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Estimating the Preservation Value of World Heritage Site Using Contingent Valuation Method: The Case of the Li River, China

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Abstract: World Heritage Sites (WHSs) play an important role in sustaining community identity and enhancing local economic development through tourism. Although the Li River was designated as a WHS in 2014, severe damage to its ecosystem and environmental problems have been reported in recent years. Thus, the purpose of this study is to estimate residents' willingness to pay (WTP) for the preservation of the Li River using a contingent valuation method. Moreover, a two-stage approach using hypothetical and real setting scenarios was utilized to reduce a hypothetical bias and overvaluation. Logit models were used to estimate the preservation value and compare factors influencing WTP between the hypothetical and real scenarios. The results of this study support the usefulness of a two-stage approach to avoid hypothetical bias and estimate a realistic preservation value. In the real setting scenario, WTP was 144.66–163.90 Yuan (USD 20.83–23.60) per capita per year, and the aggregate value was 721–818 million Yuan (USD 104–118 million) depending on mean WTP and truncated WTP. The study findings provide useful implication to support government's fund and sustainable efforts to preserve the Li River.

Keywords: world heritage site; dichotomous choice-contingent valuation method; sustainable tourism; Guilin; Li River; involvement; place attachment; perceived value

1. Introduction

To promote the preservation and sustainability of natural and cultural resources, the United Nations Educational, Scientific and Cultural Organization (UNESCO) designates World Heritage Sites (WHSs) that are assessed to have an exceptional value to humanity [1]. Since the establishment of the Convention Concerning the Protection of the World Cultural and Natural Heritage by UNESCO in 1972, the number of WHSs has increased, with 845 cultural sites, 209 natural sites, and 38 mixed sites having been included on the World Heritage List (WHL) [2]. Additionally, a tentative list of many candidate sites that each UN member country plans to apply for WHS status is available. However, research indicates that WHS designation may not guarantee the sustainability of natural or cultural assets [3,4]. Cases of WHS degradation by natural and/or human influences have been reported. For instance, in 2017, the WHS label of the Arabian Oryx Sanctuary in the Sultanate of Oman was revoked due to excessive poaching and the government's decision to cut the park size by 90%. This incident led to a large decline in the population of rare animals [5]. The Dresden Elbe Valley in Germany was also delisted in 2009 after a four-lane bridge was constructed in the middle of its previously designated cultural heritage [6]. At present, 54 sites (38 cultural sites and 16 natural sites) are in danger of severe degradation [3].

The Li River in Guilin, Guangxi Province, China, was tentatively included on the WHL in 1996, and designated as a WHS in 2014 [2]. The site is famous for the natural value of its tower-shaped karst landforms that show the evolution of peak-cluster and peak-forest karst landforms [2]. Moreover, Yangshuo, an essential area of the Li River, was established as the first observation point in China for tourism sustainability by the United Nations World Tourism Organization. The tourism development and ecological environment of the Li River Basin have attracted worldwide attention. A regional landscape interwoven with tourist attractions and residential areas, and the basin's high-quality water and unique ecology, have become popular tourist attractions and have produced a positive influence on the quality of life of residents. In recent years, however, the sustainability of the Li River ecosystem has substantially weakened [7]. Severe environmental problems, such as karst rocky desertification and karst collapse, have also become prominent [8]. In particular, karst rocky desertification results in large-area water loss, soil erosion, and karst exposure, consequently degrading the value of the area's natural landscape. Karst collapse is also caused by individual acts of vandalism, which creates a health and safety problem for tourists and Guilin residents. The damaged ecosystem of the Li River Basin became a serious issue that negatively affected the local economy and tourism. Thus, the protection of and environmental support for the Li River are urgent and there is an increasing need for a study to support government and policy-makers' sustainable efforts and secure fund for preservation.

The preservation and sustainability of a large-scale natural site such as the Li River requires financial and policy supports from the government. In the campaign of "all-for-one tourism", the Chinese government encourages residents to actively participate in sustainable tourism. To support the initiative of Guilin residents for the environmental protection of the Li River and to enhance the government's understanding on its preservation value [1,9], this study employs the dichotomous choice-contingent valuation method (DC-CVM) to estimate the preservation value of the Li River from the residents' perspective. This study also investigates socio-demographic and psychological factors that influence residents' willingness to pay (WTP). This study conducted research on the residents of the Li River for the following reasons. First, the residents are responsible for preserving the WHS for the next generation as well as for themselves. Thus, the purpose of our study is to ask residents if they are willing to donate certain amounts of money to preserve the WHS of the Li River. The results of the WTP by residents will contribute not only to promoting the preservation of the WHS but also to supporting the allocation of budget from governments. Second, maintaining the quality of the WHS can affect the quality of life of all residents, including some residents who are doing businesses there. To reduce hypothetical bias which is easily observed in the CVM and prevent the overvaluation of WTP [10], this study estimates the preservation value of the Li River in two stages by designing hypothetical and real setting scenarios. The estimation of the preservation value of the Li River is expected to increase the awareness of the Guilin residents to the importance of ecological protection. This study also aims to support the government with empirical supporting data to establish protection policy and secure a necessary budget for the preservation of the Li River.

2. Literature Review

2.1. The Li River in Guilin

The Li River, Guilin, is known as one of the most beautiful scenic rivers in the world. A saying in China states that the beauty of Guilin's scenery is second to none. Originating in the Mao'er Mountains, the river flows south through Guilin, Yangshuo, and Pingle, before merging with two other rivers to form the Li River [11]. Guilin has a long history with the Li River. Emperor Qin Shi Huang of the Qin dynasty ordered the construction of the Lingqu Canal in 214 B.C. The purpose of this construction is to link the Li and Xiangjiang rivers, forming the beginning of Guilin Prefecture. In later years, Guilin began to be known throughout China for its natural beauty [11]. With five million residents, Guilin is one of Southern China's most visited destinations for domestic and international tourists, attracting more than 80 million visitors in 2017 [12]. The famous landscapes of the Li River are shown in Figure 1.

