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Estimating the use and preservation values of national parks' tourism resources using a contingent valuation method

Choong-Ki Lee[a,*], Sang-Yoel Han[b]

[a] Department of Hotel and Tourism Management, Kyunghee University, 1, Hoegi-dong, Dongdaemun-gu, Seoul 130 701, South Korea
[b] Department of Forestry, Kyungpook National University, Taegu 702-701, South Korea

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Abstract

The Korean national parks authority has questioned whether natural resources have enough economic value to justify an increase in admission fee in the case of inadequate assistance from the government. Alternatively, they also question whether the national parks have sufficient value to contribute to citizens' welfare in order to receive continuing support from the government. Hence, the purpose of this research is to estimate the use and preservation values of natural and/or cultural resources in five distinctive national parks, using a dichotomous choice contingent valuation method.

The empirical results show that natural and/or cultural resources of the sample national parks possessed considerable use and preservation values, outweighing current admission fees and maintenance costs per visitor. Thus, these values provide enough justification for the national park authority to increase admission fees to maintain the quality of natural environment, and avoid degrading natural resources in the event of no assistance by the government. The findings may provide guidance to national park managers and practitioners who establish pricing policies. The results also show that values of natural and/or cultural resources were different across five distinctive national parks, indicating the possibility of employing differential admission fees according to park characteristics.

Keywords: National parks; South Korea; Contingent valuation; Willingness-to-pay; Use value; Preservation value; Logit model

1. Introduction

National Parks have long been recognized as popular tourist sites for Koreans. In 1999, approximately 32 million people were reported to have visited the national parks in South Korea (Korea National Parks Authority, 2000). Considering a national population of 46 million people, the visitation levels indicate that about 7 of every 10 Koreans visited the parks. Koreans like to hike with their families or friends and use the national parks for socializing, improving health, and escaping from their routine lives. Due to their proximity to population centers, Korea's national parks provide relatively easy accessibility, as compared to those of USA.

The concept of national parks in Korea is relatively new as Mt. Chirisan was designated as the first park in 1967, and now there are currently 20 national parks in the country. National parks comprise over 161.8 thousand acres, which consist of 95.6 acres of land and 66.2 acres of ocean (Korea National Parks Authority, 1999a). The Korea National Parks Authority (KNPA) was established in 1987 as a professional organization to manage, develop, and protect these resources. KNPA is currently under the Ministry of Environment.

Korea's national parks display a splendid natural scenery of mountains, beaches, and cultural or historic resources. The national parks authority has established an 'Ecology Conservation Plan' in order to preserve precious natural, cultural and historic assets, and provide an ideal habitat for ecosystems (Korea National Parks Authority, 2000). The plan is aimed to provide guidelines for conservation-oriented park management, including various resource protection and research projects.

Considerable sums of money are needed to manage the parks for preservation and conservation. In 1998, approximately 71 billion won (approximately US$ 59

*Corresponding author.
E-mail addresses: cklee1958@daum.net (C.-K. Lee), sangyhan@taegu.net (S.-Y. Han).

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million) was spent on park management (Korea National Parks Authority, 1999b), of which 67.4 percent came from the government and 32.6 percent came from revenues, including admission fees, user fees for camping and concessions. Calculating per capita, it costs 3700 won (approximately US $3) per visitor to manage the national parks, exceeding current admission fee of 1000 won (US 83 cents) per visitor. This finding indicates that government support remains a critical element of park management and preservation.

Due to slow economic growth, the Korean government may cut the budget to reduce expenditures and downsize agency staffs. It would appear that to offset such government induced budget cuts the national parks authority should consider increasing admission fees in order to maintain the quality of the natural environment and avoid degrading natural resources.

User fees for recreation services in the national parks of USA have been a major issue in managerial and academic debate since the turn of the century (Bowker, Cordell, & Johnson, 1999). According to Bowker et al. the USA National Park Service experienced increase in user fees due to federal budget reduction in the 1970s and 1980s along with rising inflation. They also state that some fee proponents believe that users and those who benefit from recreation resources should bear more of the costs for provision of recreation services.

Alternatively, in an era of increased government accountability, the KNPA national parks authority needs to better demonstrate benefits occurring to residents and guests if they are to justify continuing government support. Additionally, there is also a need to accurately estimate a valuation of national parks' programs and resources in order to justify its pricing policy. Hence, KNPA is concerned with whether natural and/or cultural resources have enough economic values to justify an increase in admission fee, or alternatively if their contribution to citizens' welfare justifies continuing support from the government.

