Economic Value of Recreation – Determinants Influencing the Willingness to Pay in Natural Region with Low-Intensity Agriculture

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Anotace

Předkládaný příspěvek se zaměřuje na studium nepřímé ekonomické hodnoty rekreace v přírodních oblastech s nižší intenzitou zemědělství. Mezi vybrané studované oblasti patří regiony, kterým zpřísněná ochrana přírody nedovoluje extenzivní formy hospodaření, NP Šumava a NP Podyjí. Cílem výzkumu je stanovit faktory, které ovlivňují nepřímou hodnotu rekreace, stanovenou na základě metody ochoty platit. Mezi studované faktory patří pohlaví, věk, vzdělání a denní výdaje během pobytu ve studovaných regionech. Data jsou zpracována pomocí ordinální logistické regrese.

Klíčová slova

Přírodní turismus, národní park, ochota platit, logistická regrese, ordinální model.

Abstract

The presented article deals with an indirect economic value of recreation in natural areas with a low-intensity agriculture. A high focus on nature preservation does not allow the high-intensity agriculture in some region. The conducted research is focused on two regions: Šumava National Park and Podyjí National Park. The aim of conducted research is to determine factors influencing the tourists´ willingness to pay. Data gathered from tourists´ survey are elaborated by ordinal logistic regression. Among studied factors are sex, age, education and daily expenditures per person during a stay.

Key words

Nature based recreation, national park, willingness-to-pay, logistic regression, ordinal models.

Introduction

Agriculture landscape makes a significant part of nature-based tourism. A strong preservation of nature does not allow high-intensity agriculture is some regions. This is a case of protected landscape areas and national parks. In the Protected Area Management Categories adopted by the World Conservation Union, a national park is defined as an area managed mainly for ecosystem protection and recreation (Puhaka, 2008). Since the first national parks were designed, they have been given a double role both as the destinations of nature conservation recreation and tourism. Although national parks have had recreational and tourist goals since the founding of the park movement, many stakeholders have debated the interaction between natural conservation and tourism. Berzina-Livina (2008) pointed out that nature-based tourism creates 50% of all international tourism in Europe and has been increasing between 10 and 30% per year, with global spending increasing on average by 2% per annum. Eagles (2002) confirms that nature-based tourism has an increasing tendency.

In recent years, the role of protected areas in society has been re-evaluated. The cost of preservation competes with the public need and increasing demand for land and sources places pressure on governments (Walpole et al., 1999). Wood (2006) summarizes the findings of several pieces of research and points out that parks often supply the most important part of the nature-based tourism experience yet captures very little of its economic benefits. The majority of protected areas charge low entrance fees and these revenues cover only a part of the costs of management. Consequently, government lacks hard fiscal evidence to justify the allocation of public funds to park management despite its importance to tourism. Walpole et al. (1999) adds that protected areas do not generate significant direct revenues.

The value of recreation is commonly determined by travel cost method and by contingent valuation methods; especially willingness to pay (WTP) approach is commonly applied. The contingent valuation methods are used in several studies for estimating recreation value (e.g. Chen et al., 2004; Wielgus et al., 2009; Scarpa et al., 2000). Togridou et al. (2006) analyzed determinants of visitors´ willingness to pay in the National Marine Park of Zakynthos. Using logistic regression they realized that visitors´ characteristics were not significant determinants of visitors´ responses to the payment questions. Nationality was either significant parameter in their model.

Vervič - Slaber-Erker (2008) analyzed recreation in Volčji Potok landscape area in Poland and future possible development scenarios. They found out that visitors´ willingness to pay is positively influenced by respondents' income; consciousness; concerns about unplanned development; perception of probable damage to the area; and perception of natural and cultural heritage.

Hakim at al. (2010) studied the economic value of nature-based tourism in Rawapening in Indonesia and found out that predictors of income and education were statistically significant in developed logit model, whereas predictors of age and gender were not statistically significant.

Mmopelwa et al. (2007) found out, in their research of visitors´ willingness to pay for park fees in Moremi Game Reserve in Botswana, that the WTP was not related to age, gender and visitors´ experience. Nevertheless, the WTP was influenced by expenditures for the trip.

Kim at al. (2007) analyzed determinants of willingness-to-pay in Changdeok Palace in South Korea. The results of their research elaborated by logistic regression proved income as statistically significant parameter of WTP; while predictor of age, education, and job were not statistically significant. Ellingneson - Seidl (2007) analyzed the determinants in Eduardo Avaroa Reserve in Bolivia and they concluded that nationality and income were not significant determinants. Lee - Mjelde (2007) valued ecotourism in Korea and realized that parameters of age, gender, education where not statistically significant.