Figure 1. Scenic views of the Li River.

2.2. Contingent Valuation Method (CVM)

CVM uses utility theory as its theoretical background [13,14]. It has been widely used for the valuation of natural or heritage tourism resources [1,15]. CVM is a method used to directly estimate the economic value of tourism resources by assessing both use and non-use value. Furthermore, CVM can quantitatively measure personal WTP which cannot be measured in reality by setting up a hypothetical situation (i.e., inquiring about respondents' WTP) [16]. The preservation value of the Li River cannot be quantified in reality, and can only be estimated by using a hypothetical situation. Thus, this study used CVM to estimate the preservation value of the Li River for Guilin residents, which is an invaluable asset as a WHS.

CVM uses either open-ended or closed-ended questioning methods. Open-ended questions require respondents to independently provide their WTP using unitary bidding games and/or payment cards [17]. Closed-ended questions mainly use DC or repeated bidding games. In particular, DC-CVM has been most commonly used ever since its first application in the appraisal of economic purchases of goose-hunting licenses [18]. DC-CVM performs the following steps. First, a hypothetical situation is set up. Second, the category of payment amounts are determined based on open-ended questions in pretesting situations. Finally, respondents express their WTP with regard to the amount randomly given by answering either "Yes" or "No." In other words, this method only requires respondents to answer "Yes" or "No" for the given payment amount. Hence, it is relatively easy for respondents to express their personal WTP amount compared with the payment card in open-ended questions [19]. It is extremely similar to the consciousness-determining circumstance of trading in real-life situations [19]. Therefore, DC-CVM can effectively reduce a strategic bias [20]. Given that the questions can easily be answered, a starting-point bias can also be effectively reduced, and thus

DV-CVM is favored by many researchers [20–22]. Given that DC-CVM is based on a hypothetical situation, a hypothetical bias may occur in such a way that the respondents' WTP is over-estimated, thus resulting in overvaluation. Therefore, in this research a two-stage method (using hypothetical and real scenarios) was used to minimize hypothetical bias.

CVM has been applied in various settings, including the evaluation of recreation value and non-use value of tourism resources, the evaluation of compensation value of natural resources, and the valuation of intangible cultural heritage [23]. In addition to the valuation of natural/cultural resources, another important use of CVM is to investigate the main factors affecting valuation. Prior studies have shown that the main factors affecting WTP include payment amount, demographic variables (e.g., age, education, marital status, and income), and psychological constructs (e.g., place attachment, perceived value, and revisit intention) [11]. For example, a study on the preservation value of Dokdo Island, South Korea showed that payment amount, age, income, patriotism, and support are the most influential factors affecting the WTP of South Korean residents [16]. Moreover, in a study assessing the economic value of Hallyu (also known as the Korean Wave), payment amount and education were found to be the significant factors affecting the WTP of Chinese pop-culture tourists to Korea [24]. A comparative study of residents' and tourists' WTP for the preservation value of endangered harbor seals found that payment amount, income, education, attitude to environment, human oriented attitude, and attitude to the spotted seal are the most important factors affecting payment amount [25]. In the valuation of mudflats, Choi et al. found that festival experiences influence visitors' WTP by confirming a significant effect of functional value [26]. In the case of the Grand Canal in China, a CVM study found that place, identity, and revisit intention are differently associated with residents' and non-residents' WTP [1]. Hence, given that the lives and social activities of Guilin residents are complexly intertwined with the Li River, capturing the effects of socio-demographic and psychological factors (i.e., involvement, place attachment, and perceived value) in the valuation of the river is important.

2.3. Involvement

Serif et al. [27] first conceptualized involvement as perceived personal importance and/or consumer interest in buying, consuming, and disposing of goods, services, or ideas [28]. According to the general rules of individual behavior [29], the extent and time of individual participation in a particular environment influence attitude and behavior. Involvement can be divided into psychological acceptance and repeated participation, which may influence individuals' attitudes and psychological status to participate in an event. The concept of involvement has been applied to studies on situational marketing and consumer behavior [30,31]. In recent years, involvement has been applied in the tourism field mostly to study how tourists' involvement influences their perception, satisfaction, or environmental protection behavior. For instance, Wang and Li [32] found that tourists' involvement in birdwatching influences their willingness to adopt environmentally friendly behaviors. In their study on the leisure involvement of cyclists, Yu and Tian [33] found that involvement produces a significant direct influence on happiness and a significant indirect influence through leisure benefits. Zhang and Li [34] also found that leisure involvement has a significant positive influence on the environmentally friendly behavior of tourists and a significant indirect influence through place attachment.

Most previous studies on involvement have also focused on tourists rather than local residents [35]. As an inherent variable of attitude, the formation of involvement takes time to accumulate [36]. Therefore, examining how residents' involvement influences their perception about environment and pro-environmental behaviors at a tourist destination is suitable. In accordance with the findings of previous studies, this study posits that the involvement of residents at a tourist destination has a positive influence on their environmental attitude and behavior. Thus, this study proposes that residents' involvement positively influences their WTP for the preservation of the Li River.