Lockwood and Tracy (1995) who assessed the non-market economic value of Centennial Park, Sydney, argued that economic valuation could contribute to decisions in choices of different policy alternatives by providing guidance on the costs and benefits of such alternatives. The results of their study indicate that the use and non-use values of the Centennial Park far outweighed the current expenditure on the Park.

In this respect, the purpose of this research is to estimate the use and preservation (or non-use) values of natural and/or cultural resources in five distinct national parks, using a dichotomous choice contingent valuation method (DC CVM). Use value is related to benefits received from actual recreational use, while preservation value is related to benefits from non-use satisfactions, such as existence, option, and bequest values. Nature-based tourism resources such as national parks, are receiving growing attention from academics (Moore & Carter, 1993; Laarman & Gregersen, 1996), but little research has been conducted to estimate the economic value of nature-based tourism in the field (Lee, 1997). The results of this research may help park managers and practitioners to establish practical park management policy, such as admission fee structures.

2. Methodology

2.1. Study area

Five national parks were selected as study areas because they each represent different types of recreation resources, such as mountain-oriented, culture-oriented, beach-oriented, and marine-oriented. The sample sites were also chosen through discussion with park management staff who funded this research. The first national park selected was Mt. Soraksan, which represents mountain-oriented resource, being located in a remote area of Seoul, the capital city of South Korea. Soraksan national park was designated as a conservation area by United Nations Educational, Scientific and Cultural Organization in 1982 because of its variety of plants and animals (Korea National Parks Authority, 2000). This park covers 373 km^2 and is well known for its beauty, marine life, spas, spring water, and ski resorts. Being beloved by many hikers and backpackers, 3 million people visited this park in 1999.

The second national park was Mt. Pukhansan, which also represents a mountain-oriented resource, and is in proximity to a large population of whom are recreationists. This park surrounds the Seoul metropolitan area, covering 78 km^2, or 13 percent of the Seoul territory. Thus, this park is likely to function as a 'green lung' for Seoul, a densely population city of 12 million. More than 4 million people from metropolitan areas visit this park every year. The advantage of close proximity to the city environment attracts urbanites, not only to refresh and energize themselves by relaxing in natural setting, but also to relieve stress from their city lives.

The third national park was Mt. Kayasan which covers an area of 80 km^2 and represents a culture-oriented resource. This park is famous for historic sites and scenic landscapes. Historic or cultural resources include the Haeinsa temple which possesses 15 national treasures and 200 private treasures. Specifically, the Tripitaka Koreana, Palmandaejanggyong in Haeinsa temple was designated as a monument of world cultural heritage by UNESCO on December 9, 1995. The Palmandaejanggyong ('Palman' means 80,000) designated as national treasure, Number 32, consists of about 8 million printing blocks which were carved over a period of 16 years from 1236 (the 23rd year of the Koryo

Dynasty) to 1252 as a prayer for protection from the Mongols' invasion. The Tripitaka Koreana is housed in the structure of the Changgyongpanjon (national treasure Number 52), which has survived for the centuries despite major wars and fire. In 1999, 730,000 people visited this park. While 56 percent of people visited for experiencing natural resources, 44 percent visited for experiencing cultural heritage, representing the largest proportion, as compared to other national parks (Korea National Parks Authority, 2000).

The fourth national park was Hallyo-Haesang which represents a marine-oriented resource, encompassing both beach and sea. This park is composed of many islands and islets which are characterized by a rich coastline and a wide variety of sea fish, plants, and crystal clear water. Approximately 2.5 million people visited this park in 1999.

The last national park chosen for this research was Taean-Haean which also represents a beach-oriented resource, located along the West Sea. This park offers coastal scenery, 430 km of beaches, rich pine trees, and unique rock formations. Almost 580,000 people visit to the park during summer vacation every year.