Lee – Han (2002) estimated the use value of tourism in national parks in Korea. They studied five national parks and they found out that sex, education and age were statistically significant only in one of the studied parks.

Above mentioned studies do not provide obvious relation between tourists´ willingness to pay and tourists´ personal characteristics. Conducted research aims to determine key factors influencing tourists´ willingness to pay in national parks in the Czech Republic. The main research question to answer is: "What are the factors influencing the tourists´ willingness to pay for recreation in national parks?"

Materials and Methods

To evaluate the recreation value the willingness to pay approach is applied. The take-it-or leave-it approach with follow-up is of elicitation format was used (the elicitation formats are discussed in Antouskova, 2012). The take-it-or-leave-it with follow-up method supposes an additional question to accepting/rejecting the initial bid. This process forms the intervals in dependent variable, so ordinal models are applicable. If there is only one additional bid, then four intervals are created and the probabilities for these sequences are given as follows:

- "no" then "no": $P = \text{Prob}(W_n < k_{nl}) = \Phi((k_{nl} - W)/6)$;

- "no" then "yes": $P = \text{Prob}(k_{nl} < W_n < k_n) = \Phi((k_n - W)/6) - \Phi((k_{nl} - W)/6)$;

- "yes" then "no": $P = \text{Prob}(k_{nl} < W_n < k_{nu}) = \Phi((k_{nu} - W)/6) - \Phi((k_n - W)/6)$;

- "yes" then "yes": $P = \text{Prob}(W_n > k_{nu}) = 1 - \Phi((k_{nu} - W)/6)$,

where W_n represents the true willingness to pay of person n, k_n is a prompt, k_{nu} is the second prompt

if the person answers "yes", k_{nl} is the second prompt if the person answers "no", Φ *(.)* is standard cumulative normal function.

Studied areas

The Podyji National Park is the smallest of national parks in the Czech Republic (63 km2). It extents a canyon of the Dyje River, which is characterized by deeply incised meanders, cliffs and stone-seas. It is the last well-preserved river valleys in the Central Europe. The predominant part of national park is covered by grass. Meadows and grasslands are situated especially along the Dyje River. These areas are handled by the National Park Authority, which intends to preserve and extend grasslands. Other areas are covered by vineyards. In the east, there are mooreland and steppe grasslands situated.

Šumava National Park is situated in the South-West of the Czech Republic with the area of 680 km². The national park protects a typical ecosystems of the central European mountain countryside, forests, glacial lakes, peat bogs and mountain meadows. A relief of forest and non-forest enclaves are typical for a landscape of national park. Non-forest areas make around 15% of all areas, however only 4.5% are farmed. The Šumava National Park Authority intends to support and conversion of non-forest areas into meadows and grass lands. The plant production is mainly focused on fodder and pasture land.

Data collection

Data were collected in Šumava National Park and Podyjí National Park during the summer 2011. Before asking valuation question, the interviewer made sure, that respondents are familiar with the value of recreation to be evaluated. Tourists without proper knowledge of the value (e.g. being in studied areas for the first time and just in the beginning of their stay) were excluded from other questioning.

Tourists were asked a following valuation question: "What maximum amount are you willing to pay for being in this area and still having the same utility from the visit?" The initial bid was CZK 100 per day. If the respondent rejected, he/she was offered a second bid at a half of initial amount (CZK 50). A similar process was applied, if the respondent accepted the initial offer. In this case they were offered the double amount of the initial bid (CZK 200).

Tourists were also asked a series of socio-economic questions, including the respondent's gender, age, educational level, spending during their visit. In total, 491 observations were elaborated.

Logit model specification

The data gathered by questioning tourists in studied areas enable to indicate the cut points for prepared ordinal model (for more see Hilbe, 2009). The cut points of ordinal model are given by 50 CZK, 100 CZK, 200 CZK. This enables to create five intervals of willingness to pay answers: 1–49 CZK; 50–99 CZK; 100–199 CZK; 200 and more. The willingness to pay for admission fee is a depended variable in developed models.

The independent variables in proposed models correspond to the factors that may influence tourists´ decision about their willingness to pay (sex, age, education, and daily expenditures per actual visit). The general model function is characterized as follows:

ln (p/ (1–p)) = α + β1 (sex) + β2 (age) + β3 (level of education) +β4 (daily expenditures per visit) + e, where

ln (p/ (1–p)) is logit or log odds ratio of dependent variable, *α* is constant, *β* is coefficient of dependent variable, and *e* is error term.