2.4. Place Attachment

Place attachment, developed from place and attachment theories, has been applied in the fields of environmental psychology, social psychology, and sociology [37]. Place attachment emphasizes the psychological and behavioral connections that individuals have with a place [38]. Place attachment reflects the emotional psychological status of individuals to a certain place/environment. For instance, individuals' cognition and acceptance of a specific environment and their interaction with the environment make them feel comfortable, safe, and willing to stay in that place [39]. Forming attachment takes time, and visit frequency is one of the expression modes. For residents, forming an attachment relationship with their domiciles is easy. Bao and Yang [40] studied the process of place attachment of the residents of West Street in Yangshuo. The results of their study showed that the appropriate level of commercialization plays an important role in producing the place attachment of local residents. In the field of environmental psychology, previous studies found that place attachment has a positive influence on environmental attitude and environmental protection [41]. In their study on the residents of Xidi and other ancient villages, Tang et al. [42] concluded that place acceptance of ancient village residents has a significant positive influence on their attitudes toward resource protection in the villages. In the case of a resort in Zhejiang, Fan et al. [43] also confirmed a positive relationship between place attachment and the environmental responsibility of tourists. This result indicated that the higher the place attachment, the higher the likelihood of practicing environmentally responsible behavior. Thus, this study proposes that place attachment with the Li River is positively associated with residents' WTP for the preservation of the river.

2.5. Perceived Value

Perceived value is defined as a tourist's comprehensive evaluation of the efficiency of a tourism product or service [44]. Recognized as a world natural heritage site, the Li River is considered to have an exceptional value to humanity, which makes preserving the current status of the river's natural environments and ecosystem worthwhile. The Li River is an important tourist resource for Guilin to attract domestic and international tourists. Guilin residents have built a strong and intimate connection with the Li River as a living foundation [45]. Perceived value is the subjective evaluation of Guilin residents on the preservation of Li River. Perceived value is an important construct to understand the environmental protection attitude and behavior of Guilin residents.

In consumer behavior studies, consumers' perceived value has been shown to have a positive influence on their buying behavior [46]. The research results of Yu, Tian, and Shu [47] indicated that tourists' value perception has a significant influence on their subsequent behavior. The stronger the value perception of tourists, the more likely that they will visit a sightseeing place again. In an empirical study of the Sun Island Scenic Area in China, Dou [48] found that tourists' perceived value has a positive influence on their environmental behavior. The higher the tourists perceive the quality of the tourism resource, the more likely they are to practice environmental protection. Chiu et al. [46] argued that tourists' perceived value has a positive direct influence on their environmentally responsible behavior and a significant indirect influence through satisfaction. Therefore, this study proposes that that when viewing the Li River's preservation value, Guilin residents will positively accept protection behavior and will be willing to pay more for the river's preservation.

3. Method

3.1. Model Specification

As discussed earlier, this study used DC-CVM. First, Guilin residents were asked if they were willing to pay a preservation fund of a randomly given bid amount (A Yuan). Then, the WTP for the given amount was converted into a probabilistic model. Lastly, logit models were used to estimate the preservation value of the Li River WHS. The preservation value was mainly determined by the compensating variation proposed by Hicks [49].

To protect the Li River, Guilin residents could choose to pay or not to pay a given preservation fund (A). In paying the preservation fund, Guilin residents could enjoy the benefits from the Li River such as clean air and water, free entrance to scenic spots, and a good ecosystem. On the contrary, Guilin residents would no longer enjoy any utility from the Li River if they did not pay the preservation fund, which can be expressed with the following function [17]:

$$U(\cdot) = v\ (j,\ Y;\ s) + \varepsilon_j j = 0,\ 1. \tag{1}$$

where U = utility function; v = indirect utility function; Y = income; j = 1 (pay a given bid); j = 0 (not pay a given bid); s = individual social and economic variable (e.g., gender, age, and education); and ϵ_j = random variable with average value of 0.

On the basis of utility theory, Guilin residents would be oriented with individual maximum utility to make a choice from the foregoing two solutions [16]. The indirect utility function for Guilin residents to choose to pay the randomly given bid amount of A Yuan and enjoy the utility from the Li River can be expressed as $\{v\ (1, Y\text{-}A; s)\}$. On the contrary, the indirect utility function for Guilin residents to choose not to pay the randomly given bid amount and give up enjoying the utility of the Li River is {v (0, Y; s)} [50]. Individuals would accept the offer in the condition as v (1, Y-A; s) + $\epsilon_1 \geq v$ (0, Y; s) + ϵ_0.

As the bid amount (A Yuan) changed, the change in utility can be expressed as Δv. The difference of utility for Guilin residents under the two circumstances is shown in Formula 2 [17]:

$$\Delta v = v\ (1,\ Y - A;\ s) - \ v(0,\ Y;\ s) + (\varepsilon_1 - \varepsilon_0). \tag{2}$$

3.2. Logit Model and Willingness to Pay (WTP)

The utility difference (Δv) in this study model is the continuous data of the independent variable: paying A Yuan and enjoying the utility of the Li River or not paying A Yuan and giving up the utility of the Li River. The dependent variable is the discrete data of 0 and 1, and the logit model is used with maximum likelihood estimation. As for the preservation value of the Li River in terms of the circumstance of the maximum WTP of Guilin residents for preservation, the method of measuring WTP includes two ways. The first method is the mean WTP, which assesses the value by numerical integration from 0 to infinity as follows [51]:

$$WTP_{mean} = \int_0^{\infty} F_\eta(\Delta v)dA = \frac{1}{\beta}\ln[1 + \exp(\alpha)] \tag{3}$$

where α = constant and β = coefficient of bid amount.

The second method is the truncated mean WTP, which estimates the value by numerical integration from 0 to Max A (maximum bid amount) as follows:

$$WTP_{truncated} = \int_0^{Max.A} F_\eta(\Delta v)dA = \frac{1}{\beta}\ln[\frac{1 + \exp(\alpha)}{1 + \exp(\alpha + \beta Max.A)}] \tag{4}$$

Of the two methods, the truncated mean WTP is considered more appropriate due to statistical efficiency, consistency with theoretical constraints, and aggregation ability [52].