2.2. Contingent valuation method (CVM) and dichotomous choice (DC) questionnaire

This research employed CVM, which has been commonly used as one of the standard approaches to measure the economic values of non-market goods, such as recreation resources, wildlife, and environmental quality goods (Hanemann, Loomis, & Kanninen, 1991; Hanemann, 1994). The CVM relies on the stated intentions of individuals' willingness-to-pay (WTP) for recreation resources or activities, contingent on hypothetical changes in the quantity or quality of environmental amenity (Walsh, 1986). In other words, the CVM basically attempts to ascertain from respondents what they would be willing to pay under certain hypothetical market scenarios (Lee, 1997).

Although the travel cost method (TCM) is another approach that has been used to estimate the economic value of recreation resources, there are two underlying advantages of CVM (Sorg, Loomis, Donnelly, Peterson, & Nelson, 1985; Sorg & Nelson, 1987). First, it is able to assess an individual's WTP for hypothetical changes in the quality of recreational activities, as well as for present conditions. Second, while the TCM can be used to value only trips with primary purpose or primary destination, the CVM is able to value trips with multiple purposes or multi-destinations. The CVM is the only approach to elicit existence (i.e., non-use) benefits of environment amenity from both users and non-users (Carson & Mitchell, 1993). Bateman, Willis, and Garrod (1994) estimated economic values of two UK national parks, Yorkshire Dales and Norfolk Broads, using CVM. The findings of their study supported the popularity of CVM as an accurate method of evaluation.

This research also utilizes the DC questionnaire to measure individuals' WTP in the contingent valuation surveys. The DC approach was first employed by Bishop and Heberlein (1979) in their well-known study of measuring the economic value of goose hunting. Respondents in the DC approach are asked only to accept or reject a suggested price under a hypothetical market situation. In other words, they need answer only a 'yes' or 'no' where each respondent is confronted with a different price. It is easier for them to make their decisions in the DC question because they are familiar with discrete choices in market transactions (Hanemann, 1994). In this respect, the DC format is generally considered to be the superior elicitation method (Lockwood & Tracy, 1995).

2.3. Types of values to be estimated

A review of environmental economics literature suggests that resources be distinguished as having use and preservation (non-use) values (Walsh, Loomis, & Gillman, 1984): use value is related to consumer surplus benefit from actual recreational use, while preservation value is related to benefits from non-use satisfactions. Preservation value includes option, existence and bequest values (Greenley, Walsh, & Young, 1981): option value is defined as WTP for retaining the recreation opportunity for possible future use; existence value as WTP for the knowledge that natural resources are preserved; and bequest value as WTP for the satisfaction derived from endowing future generations with natural resources. This research attempts to assess preservation value as a whole as well as examining use values.

2.4. Survey method

Deriving an accurate value is highly dependent upon a survey method. The direct face-to-face interview is the most commonly used approach at recreation sites (Forster, 1989) and was employed in this study. The on-site survey was conducted in the five national parks: Mt. Soraksan, Mt. Pukansan, Mt. Kayasan, Hallyo-Haesang, and Taean-Haean, during the peak summer vacation period in 1999. The direct face-to-face interview was administered by well-trained students, who randomly selected visitors after they had experienced the natural and/or cultural resources at each national park, and who agreed to participate in the survey. In case of many family members, one person was chosen for the survey. However, a self-administered questionnaire was given to those who preferred to complete the questionnaire by themselves.

The questionnaire comprised four major parts: (1) questions on measurement of recreation use and preservation values; (2) items on push and pull factors; (3) items on environmental attitudes; and (4) questions on demographic characteristics.

A total of 2300 usable questionnaires were finally collected from the CV survey: 530 questionnaires from Mt. Soraksan, 550 questionnaires from Mt. Pukansan, 400 questionnaires from Mt. Kayasan, 420 questionnaires from Hallyo-Haesang, and 400 questionnaires from Taean-Haean national park.

2.5. Payment option used for CVM

It is important for researchers to choose a realistic payment option in a CV survey. This option represents the willingness-to-pay scenario posed to the respondents. The payment vehicle may have included an admission fee, sales tax, electric bills, license fees, or a special fund; but admission fees were selected as the most logical choice and a realistic payment vehicle for users at recreation sites (Forster, 1989; Randall, Ives, & Eastman, 1974).

An admission fee was chosen for the measurement of use value in this research as a realistic and appropriate payment vehicle since Korean people are familiar with paying admission fees for activities at recreation sites (Lee, 1997); whereas a special tax levied by government, such as an education tax, was selected for measurement of preservation value.