The independent categorical variables are subsequently coded according to the studied variables. The sex is coded as: m – man, reference category is women. The age is coded as: age group 0–19 (-20); age group 20–29 (-30); age group 30–39 (-40); age group 40–49 (-50); age group 50–59 (-60). The reference category of age is an age group with tourists 60 years old and older. The parameter of education is coded as: without education (1); elementary education (2); high school education (3); technical institute/college (4). The reference category for education is tourists with university degree. Expenditures, which stand for daily expenditures per actual visit, are coded as follows: spendings up to 499 (1); spendings 500 – 999 CZK (2); spendings 1,000 – 1,499 CZK (3); spendings 1,500 – 1,999 (4). The reference category group are tourists spending more than 2,000 CZK a day on their trip in national parks.

Chi – square test, Cox&Snell R Square and Nagelkerke R Square and McFadden test are applied. Cox & Snell R Square, Nagelkerke R Square and – 2 log likelihood are for guidance only since they can take moderate or low levels, even when the estimated model could be appropriate and useful, due to the fact that the dependent variable is categorical.

Results

1. Šumava National Park region

Tourists coming to Šumava National Park are mainly in the age category 20–29 years (37.3%), and 30–39 years (22.0%). Tourists coming to studied area have obtained above all high-school education (39.1%), and 39.7% of tourists have obtained a university degree. Tourists spent 1,654 CZK per their visit in average. The highest costs are spent for accommodation and boarding. Most tourists spend between 500-999 CZK per day/person during their stay in Šumava National Park (51.4%). There are 29% of tourists spending up to 500 CZK day/person; and 13.8% of tourists spending 1,000-1,499 CZK day/person.

There are 20.0% of tourists who are not willing to pay any hypothetical entrance fee 34.3% of tourists are willing to pay up to 49 CZK. 31.4% of tourists are willing to pay more than 50 CZK and less than 99 CZK. 23.6% of tourists are willing to pay in the interval 100–149 CZK. Only 3.6% of tourists are willing to pay between 150 and 199 CZK, and 7.1% of tourists are willing to pay more than 200 CZK.

Willingness to pay in Šumava NP

The results proved the tourists´ spendings are statistically significant predictor in developed model. Tourists spending on their trip more than 2,000 CZK (day/person) are 1.02 times more likely to be willing to pay higher admission fee for a park entrance fee than those tourists spending on their trip up to 500 CZK. Tourists spending on their trip over 2,000 CZK are also 1.09 times more likely to pay higher admission fee than tourists spending between 500 and 999 CZK; 1.07 times more likely than tourists spending 1,000 - 1,499 CZK; and 1.08 more likely times than those spending 1,500 - 1,999 CZK.

The analyzed parameter of age proved that tourists in the age categories under 60 years are more likely to be willing to pay for admission fee than those tourists older than 60 years. The only statistical significant age group is indicated to the age category up to 20 years. Tourists younger than 20 years old are 6.0 times more likely to be willing to pay higher entrance fee than those 60 years old and older.

The parameter of sex is not statistically significant in the developed model, however, the results show that women tends to be willing to pay higher admission fee than men do. The parameter of education indicates that tourists with elementary education and without education are more likely to be willing to pay higher admission fee than those

		Estimate	Std. Error	Sig.
Threshold	[interval = 1,00]	-2.508	1.648	0.128
	[interval = 2,00]	-0.962	1.647	0.559
	[interval = 3,00]	0.703	1.634	0.667
	[interval = 4,00]	1.18	1.634	0.47
Location	Sex (m)	-0.314	0.324	0.333
	Age (-20)	1.794	1.011	.076*
	Age (-30)	1.373	0.89	0.123
	Age (-40)	1.173	0.885	0.185
	Age (-50)	1.407	0.952	0.14
	Age (-60)	1.503	0.943	0.115
	Education (1)	1.075	1.317	0.414
	Education (2)	1.058	0.56	.059*
	Education (3)	-0.156	0.378	0.681
	Education (4)	-0.216	0.594	0.716
	Spendings (1)	-3.873	1.428	.007**
	Spendings (2)	-2.432	1.399	.082*
	Spendings (3)	-2.704	1.46	.064*
	Spendings (4)	-2.712	1.576	.085*

**Statistical significance α = 0.05
*Statistical significance α = 0.1
Source: Own calculations

Table 1: Logit model parameters of Willingness to pay (Šumava NP).

Model Fitting Information					Pseudo R-Square	
Model	-2 Log Likelihood	Chi-Square	df	Sig.	Cox and Snell	0.191
Intercept Only	290.358				Nagelkerke	0.203
Final	261.159	29.199	14	0.01	McFadden	0.076

Source: Own calculations

Table 2: Logit model tests.