3.3. Contingent Valuation Method (CVM) Setup

A hypothetical scenario was used to determine the situational value of the Li River [53]. In this study, basic information about the Li River was provided to the respondents. Furthermore, the following hypothetical scenario was given to elicit the respondents' WTP for the preservation value of the Li River.

> *The Li River is a pearl among the beautiful rivers and mountains of China. It is the essence of Guangxi's landscape, the quintessence of Guilin's mountains and rivers, and a place with one of the most developed karst peak forests in the world. It was included by the State Council "First*

Batch of National Key Scenery Resorts" in 1982 and designated as an AAAAA scenery resort in 2007. The Guilin karst landforms were included on the WHL in 2014. The development and utilization of the Li River not only has natural, beautiful scenery for tourists, but also provides employment and economic development for Guilin residents on the Li River. However, in recent years the natural environment in the scenic area of the Li River has been seriously damaged, especially the water quality. Protection of the Li River can not only provide tourists with a quality sightseeing destination, but also furnish the local residents with an opportunity for development and a good living environment. Perhaps most importantly, preserving the river can protect this treasured heritage for the next generations. Since the Li River has sight-seeing, cultural bequest, economic development, and other values, it is extremely necessary for local residents to protect it.

It is not possible to assess the monetary value of the river, but in the interest of scientific analysis, this study is using monetary value for discussion. Hereinafter, you will be questioned about a "preservation fund" regarding your perceived value of the Li River. The "preservation fund" does not exist in actuality, but is instead used as the basis for hypothetical questions to evaluate preservation of the Li River for academic purposes.

DC-CVM has various merits, however a hypothetical bias may still be observed [54]. Respondents are likely to over-value their WTP due to the hypothetical bias, thus over-assessing the preservation value of the river. Therefore, this study adopted a two-stage approach to reduce such bias. The first stage was the hypothetical scenario and the second stage was the real setting scenario.

In the first stage (a hypothetical scenario), the first DC question was presented as follows:

In the case of protecting the Li River, are you willing to donate A Yuan to the "preservation fund" annually?

☐① *Yes* ☐② *No*

The bid amount range (total of nine amounts) of "preservation fund" for the Li River was determined from open-ended questions in a pre-test with 30 Guilin residents. The amounts were 10 Yuan (1 Yuan = US$0.144), 50 Yuan, 100 Yuan, 150 Yuan, 200 Yuan, 300 Yuan, 500 Yuan, 800 Yuan, and 1000 Yuan. The bid amount was randomly assigned and the respondents were only required to answer "Yes" or "No."

In the second stage (a real setting scenario), an additional DC question was presented as follows:

Would you be willing to provide your contact information (mobile number/WeChat/mailing address, and name)?

☐① *Yes* ☐② *No*

3.4. Measures

Measurement items for psychological variables that were included were: involvement ("There is a connection between me and the Li River"), adopted from Wang and Li [32]; place attachment ("The Li River and I are one"), adopted from Tang et al. [42]; and perceived value ("The Li River has a very high protection value"), adopted from Yu, Tian, and Shu [47]. These psychological variables were measured with a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Additionally, socio-demographic information of the respondents was collected.

3.5. Data Collection

For the purpose of collecting a representative sample from the population of Guilin, this study used the Sixth National Census Data of Guilin in 2010 [55]. To reflect the quota of age and gender, a total of 306 samples were gathered in the scenic and residential areas of the Li River (see Table 1). The respondents were invited to participate in the survey by tourism instructors and undergraduate students who had been trained for the purpose of the survey and the survey procedures to ensure collection of appropriate samples.

Table 1. Quota sampling by age and gender.

Age	Gender			
	Male		Female	
	Quota	Actual	Quota	Actual
<20	35	35	32	32
20–29	24	24	25	25
30–39	21	21	23	23
40–49	26	26	27	27
50–59	20	20	22	22
60	24	24	28	28

4. Results

4.1. Demographics

As shown in Table 2, 51.3% of the respondents were males and 48.7% were females. The respondents aged from younger than 20 years to older than 60 years was evenly distributed, meeting the quota sampling proportion used in this study. Education level ranged widely, from middle school to below postgraduate levels. The samples with an educational level of high school and below made up 66% of the total sample, showing a relatively low educational level. Respondents with an average monthly income of below 10,000 Yuan comprised 88.0% of the total sample. Married respondents represented 61.4%, single respondents represented 38.6%, and respondents with children accounted for 58.5%.

Table 2. Demographic characteristics of respondents.

Variable		*N*	%	Variable		*N*	%
Gender	Male	157	51.3	Education level	Middle school and below	113	36.9
	Female	149	48.7		High school	89	29.1
Age	<20	67	21.9		College	35	11.4
	20–29	49	16		Undergraduate	60	19.6
	30–39	45	14.7		Postgraduate	9	2.9
	40–49	53	17.3	Monthly income (Yuan)	Below 5000	185	60.5
	50–59	41	13.4		5000–10,000	84	27.5
	60s or over	51	16.7		10,000–15,000	18	5.9
Marital status	Married	188	61.4		15,000–20,000	7	2.3
	Single	118	38.6		20,000–25,000	3	1
Child	Child	179	58.5		Above 25,000	9	2.9
	No child	127	41.5		Total	306	100

4.2. Probability Distribution of WTP for the Li River

The probability distributions of WTP for the hypothetical and real setting scenarios are presented in Figure 2. The probability distributions of WTP for both scenarios gradually declined as higher bid amounts were given. A total of 44.12% (n = 135) of the respondents were willing to pay in the hypothetical scenario, compared with 22.22% (n = 68) in the real setting scenario. The results confirmed that a hypothetical bias existed. For instance, for a bid amount of 10 Yuan, 38.24% of the residents were willing to pay in the real setting situation, compared to 82.35% in the hypothetical situation. For a bid amount of 300 Yuan, 14.71% of the residents were willing to pay in the real setting scenario, compared to 35.29% for the hypothetical scenario. That is, a large hypothetical bias among the residents' WTP became larger when lower amounts were given.

