | -0.077 | 0.059 | 1.690 | 1  | 0.194 | 0.926   |
| Income                      | 0.182  | 0.105 | 3.041 | 1  | 0.081 | 1.200   |
| Satisfaction                | 0.693  | 0.187 | 13.718 | 1  | 0.000 | 2.000   |
| Constant                    | 1.258  | 1.760 | 0.511 | 1  | 0.475 | 3.517   |

Note: -2 Log Likelihood 321.882, Cox & Snell R^2 0.289, Nagelkerke R^2 0.418

### Figure 1. Ways of use for ecological compensation expected by tourists

4.2. Tourists' cognition of ecological compensation
Taking the survey data as samples, spss20.0 was used to estimate the parameters of the model. The results of parameter estimation are shown in Table 2.
According to the results of binary logistic regression, the standard deviation (SIG.) of cognition to the importance of ecological environment, understanding of ecological compensation policy, gender, family monthly income and satisfaction degree was less than 0.1, which passed the significance test of 10% level. Age, education level and occupation did not pass the significance test.

The survey found that tourists have a strong awareness of ecological environment protection. Among the survey samples, 64.2% of the tourists think that the ecological environment is very important to the tourist attractions, and only 1.82% of the tourists think that the ecological environment is not important or very important to the scenic spots.

83.4% of tourists think that tourism activities will bring more garbage, followed by destruction of the natural environment and landscape, pollution of water resources, only 1.6% of tourists think that tourism activities will not have an impact on the scenic spot.

For the undertakers of ecological and environmental protection responsibilities, tourists think that the important ones are the government and tourism enterprises, accounting for 78.40% and 66.5% of the total number of the survey respectively, and 55.3% think that the tourists bear the responsibility of ecological and environmental protection, indicating that most tourists have a strong sense of ecological and environmental protection responsibility.

As for the ecological compensation policy, only 10% of the total number of survey samples are well known by tourists. 45.2% of the tourists said "know something" and 27.3% of the tourists only heard about it but did not understand it.

4.3. Tourist satisfaction
The influence of tourists' satisfaction on willingness to pay through the 1% level of significance test shows that satisfaction has a greater impact on tourists' willingness to pay. Generally speaking, tourists' satisfaction is high, and their willingness to revisit is also high. According to the composition of the survey samples, most of the tourist source areas are located in Shandong Province. If the tourists are satisfied, the probability of revisiting is high. Therefore, tourists are willing to pay a certain amount of ecological compensation for the protection of the ecological environment of the scenic spot.

5. Conclusion and discussion
This paper studies the willingness of tourists to pay ecological compensation and the influencing factors by using the method of questionnaire survey.

First, 75.2% of the tourists are willing to pay certain ecological compensation for visiting the best spring scenic spot in the world, and about a quarter of the tourists are not willing to pay. The main reasons are that they are worried that the ecological compensation funds will be used for other purposes, that there is no need to pay additional taxes after paying taxes, and that the income level is limited and there is no ability to pay. It shows that most tourists have a strong awareness of ecological protection, and tourists pay more attention to the use of ecological compensation. If the ecological compensation is collected, the way to use the funds should be publicly announced to the public, so as to ensure the transparency of the use of funds.

Secondly, the main factors influencing tourists' willingness to pay for ecological compensation are gender, income level, tourist satisfaction and tourists' cognition of ecological protection. Men's willingness to pay is higher than that of women. The impact of income level on willingness to pay for ecological compensation is somewhat different from the existing literature. Tourists' willingness to pay first increases and then decreases with the increase of income level, showing an inverted U-shape, which is an aspect that needs to be further discussed in the future. Tourist satisfaction, awareness of ecological compensation policy and awareness of ecological protection have significant impact on tourists' willingness to pay for ecological compensation. However, this paper does not study the factors affecting tourists' satisfaction. How these factors affect tourists' satisfaction and then affect tourists' willingness to pay for ecological compensation is the subject of further research. Therefore, we should publicize the ecological compensation policy through various media to improve the tourists' awareness of the ecological compensation policy.
Thirdly, for the first spring scenic spot, the average willingness to pay is 3.99 yuan per person time, which is at a low level compared with other literatures. Yang Z Q took Yangshuo County of Guilin as an example to study the ecological compensation of tourists. The willingness to pay for the ecological compensation of tourists was 30 yuan / time [3]. Hu H and others studied the ecological compensation of tourists in Huangshan Scenic Area, and the average willingness to pay was 87.97 yuan / person time [4]. Compared with Yangshuo and Huangshan scenic spots, the best spring in the world scenic spot has less tourism expenses and shorter tour time, which may affect the payment amount of tourism ecological compensation.

Fourthly, the form of ecological compensation for tourists is not limited to the payment of ecological compensation. Volunteers can be recruited to participate in ecological protection publicity and ecological environment cleaning activities. Labor input should also be a way of ecological compensation.

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