2.6. Hypothetical market scenario

Contingent markets should be established in the absence of market prices for non-market goods, such as natural resources, in order to provide a reasonable basis for estimating their values (Sellar, Chavas, & Stoll, 1986). The CV questionnaire for interviews was carefully designed to provide respondents with adequate and accurate information, making them fully aware of the hypothetical market situation. Those surveyed were informed that data from their surveys would not be used for specific pricing policies for the admission fee of the national park, but instead for academic research to measure the economic value of recreation and/or cultural resources. This information from the CV questionnaire was intended not only to help them reveal their true values as accurately as possible, but also to reduce the rate of rejection from the respondents.

The two CV scenarios were carefully worded to elicit valid responses. The first CV question pertaining to use value reads: 'If the national park provides you with opportunities for appreciating natural and/or cultural resources, hiking, and resting, and it charges x_1 won (Korean currency) as an admission fee per person, would you be willing to pay for it?' The second CV question pertaining to preservation value reads: 'If it charges x_2 won per person per year as a tax for preservation of the national park, would you be willing to pay for it?'

In the blank, each respondent received only one offer, which was randomly selected from a predetermined range of offers. If the respondents answered 'yes', then the values were recorded. A set of nine different offers were selected on the basis of pretest in Mt. Kayasan national park where maximum WTP for entrance fee was asked to visitors to the national park, using open-ended questionnaire. The results show that WTP ranged from 0 to 50,000 won (US$ 1≒1200 won) with mode and median values of 1000 won, respectively. In this study, offers were set at 10 percentile intervals, and thus a set of nine different offers included 100, 200, 500, 1000, 2000, 5000, 10,000, 20,000, and 50,000 won, respectively. Photographs or illustrations were not presented, since the on-site survey was conducted to visitors who came down after experiencing natural and/or cultural resources at each national park.

2.7. Model specification for measuring WTP

It is assumed that the individual will accept a suggested admission fee for recreation activities (or a suggested tax for preservation), to maximize his or her utility under the following condition (Hanemann, 1984):

$$v(1, Y - A; s) + \varepsilon_1 \geqslant v(0, Y; s) + \varepsilon_0 \quad (1)$$

and reject it otherwise. Here, v is the indirect utility which is assumed to equal the utility u, Y is income, A is an offer (admission fee or tax), s is other socio-economic characteristics affecting individual preference, and ε_0 and ε_1 are the identically, independently distributed random variables with zero means.

The utility difference (Δv) can be described as follows:

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

The DC format of CVM has a binary choice dependent variable which requires a qualitative choice model. The probit and logit models are commonly used qualitative choice methods (Capps & Cramer, 1985). Because of its relative simplicity to compute, the logit model is used in this research and in the past has been preferred to the probit model in many fields including recreation (Bishop & Heberlein, 1979; Seller, Stoll, & Chavas, 1985). The probability (P_1) that the individual will accept an offer (A) can be expressed as the following logit model (Pindyck & Rubinfeld, 1981; Hanemann, 1989):

$$P_i = F_\eta(\Delta v) = \frac{1}{1 + \exp(-\Delta v)} = \frac{1}{1 + \exp\{-(\alpha - \beta A + \gamma Y + \theta S)\}}, \quad (3)$$

where $F_\eta(\cdot)$ is the cumulative distribution function of a standard logistic variate and some of socio-economic variables are included in this research. β, γ, and θ are coefficients to be estimated where $\beta \leqslant 0$, $\gamma > 0$, and $0 < \theta$ or $\theta > 0$ are expected.

There are three methods to compute the value of WTP: the first method, called mean WTP is to calculate the expected value of WTP by numerical integration, ranging from 0 to ∞; the second method, called overall mean WTP is to calculate the expected value of WTP by numerical integration, ranging from $-\infty$ to $+\infty$; and the third method, called truncated mean WTP, is to calculate the expected value of WTP by numerical integration, ranging from 0 to Maximum Bid (A). The last method is preferable because it satisfies consistency with theoretical constraints, statistical efficiency, and ability to be aggregated (Duffield & Patterson, 1991). Thus, the truncated mean WTP is used in this research.