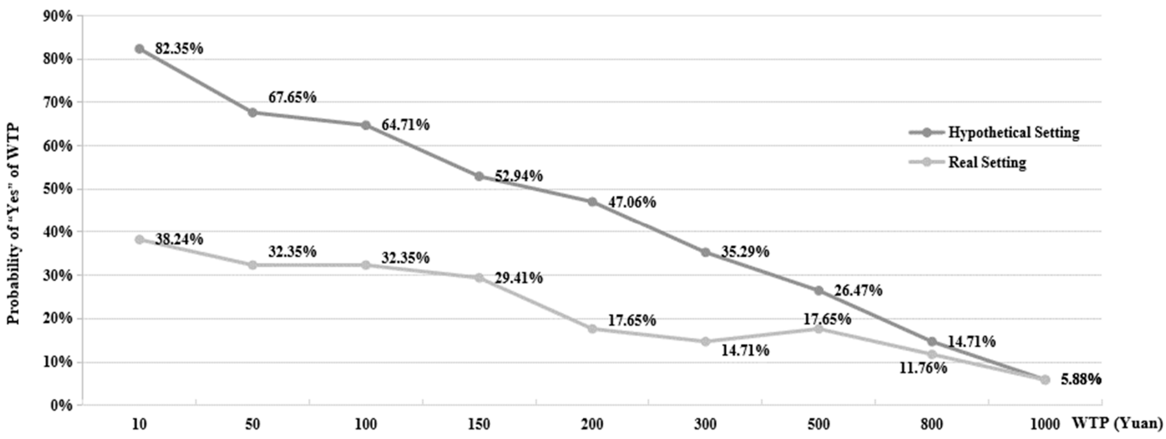

Figure 2. Probability of "Yes" response of WTP in the hypothetical and real situations.

4.3. Determinants of WTP

4.3.1. Socio-demographic and Psychological Variables

Four socio-demographic variables were included in the logit model: age, education level, marital status, and monthly income. Three psychological variables, namely, involvement, place attachment, and perceived value, were also included.

4.3.2. Results of Logit Model for the Hypothetical and Real Situations

Binary logistic regression analysis was separately conducted for the hypothetical and real setting situations by using SPSS 23.0 (IBM Corporation, Armonk, New York, USA) (see Table 3). In the hypothetical situation, payment (bid) amount, involvement, place attachment, perceived value, and income had a significant influence on residents' WTP for the preservation of the Li River. While the hypothetical bias was easily observed in the CVM, more attention should be paid to the real setting situation [26]. In the real setting situation, payment (bid) amount, perceived value, and income also had a significant effect on respondents' WTP. Additionally, some extra variables existed, such as age and marital status, which had a significant effect on respondents' WTP in the real setting. On the contrary, education level had no influence on WTP in either setting. As predicted, bid amount showed a negative relationship with residents' WTP. This indicates that the higher the bid amount, the lower the residents' WTP. Only the effect of perceived value was significant; involvement and place attachment were insignificant in the real setting scenario.

Table 3. Results of logistic model for the preservation value of the Li River.

Variable	Hypothetical Situation		Real Situation	
	Estimated Coefficient	Wald	Estimated Coefficient	Wald
Bid amount	−0.004	41.433 ***	−0.002	13.089 ***
Involvement	−0.540	5.415 *	0.139	0.303
Place attachment	0.625	7.954 **	0.184	0.607
Perceived value	0.746	7.719 **	0.658	4.581 *
Age	0.209	2.757	0.386	7.678 **
Education	0.184	2.231	0.049	0.145
Marital status	0.586	1.701	1.074	4.382 *
Monthly income	0.322	5.037 *	0.348	6.122 *
Constant	−5.024	11.400	-8.334	22.495

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

4.4. Results of Preservation Value

The estimation of the residents' preservation value of the Li River is shown in Table 4 and Figure 3. In the hypothetical scenario, WTP_{mean} was 314.24 Yuan per person as the annual donation to the preservation funding of the Li River, whereas $WTP_{truncated\ mean}$ was 303.18 Yuan. The preservation value of the Li River with WTP_{mean} was much higher than that with $WTP_{truncated\ mean}$. According to the sixth population census, the population of Guilin is approximately 4.99 million. Therefore, the estimation of the total preservation value of the Li River results in an annual amount of 1568 million Yuan based on WTP_{mean} and 1512 million Yuan based on $WTP_{truncated\ mean}$. In the real setting scenario, one person is willing to pay 163.90 Yuan annually in terms of WTP_{mean}, as compared to 144.66 Yuan with $WTP_{truncated\ mean}$. The estimation of the total preservation value of the Li River annually was approximately 818 million Yuan with WTP_{mean} and 722 million Yuan with $WTP_{truncated\ mean}$.

Table 4. Estimations of the per capita and aggregate preservation values of the Li River for residents.

Category		Hypothetical Situation	Real Setting Situation
Person/year	WTP_{mean}	314.24 (45.25)	163.90 (23.60)
	$WTP_{truncated\ mean}$	303.18 (43.66)	144.66 (20.83)
Total/year	WTP_{mean}	1568 million (226 million)	818 million (118 million)
	$WTP_{truncated\ mean}$	1512 million (218 million)	722 million (104 million)

Note: Yuan (USD).