		Estimate	Estimate	Std. Error	Sig.
Threshold	[interval = 1,00]	-4.24		1.421	0.003
	[interval = 2,00]	-3.339		1.41	0.018
	[interval = 3,00]	-0.767		1.379	0.578
	[interval = 4,00]	-0.505		1.38	0.715
Location	Sex (m)	-0.727		0.332	.029**
	Age (-20)	-2.808		1.197	.019**
	Age (-30)	-2.933		0.959	.002**
	Age (-40)	-2.299		0.968	.018**
	Age (-50)	-2.529		1.006	.012**
	Age (-60)	-3.071		1.018	.003**
	Education (1)	2.379		1.419	.094*
	Education (2)	0.633		0.579	0.275
	Education (3)	0.496		0.363	0.173
	Education (4)	0.395		0.581	0.497
	Spendings (1)	-0.984		1	0.325
	Spendings (2)	-0.56		0.994	0.573
	Spendings (3)	-0.22		1.038	0.832
		-0.684		1.217	0.574

**Statistical significance α = 0.05
 *Statistical significance α = 0.1
Source: Own calculations

Table 3: Logit model parameters of Willingness to pay (Podyjí).

with university degree, however, those tourists with high school education and those with technical institute are less likely to be willing to pay higher admission fee.

2. Podyjí National Park

Tourists coming to Podyjí National Park are mainly in the age category 20–29 years (36.4%), 30–39 years (27.8%) and 40–49 years of age (17.2%). The research shows that most tourists have at least high-school education (72.2%), from whom 36.4% of tourists have obtained a university degree. There are 21.9% of tourists are not willing to pay any hypothetical entrance fee. There are 29.1% of tourists willing to pay up to 49 CZK. 18.5% of tourists are willing to pay more than 50 CZK and less than 99 CZK. There are 42.4% of tourists willing to pay in the interval 100–149 CZK. Only 2.0% of tourists are willing to pay between 150

CZK and 199 CZK, and 7.9% of tourists are willing to pay more than 200 CZK.

There are 33.8% of tourists spending up to 500 CZK. There are 18.5% of tourists spending 500-999 CZK day/person, and 42.4% spending 1,000-1,499 CZK.

Developed model of willingness to pay in Podyji National Park showed that tourists´ spendings are not a statistically significant predictor. Tourists spending more than 2,000 CZK a day are more likely to be willing to pay higher admission fee then those tourists with lower expenditures on their trip per day.

The developed model proved that women are 1.9 times more likely to pay higher admission fee than men do. The predictor of age is also statistically significant parameter in developed model. Tourists

Model Fitting Information					Pseudo R-Square	
Model	-2 Log Likelihood	Chi-Square	df	Sig.	Cox and Snell	0.157
Intercept Only	303.326				Nagelkerke	0.169
Final	277.78	25.546	15	0.043	McFadden	0.065

Source: Own calculations

Table 4: Logit model tests.

up to their 20 years old are 1.1 times more likely to be willing to pay higher entrance fee than tourists 60 years old and older. Similarly probability may be identified in all other age groups, all tourists younger than 60 years are 1.1 times more likely to be willing to pay higher admission fee.

Analyzing the parameter of education, the only statistically significant group is tourists without education. These tourists are 4.6 times more likely to be willing to pay higher admission fee than tourists with university degree. Tourists with other than university degree also tend to be willing to pay higher admission fee than those with university degree.

Conclusion

Willingness-to-pay is one of a methods used for evaluation recreation value in nature based areas. This method supposes questioning tourists about willingness to pay for natural resources used for recreation. The data gained for such as questioning are often elaborated by logistic regression. The analyzed natural areas with a high focus on nature preservation and low-intensity agriculture in the Czech Republic are Podyjí National Park and Šumava National Park. The results proved that tourists are willing to pay for hypothetical admission fee. The mean value of such an admission fee is 100 CZK (person/day).

To study factors influencing tourists´ willingness to pay, two models of ordinal logistic regression are developed. Even if the models themselves are statistically significant, not all of all studied parameters are statistically significant. The parameter of spendings is statistically significant only in the model of Šumava NP. However, the same tendencies can be seen in both models, that means that tourists spending more 2,000 CZK a day are more willing to pay higher entrance fee than tourists spending less.

Both models prove that women tend to be more willing to be higher admission fee than men do. However, this parameter is statistically significant only in the model of Podyjí NP.

On the contrary, the parameter of age does not show similar tendencies. This parameter is statistically significant only in NP Podyjí. Similarly, the parameter of education does not show the same tendencies.

The results of conducted research in the Czech Republic proved the disunity in factors influencing tourists´ willingness to pay. This confirms results of previous studies in which such as disunity is seen.

The results of conducted research may be influence by the number and structure of respondents. Nevertheless, methods used in presented research are applicable, and may be used for higher sample of respondents in other natural and agricultural regions for evaluating indirect economical value of recreation, consumer surplus and factor influencing respondents' willingness to pay.

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