The logit model in Eq. (3) is then estimated using the maximum likelihood (ML) estimation method, the most common technique for estimating the logit model (Capps & Cramer, 1985). Once the parameters have been estimated using the ML method, then the expected value of WTP can be calculated by numerical integration, ranging from 0 to Maximum Bid (A) as follows:

$$E(\mathrm{WTP}) = \int_0^{\mathrm{Max}.A} F\pi(\Delta v)\,\mathrm{d}A = \int_0^{\mathrm{Max}.A} (\alpha^* + \beta A)\,\mathrm{d}A, \quad (4)$$

where E(WTP) is the expected value of WTP, and α^* is the adjusted intercept which was added by the socio-economic term to the original intercept term of α. The area under the curve in Eq. (4) can also be used to make inferences of truncated mean of WTP.

3. Empirical results

Logit models may be estimated with either linear or logarithmic functional forms in measuring both use and preservation values. However, the linear-logit models were employed in this study because the linear functional form was much easier to compute mean WTP. This research included several variables: bid, income, education, sex, age, environmental attitude items, and push and pull factor items, respectively. Although their estimated coefficients showed the expected signs, variables with statistical insignificance were excluded in the following logit models to help derive the best models.

3.1. Estimating logit model for Soraksan national park

Table 1 presents the parameter estimates of the linear-logit models of measuring use and preservation values for Soraksan national park. Two variables, offer (Bid1) and pull factor, were included in the logit model to measure use value. The income variable was found to have the expected sign but was not significant. The estimated coefficient of offer, which is the most important explanatory variable of Probability of WTP, was found statistically significant at the 1 percent level with the expected negative sign. This indicates that the probability of WTP 'yes' decreases (increases) as the price of offer increases (decreases) under the hypothetical market scenario. The estimated coefficient of pull factor was found statistically significant at the 5 percent level, and the sign was positive as expected. The pull factor was comprised of 12 items, representing characteristics of national parks, such as attractiveness and accessibility. The finding suggests that the probability of WTP 'yes' increases as the pull factor is stronger. The results reveal that almost 77 percent of respondents were correctly allocated to predicted WTP either 'yes' or 'no' in the model, indicating a relatively good-fit to the data (see also Cox & Snell R^2 and Nagelkerke R^2). The variable of offer (Bid2) was only significant in the model of measuring preservation value. The estimated coefficients of offer were found to be statistically significant at the 1 percent level, with the expected negative sign. In this case, 60 percent of respondents were correctly

Table 1
Results of logit models for Soraksan national park

Use value				Preservation (or non-use) value			
Variable	Coefficient	t-Value	Significance	Variable	Coefficient	t-Value	Significance
Constant	−0.1130	−0.15	0.8781	Constant	0.2462	2.31	0.0206
Bid1	−0.0001	−8.55	0.0000	Bid2	−4.9E-05	−5.92	0.0000
Pull factor	0.5335	2.23	0.0239				
	−2 log likelihood: 479			−2 log likelihood: 673			
	Cox & Snell R^2: 0.312			Cox & Snell R^2: 0.091			
	Nagelkerke R^2: 0.444			Nagelkerke R^2: 0.122			
	Percent of right prediction: 77%			Percent of right prediction: 60%			

allocated to predicted WTP, either 'yes', or 'no,' in the model.

3.2. Estimating logit model for Pukhansan national park

As shown in Table 2, two variables of Bid1 and education were included in the model of measuring use value for Pukhansan national park, while Bid2 was only included in the model of measuring preservation value. The estimated coefficients of offers (Bid1 and Bid2) were found statistically significant at the 1 percent level with the expected negative sign. The coefficient of education variable appeared to be significant at the 1 percent level with the expected positive sign. The positive sign indicates that the higher the education level, the higher the probability of WTP 'yes'. The results reveal that 75 percent and 63 percent of respondents were correctly allocated to predicted WTP, either 'yes', or 'no', in the two models, respectively.

3.3. Estimating logit model for Kayasan national park

As shown in Table 3, three variables of Bid1, sex, and pull factor were included in the model of measuring use value for Kayasan national park, while Bid2 was only included in the model of measuring preservation value. The estimated coefficients of offers (Bid1 and Bid2) were found statistically significant at the 1 percent level with the expected negative sign. The coefficients of pull factor and sex variables appeared to be significant at the 1 percent and 5 percent level, respectively, along with the positive sign. The positive sign of sex variable indicates that the probability of WTP 'yes' is likely to be higher in female than male respondents. The results reveal that 78 percent and 69 percent of respondents were correctly allocated to predicted WTP either, 'yes,' or 'no,' in the two models, respectively.