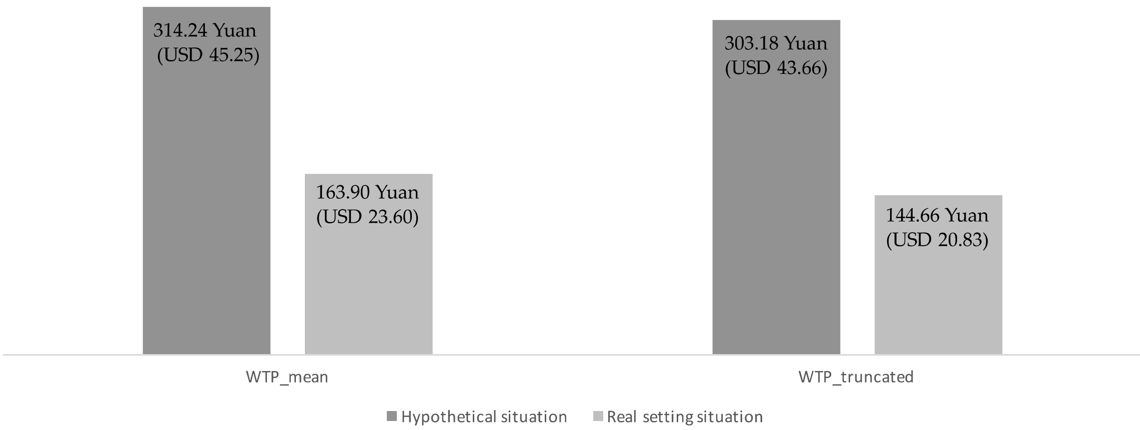

Figure 3. Residents' WTP in the hypothetical and real setting situations.

5. Discussion

Many researchers have emphasized the importance of estimating residents' WTP [1,25]. This study is the first attempt to estimate the preservation value of the WHS of the Li River. The results are in line with economic theories which state that WTP is negatively associated with the bid amount. Using a two-stage approach, this study found that WTP for the preservation value was substantially lower in the real setting scenario than in the hypothetical scenario. This finding is consistent with the findings of previous studies [1,24,52]. To enhance the credibility of the WTP values, WTP_{mean} and $WTP_{truncated\ mean}$ were used [22]. In the hypothetical scenario, Guilin residents' WTP for the protection of the river was 303.18–314.24 Yuan (USD 43.66–45.25) per person per year, and the total or aggregate preservation value of the Li River was 1512–1568 million Yuan (USD 218–226 million) depending on $WTP_{truncated\ mean}$ and WTP_{mean}. In the real setting scenario, WTP was 144.66–163.90 Yuan (USD 20.83–23.60) per person per year, and the total preservation value was 722–818 million Yuan (USD 104–118 million). The hypothetical scenario exaggerated Guilin residents' WTP by 47.7–52.2% as compared with the real setting scenario, and the total preservation value was over-assessed by 750–791 million Yuan. The findings confirmed the existence of hypothetical bias, supporting the usefulness of a two-stage approach to avoid the hypothetical bias and estimate a realistic preservation value. Additionally, the results showed that the $WTP_{truncated\ mean}$ was more conservative than the WTP_{mean}. This finding supports the strength of $WTP_{truncated\ mean}$ in terms of statistical efficiency and aggregation ability. In summary, Guilin residents are willing to pay 144.66 Yuan (USD 20.83) annually for the protection of the Li River based on WTP $_{truncated\ mean}$ in the real setting scenario, and the total preservation value of the Li River was 722 million Yuan (USD 104 million).

In the two scenarios, the influential factors of Guilin residents' WTP were different to some extent. For instance, bid amount, perceived value, and income were the important variables affecting Guilin residents' WTP for the protection in both scenarios. However, residents' involvement and place attachment had a significant influence on WTP only in the hypothetical situation. Age and marital status had a significant influence only in the real situation. In the hypothetical scenario, residents' psychological variables (involvement, place attachment, and perceived value) had a stronger influence on WTP. However, in the real scenario, demographic variables (age, marital status, and income) seemed to have stronger influences on WTP, indicating a high probability for older, married, and high-income Guilin residents to pay to protect the river. Overall, the findings support that WTP in the hypothetical and real setting scenarios was influenced by individual attributes.

Given that perceived value had a positive influence on WTP in both scenarios, WTP could be increased by enhancing Guilin residents' awareness of the Li River's value. The awareness of the preservation value can be promoted from the angles of option, existence, and bequest values. Promotion activities particularly designed for the residents could be useful for increasing their understanding of the value of the river's natural resources and ecology. For instance, the residents' awareness could be enhanced by taking park tours and other recreational activities in such a way that more residents experience the beauty and nature of the Li River. The perceived value of the Li River could also be enhanced by bolstering the emotional linkage between residents, the integration of residents and the river, and increasing residents' environmental consciousness. Residents must also understand that the protection of the river is not solely the responsibility of the government and that their support is also required.

In the future, the preservation value of the Li River can be assessed from the angle of tourists so that valuation of residents and tourists can be compared. Furthermore, the influences of psychological variables, such as involvement, place attachment, and value perception on WTP can be compared between tourists and residents. Future studies may also explore other key psychological factors affecting the residents' WTP to promote their willingness to protect the river.

6. Conclusions

The natural heritage and environmental quality of the Li River have a considerable value for Guilin residents. From the perspective of Guilin residents, this study estimated the preservation value of the Li River. Despite the potential risk of degradation of the Li River's ecosystem and the increasing need for governmental financial support, no previous study has attempted to evaluate its valuation using a quantitative approach. Therefore, this study employed CVM, a valuation technique frequently used in environmental studies, to estimate the preservation value of the Li River for residents. This study provides empirical evidence to support governmental sustainable efforts and securing a necessary budget, ultimately contributing to sustainable tourism.

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References

1. Ji, S.; Choi, Y.; Lee, C.K.; Mjelde, J.W. Comparing willing-to-pay between residents and non-residents using a contingent valuation method: Case of the Grand Canal in China. *Asia Pac. J. Tour. Res.* **2018**, *23*, 79–91. [CrossRef]
2. World Heritage List. Available online: http://whc.unesco.org/en/list (accessed on 2 November 2018).
3. Poria, Y.; Reichel, A.; Cohen, R. Tourists perceptions of World Heritage Site and its designation. *Tour. Manag.* **2013**, *35*, 272–274. [CrossRef]
4. Suntikul, W.; Jachna, T. Contestation and negotiation of heritage conservation in Luang Prabang, Laos. *Tour. Manag.* **2013**, *38*, 57–68. [CrossRef]
5. Thomson Reuters. UNESCO Removes OMAN Oryx Sanctuary from Heritage List. Available online: https://www.reuters.com/article/us-oman-oryx-unesco-idUSL3065930320070630 (accessed on 14 November 2018).
6. UNESCO. Dresden is Deleted from UNESCO's World Heritage List. Available online: https://whc.unesco.org/en/news/522/ (accessed on 14 November 2018).
7. Wang, J.Y.; Wei, W. Fuzzy element-matter evaluation of the sustainability of tourist eco-system in the Li River Basin. In Proceedings of the Sociological Assessment Conference, 2011 International Conference on Social Sciences and Society, Shanghai, China, 14 November 2011; pp. 31–45.
8. Qian, J.P.; Ye, J. Countermeasures for the environmental problems of Guilin and comprehensive governance. *Miner. Geol.* **2009**, *23*, 183–191.
9. Wang, J. Research on tactics for sustainable development of eco-system of the Li River Basin. *Guangxi Soc. Sci.* **2012**, *200*, 12–15.
10. Mjelde, J.W.; Jin, Y.H.; Lee, C.K.; Kim, T.K.; Han, S.Y. Development of a bias ratio to examine factors influencing hypothetical bias. *J. Environ. Manag.* **2012**, *95*, 39–48. [CrossRef] [PubMed]
11. ECNS. China's 'Most Scenic City' Preserves its Mother River. Available online: http://www.ecns.cn/hd/2018-10-25/detail-ifyzfmpy6334147.shtml (accessed on 9 November 2018).
12. UNESCO. The Lijiang River Scenic Zone at Guilin. Available online: https://whc.unesco.org/en/tentativelists/108/ (accessed on 9 November 2018).
13. Lehtonen, E.; Kuuluvainen, J.; Pouta, E.; Rekola, M.; Li, C.Z. Non-market benefits of forest conservation in southern Finland. *Environ. Sci. Policy* **2003**, *6*, 195–204. [CrossRef]
14. Tyrväinen, L.; Väänänen, H. The economic value of urban forest amenities: An application of the contingent valuation method. *Landsc. Urban Plan.* **1998**, *43*, 105–118. [CrossRef]
15. Lin, Y.C. The willingness of heritage tourists to pay for perceived authenticity in Pingxi, Taiwan. *Curr. Issues Tour.* **2017**, *20*, 1044–1069. [CrossRef]
16. Lee, C.K.; Kim, T.K.; Mjelde, J.W. Comparison of preservation values between Internet and interview survey modes: The case of Dokdo, South Korea. *J. Environ. Plan. Manag.* **2016**, *59*, 22–43. [CrossRef]
17. Mjelde, J.W.; Kim, H.; Kim, T.K.; Lee, C.K. Estimating willingness to pay for the development of a peace park using CVM: The case of the Korean Demilitarized Zone. *Geopolitics* **2017**, *22*, 151–175. [CrossRef]
18. Bishop, R.C.; Heberlein, T.A. Measuring values of extramarket goods: Are indirect measures biased? *Am. J. Agric. Econ.* **1979**, *61*, 926–930. [CrossRef]
19. Hanemann, W.M. Valuing the environment through contingent valuation. *J. Econ. Perspect.* **1994**, *8*, 19–43. [CrossRef]
20. Freeman, A.M. *The Measurement of Environmental and Resource Value: Theory and Methods*; Resources for the Future: Washington, DC, USA, 1993.
21. Lee, C.K.; Han, S.Y. Estimating the use and preservation values of national parks' tourism resources using a contingent valuation method. *Tour. Manag.* **2002**, *23*, 531–540. [CrossRef]
22. Lee, C.K.; Mjelde, J.W. Valuation of ecotourism resources using a contingent valuation method: The case of the Korean DMZ. *Ecol. Econ.* **2007**, *63*, 511–520. [CrossRef]
23. Ruijgrok, E.C.M. The three economic values of cultural heritage: A case study in the Netherlands. *J. Cult. Herit.* **2006**, *7*, 206–213. [CrossRef]
24. Lee, D.E.; Jin, M.L.; Lee, C.K. Estimating the economic value of Hallyu experience using CVM-valuation of Hallyu for Chinese tourists. *Korean J. Tour. Res.* **2015**, *30*, 163–182.