3.4. Estimating logit model for Hallyo-Haesang national park

As shown in Table 4, two variables of Bid1 and pull factor were included in the model of measuring use value for Hallyo-Haesang national park, while Bid2 was only included in the model of measuring preservation value. The estimated coefficients of offers (Bid1 and Bid2) were found to be statistically significant at the 1 percent level with the expected negative sign. The coefficient of pull factor variable appeared to be significant at the 5 percent level with the positive sign. The results reveal that 73 percent and 59 percent of respondents were correctly allocated to predicted WTP, either 'yes,' or 'no,' in the two models, respectively.

Table 2
Results of logit models for Pukhansan national park

Use value				Preservation value			
Variable	Coefficient	*t*-Value	Significance	Variable	Coefficient	*t*-Value	Significance
Constant	−0.7140	−1.55	0.1213	Constant	0.1400	1.30	0.1936
Bid1	−0.0001	−7.20	0.0000	Bid2	−3.7E-05	−5.03	0.0000
Education	0.4310	3.23	0.0013				
	−2 log likelihood: 550			−2 log likelihood: 658			
	Cox & Snell R^2: 0.243			Cox & Snell R^2: 0.061			
	Nagelkerke R^2: 0.324			Nagelkerke R^2: 0.082			
	Percent of right prediction: 75%			Percent of right prediction: 63%			

Table 3
Results of logit models for Kayasan national park

Use value				Preservation value			
Variable	Coefficient	*t*-Value	Significance	Variable	Coefficient	*t*-Value	Significance
Constant	−2.2966	−2.42	0.0154	Constant	0.3070	0.31	0.7634
Bid1	−0.0001	−7.00	0.0000	Bid2	−3.7E-05	−4.50	0.0000
Sex	0.5099	2.00	0.0449				
Pull factor	0.8490	3.14	0.0017				
	−2 log likelihood: 398			−2 log likelihood: 516			
	Cox & Snell R^2: 0.275			Cox & Snell R^2: 0.063			
	Nagelkerke R^2: 0.369			Nagelkerke R^2: 0.085			
	Percent of right prediction: 78%			Percent of right prediction: 69%			

Table 4
Results of logit models for Hallyo-Haesang national park

Use value				Preservation value			
Variable	Coefficient	*t*-Value	Significance	Variable	Coefficient	*t*-Value	Significance
Constant	−0.7970	−1.11	0.2665	Constant	−0.0266	−0.22	0.8254
Bid1	−7.6E-05	−6.35	0.0000	Bid2	−4.6E-05	−4.57	0.0000
Pull factor	0.5802	2.39	0.0169				
	−2 log likelihood: 430			−2 log likelihood: 511			
	Cox & Snell R^2: 0.187			Cox & Snell R^2: 0.072			
	Nagelkerke R^2: 0.250			Nagelkerke R^2: 0.097			
	Percent of right prediction: 73%			Percent of right prediction: 59%			

Table 5
Results of logit models for Taean-Haean national park

Use value				Preservation value			
Variable	Coefficient	*t*-value	Significance	Variable	Coefficient	*t*-value	Significance
Constant	−2.3910	−2.26	0.0237	Constant	−0.3176	−2.58	0.0098
Bid1	−0.0002	−6.45	0.0000	Bid2	−3.1E-05	−3.61	0.0000
Age	−0.3228	−2.17	0.0296				
Education	0.4680	2.00	0.0457				
Pull factor	0.9206	3.84	0.0001				
	−2 log likelihood: 376			−2 log likelihood: 501			
	Cox & Snell R^2: 0.341			Cox & Snell R^2: 0.064			
	Nagelkerke R^2: 0.420			Nagelkerke R^2: 0.088			
	Percent of right prediction: 76%			Percent of right prediction: 64%			

3.5. Estimating logit model for Teaan-Haean national park

As shown in Table 5, four variables of Bid1, age, education, and pull factor were included in the model of measuring use value for Taean-Haean national park, while Bid2 was only included in the model of measuring preservation value. The estimated coefficients of offers (Bid1 and Bid2) were found to be statistically significant at the 1 percent level with the expected negative sign and the coefficients of pull factors and education variables appeared to be significant at the 1 percent and 5 percent level with a positive sign, respectively. The coefficient of the age variable was statistically significant at the 5 percent level with a negative sign. The negative sign of age indicates that the probability of WTP 'yes' is likely to be higher in younger people than older people. The results reveal that 76 percent and 64 percent of respondents were correctly allocated to predicted WTP either, 'yes,' or 'no,' in the two models, respectively.

3.6. Measuring use value of national parks

Eqs. (5)–(9) show the expected value of truncated mean WTP, which represents use values of the five distinctive national parks. It was calculated by numerical integration, ranging from *0* to Maximum Bid (see Eq. (4)) after parameters from logit models were estimated using the ML method. The socioeconomic term of θ was estimated and added to an adjusted intercept together with the original intercept term of α.

Mt. Soraksan (mountainous park), was estimated to have the highest use value of 17,208 won (approximately US$ 14.3) per visitor, followed by Hallyo-Haesang marine park with the second highest use value of 15,701 won ($13.1). These two national parks are located in remote parts of the country. Mt. Kayasan, a culture-oriented park, was measured by the third highest use value of 14,028 won ($11.7) per visitor. However, Taean-Haean national park was estimated to have the lowest use value of 5758 won ($4.8) per visitor, while Pukhansan national park was measured to have the second lowest use value of 11,439 won ($9.5). Pukhansan national park (mountainous resources) is located in the vicinity of metropolitan, Seoul.

Sorahsan:

$$\int_0^{50{,}000} \frac{1}{1+\exp\{-(1.5621-(0.0001A)\}}\,\mathrm{d}A = 17{,}208 \text{ won } (\$14.3) \quad (5)$$

Hallyo–Haesang:

$$\int_0^{50{,}000} \frac{1}{1+\exp\{-(0.9087-(0.000076A)\}}\,\mathrm{d}A = 15{,}701 \text{ won } (\$13.1) \quad (6)$$

Kayasan:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(1.1484-(0.0001A)\}}\,dA = 14,028 \text{ won } (\$11.7) \quad (7)$$

Pukhansan:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(0.7818-(0.0001A)\}}\,dA = 11,439 \text{ won } (\$9.5) \quad (8)$$

Taean–Haean:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(0.7719-(0.0002A)\}}\,dA = 5758 \text{ won } (\$4.8) \quad (9)$$

The results imply that use value seems to be affected by location for users as well as beauty and/or cultural resources. As for location, people tend to consider transportation costs and time spent in traveling to national parks when they estimate the use value. For instance, Soraksan and Hallyo-Haesang national parks with the highest use values are located in the most remote areas for users, whereas Pukhansan national park, with the lowest use value, is located relatively close to users. The results also indicate that people tend to place a low use value on beach resources, such as Taean-Haean national park, as compared to other national park resources.

3.7. Measuring preservation value of national parks

Eqs. (10)–(14) show the expected value of truncated mean WTP which represents preservation values of five distinctive national parks. In terms of preservation value, Pukhansan national park was estimated to have the largest value of 16,198 won (US$ 13.5) per person per year, followed by Kayasan national park with the second largest value of 15,153 won ($12.6). Soraksan national park had the third largest value of 14,682 won ($12.2). Hallyo-Haesang national park possessed the smallest value of 12,756 won ($10.6); and Taean-Haean national park had the second-smallest value of 13,007 won ($10.8).

Pukhansan:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(0.1400-(0.000037A)\}}\,dA = 16,198 \text{ won } (\$13.5) \quad (10)$$

Kayasan:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(0.3070-(0.000037A)\}}\,dA = 15,153 \text{ won } (\$12.6) \quad (11)$$

Soraksan:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(0.2462-(0.000049A)\}}\,dA = 14,682 \text{ won } (\$12.2) \quad (12)$$

Taean–Haean:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(-0.3176-(0.000031A)\}}\,dA = 13,007 \text{ won } (\$10.8) \quad (13)$$

Hallyo–Haesang:

$$\int_0^{50,000} \frac{1}{1+\exp\{-(-0.0266-(0.000046A)\}}\,dA = 12,756 \text{ won } (\$10.6) \quad (14)$$

While the use value for national parks seems to be negatively related to location for users, the preservation value tends to be positively related to location for users and non-users. For instance, Pukhansan national park with the largest preservation value, is located in the vicinity of metropolitan Seoul indicating accessibility to users, while Hallyo-Haesang park, with the smallest preservation value, is located in a remote area. Also, the preservation value for Soraksan national park, located in the most remote area, was found to be smaller than its use value. This indicates that people are likely to estimate preservation value higher if the national park is close to home. Those who live in metropolitan Seoul might be satisfied with the knowledge that Pukhansan national park is preserved because it plays an important role as a 'green lung'.