25. Kim, J.Y.; Mjelde, J.W.; Kim, T.K.; Ahn, K.M. Comparing willing-to-pay between residents and non-residents when correcting hypothetical bias: Case of endangered spotted seal in South Korea. *Ecol. Econ.* **2012**, *78*, 123–131. [CrossRef]
26. Choi, Y.; Lee, W.S.; Lee, C.K.; Dattilo, J. Valuation of mudflats in nature-based tourism: Inclusion of perceived value of festival experiences. *Tour. Econ.* **2015**, *21*, 833–851. [CrossRef]
27. Sherif, M.; Cantril, H. *The Psychology of Ego-involvements: Social Attitudes and Identifications*; John Wiley Sons Inc.: New York, NY, USA, 1947.
28. Mowen, A.J.; Graefe, A.R.; Williams, D.R. An assessment of activity and trail type as indicators of trail user diversity. *J. Park Recreat. Adm.* **1998**, *16*, 80–96.
29. Lewin, K. *Field Theory in Social Science: Selected Theoretical Papers*; University of Chicago Press: Chicago, IL, USA, 1976.
30. Wu, S.I. Internet marketing involvement and consumer behavior. *Asia Pac. J. Mark. Logist.* **2002**, *14*, 36–53. [CrossRef]
31. Wang, H.Z.; Chao, P.; Wang, J.Y. Effects of fit consumer involvement and the number of celebrities on consumer behavior in an emerging market. *J. Int. Consum. Mark.* **2015**, *27*, 388–402. [CrossRef]
32. Wang, H.; Li, L. Influence of ecological tourist involvement, group regulation on the willingness of tourists for environment-friendly behavior: With birdwatching tourists as an example. *Tour. Sci.* **2018**, *32*, 86–95.
33. Yu, Y.; Tian, J.X. A study on structural relation of cyclers' leisure involvement, leisure benefit and happiness: With Zhaoqing Star Lake bicycle green path as an example. *Tour. Trib.* **2013**, *28*, 67–76.
34. Zhang, A.M.; Li, Y.W. A study on the influence of recreation involvement on tourists' environment-friendly behavior: With place attachment as media variable. *J. Cent. South Univ. For. Technol.* **2016**, *10*, 70–78.
35. Li, Y.M. Effects of story marketing and travel involvement on tourist behavioral intention in the tourism industry. *Sustainability* **2014**, *6*, 9387–9397. [CrossRef]
36. Kim, S.M.; Jang, J.W.; Yoon, S.M. The influence of leisure sports participation on sports commitment and exercise addiction. *J. Sport Leis. Stud.* **2008**, *32*, 585–593.
37. Cheng, T.M.; Wu, H.C. How do environmental knowledge, environmental sensitivity, and place attachment affect environmentally responsible behavior? An integrated approach for sustainable island tourism. *J. Sustain. Tour.* **2015**, *23*, 557–576. [CrossRef]
38. Tsai, S.P. Place attachment and tourism marketing: Investigating international tourists in Singapore. *Int. J. Tour. Res.* **2012**, *14*, 139–152. [CrossRef]
39. Kyle, G.; Graefe, A.; Manning, R. Testing the dimensionality of place attachment in recreational settings. *Environ. Behav.* **2005**, *37*, 153–177. [CrossRef]
40. Bao, W.G.; Yang, X. A study on the changes of local residents' place attachment under tourism commercialization: Case analysis based on Yangshuo West Street. *J. Guangxi Univ. Natl.* **2012**, *34*, 49–54.
41. Zhang, Y.; Zhang, H.L.; Zhang, J.; Cheng, S. Predicting residents' pro-environmental behaviors at tourist sites: The role of awareness of disaster's consequences, values, and place attachment. *J. Environ. Psychol.* **2014**, *40*, 131–146. [CrossRef]
42. Tang, W.Y.; Zhang, J.; Luo, H.; Lu, S.; Yang, X.Z. Relation between ancient village residents' place attachment and attitude to resource protection: With Xidi, Hongcun and Nanping as an example. *Tour. Trib.* **2008**, *23*, 87–92.
43. Fan, J.; Qiu, H.L.; Wu, X.F. Tourism destination image, place attachment and tourists' environmental responsibility behavior: With Zhengjiang tourist resorts as an example. *Tour. Trib.* **2014**, *29*, 55–66.
44. Pai, C.K.; Wang, Z.Y.; Chen, S.H. Measuring the effect of ubiquitous internet success on traveler' perceived value and overall tourism destination satisfaction. *Int. J. Tour. Sci.* **2017**, *17*, 298–315. [CrossRef]
45. Liao, Y. Legal assurance mechanism in the areas of ecological civilization: With local legislative protection of water body of the Li River Basin as an example. *Cent. South Univ. For. Technol. (Soc. Sci.)* **2013**, *7*, 96–111.
46. Chiu, Y.T.H.; Lee, W.I.; Chen, T.H. Environmentally responsible behavior in ecotourism: Antecedents and implications. *Tour. Manag.* **2014**, *40*, 321–329. [CrossRef]
47. Yu, Y.; Tian, J.X.; Shu, J. A study on the relation of place dependence and tourists' post-tour behavioral preference—with value perception, and satisfactory experience as the media variable. *Tour. Sci.* **2010**, *24*, 54–62.
48. Dou, L. Tourists' perceived value, satisfaction and environmental-responsibility behavior. *J. Arid Land Resour. Environ.* **2016**, *30*, 197–202.

49. Hicks, J.R. The four consumer's surpluses. *Rev. Econ. Stud.* **1943**, *11*, 31–41. [CrossRef]
50. Hanemann, W.M. Welfare evaluation in contingent valuation experiments with discrete responses. *Am. J. Agric. Econ.* **1984**, *66*, 332–341. [CrossRef]
51. Lee, C.K. Valuation of eco-tourism resources for DMZ using a contingent valuation method: International comparison of values. *Int. J. Tour. Hosp. Res.* **2005**, *17*, 65–81.
52. Duffield, J.W.; Patterson, D.A. Inference and optimal design for a welfare measure in dichotomous choice contingent valuation. *Land Econ.* **1991**, *67*, 225–239. [CrossRef]
53. Seller, C.; Stoll, J.R.; Chavas, J.P. Validation of empirical measures of welfare change: A comparison of nonmarket techniques. *Land Econ.* **1985**, *62*, 158–175. [CrossRef]
54. Lee, E.J.; Lee, C.K. Estimating the economic value of whale watching using two step CVM: Focused on the Ulsan whale-watching. *Korea J. Tour. Res.* **2016**, *31*, 111–129.
55. Population Census Yearbook. Available online: http://www.gltj.gov.cn/ (accessed on 3 November 2018).