When comparing use value with preservation value, the former was found to be greater in Soraksan and Hallyo-Haesang national parks than the latter, while preservation value was larger in Pukhansan and Taean-Haean national parks than use value. Kayasan national park appears to be relatively similar in both use and preservation values.

3.8. Justification for admission fee and its differentiation

To make better internal policies, the Korea national parks authority would benefit from determining if natural resources have enough economic values to justify increases in admission fees in the event of no assistance from the government, or if they have enough economic values to contribute to citizens' welfare to receive continuing government support.

The results of this research indicate that the use value of each national park is far greater than the current admission fees of 1000 won per visitor and maintenance costs of 3700 won per visitor. Thus, the estimated economic value provides justification for the national park authority to increase admission fees to maintain the quality of the natural environment, should the

government provide no funding. The results also indicate that the natural resources found in this parks study provide considerable use and preservation value for citizens. Thus, the Korean government should continue to provide money for parks management in order to maintain citizens' welfare. This finding is supported by the study by Lockwood and Tracy (1995) who also reported that the use and non-sue values of the Centennial Park, Sydney far outweighed the current expenditure on the Park.

4. Conclusions

National Parks in South Korea have been popular tourist sites with more than 32 million visitors every year. However, approximately 71 billion won (US$59 million) is required to maintain the quality of national parks environment every year. This figure is equivalent to 3700 won ($3) per visitor, but admission fee is 1000 won (¢83) per visitor irrespective of the national park. Thus, slightly over two-thirds of the total budget is provided by the government from general tax revenues.

The Korean government has indicated it may downsize federal agencies to reduce its spending, including its assistance to the national park management. If so, current admission fee policies should be evaluated to determine if increases are needed to maintain the existing quality of the natural environment and could demonstrate the rationale for public subsidy. Alternatively, the national parks authority needs to prove the necessity for parks to maintain citizen's welfare, or benefits from recreation use.

This research was conducted to estimate the use and preservation values of natural and/or cultural resources in five distinct national parks, using a DC CVM. The results of this research show that natural and/or cultural resources of the national parks generated considerable use and preservation values, exceeding far greater than current admission fees of 1000 won per visitor and maintenance costs of 3700 won per visitor. Specifically, Soraksan national park was estimated to be the highest use value of 17,208 won (US$14.3) per visitor, followed by Hallyo-Haesang (15,701 won, or $13.1), Mt. Kayasan (14,028 won, or $11.7), and Mt. Pukhansan (11,439 won, or $9.5), Taean-Haean (5758 won, or $4.8). In terms of preservation value, Pukhansan national park was estimated to be the largest value of 16,198 won (US$ 13.5) per person per year, followed by Mt. Kayasan (15,153 won, or $12.6), Mt. Soraksan (14,682 won, or $12.2), Taean-Haean (13,007 won, or $10.8), and Hallyo-Haesang (12,756 won, or $10.6).

The findings indicate that the estimated economic value provides enough justification for the national park authority to increase admission fees in order to maintain the quality of the natural environment, and thereby avoid the degradation of natural resources, should the government reduce or withdraw budgeting support. The findings also indicate that natural and/or cultural resources of national parks provide considerable use and preservation values for citizens. Thus, the Korean government should continue to finance parks management in order to maintain citizens' welfare.

Values of natural and/or cultural resources were found to be different across five distinctive national parks. WTP by respondents appeared to be affected by location of users and parks, as well as attractiveness of national parks. That is, the more remote the location from users, the higher the use value, other things being equal. Conversely, the closer the location to users, the higher the preservation value, other things being equal.

The findings may contribute to guidance on the pricing policy of national park managers and practitioners, although public policy may be made in the political arena. The findings support the parks management policy of differentiating admission fees according to characteristics of national parks and consumer background, which has been taken into consideration by the national parks authority.

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