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CONTINGENT VALUATION OF THE WIELKOPOLSKA NATIONAL PARK BY RESPONDENDS OF DIFFERENTIATED AGE AND EDUCATION

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ABSTRACT: The aim of this study was to identify factors determining propensity to incur costs for the Wielkopolska National Park and to accept compensation for the prevention of access to the Park depending on the age and education of respondents. Source materials for the investigation of this problem were collected in the course of a survey in the form of standardised interviews, conducted in the years of 2012–2013 among residents of towns located within communes, in which the Park is situated. Analyses were conducted using contingency tables. Based on research results it was found that respondents assess the value of WNP differently depending on their age and education.

KEY WORDS: valuation of environmental goods,contingent valuation method, chi-square test

JEL: Q51, H4,D6

Introduction

Trying to explain the behavior of the respondents regarding the willingness to pay for the environment, it can be assumed that they depend on a number of socio-economic characteristics, including gender. Economy has developed methods for the valuation of public goods including ecological, which can be described in monetary units. The most commonly used method is contingent valuation, which is used to estimate value of the ecological services (Mitchell, Carson, 1989).

In the literature, the results of studies that show the differences by gender in declared WTP and WTA estimates can be found. In some studies declared the amount of money for ecological services were higher for men while in other cases, women wanted spend larger amounts. For example, research carried out in the northeastern US, where the willingness to pay costs for doubling the population of trout has been estimated, the value of WTP for men was much higher than that of women (Cameron, Englin, 1997). While the study of the (Berrens, Bohara, Kerkvliet, 1997) have shown significantly higher WTP values declared by women – the study concerned the estimation of social preferences on the location of landfills.

The growing popularity of the contingent valuation method in recent years has led to its increasingly broader applications: starting from the assessment of the environmental value, through evaluation of public services, cultural activity, nature conservation, valuation of recreational services, to valuation of cultural heritage resources and works of art (Willis 1994; Nowacki 2009). The CVM is a highly universal technique to estimate the value of various goods and non-market services. It is a method based on the so-called declared preferences (Boxall, Adamowicz, Swait, Williams, Louviere 1996).

Valuation of the Wielkopolska National Park using the contingent valuation method consists in the assessment of willingness to pay specific amounts of money for the possibility of direct or indirect use of the environment. This method is based on interviews, thanks to which we may specify which benefit or loss in human prosperity results from changes in the quality of the environment changes in terms of access to a given environmental good. Respondents specify their behaviour on a hypothetical market in relation to the presented questionnaire scenario, linking indirectly the valuation of the social value of the Park (assessed by the public) with the market situation it concerns. In the behaviour of the respondents we may observe the effect of substitution and indifference acting in the economic theory of demand and the

theory of consumer choice on a normal market (Spash, 2000). Results of the investigations (value) may be considered reliable and reflecting actual preferences of respondents; however, we may not forget the numerous drawbacks and limitations of the applied method, resulting primarily from the numerous sources of errors, which may appear in the course of investigations (Bateman 2000; Holmes, Kramer 2001).

The aim of the study was to identify factors determining propensity to incur costs for the Wielkopolska National Park (WNP) and to accept compensation in the case of prevention of use of the Park, depending on the age and education of respondents.

Characteristic of the study area

The Wielkopolska National Park was established in 1957 and its entire area is located in the Wielkopolska province, in the southern part of the Poznań county – approx. 15 km in the straight line from the province capital.

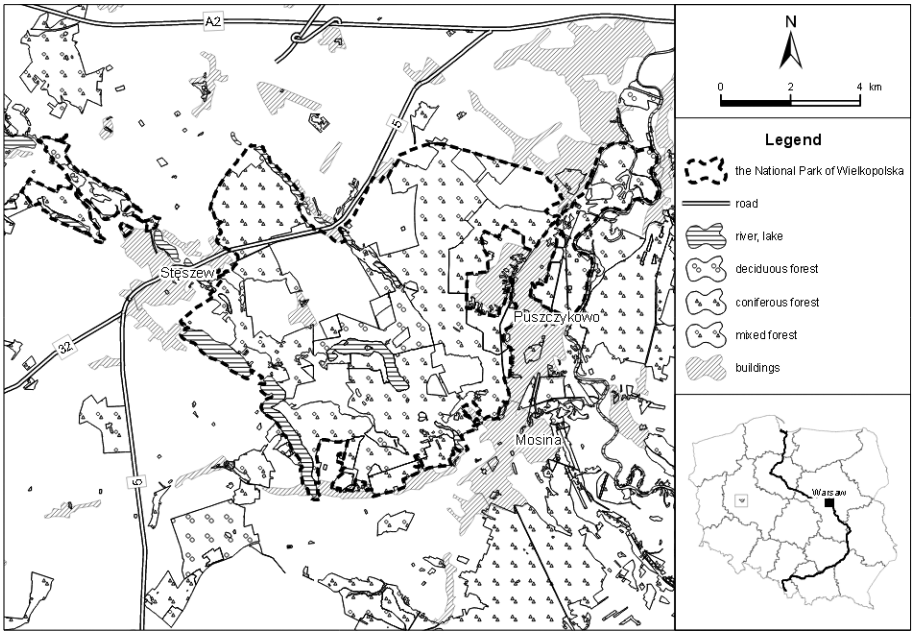

Figure 1. Location of the experimental object – the Wielkopolska National Park

In the Park there are 18 strict protection areas of the total area of 259 ha, protecting primarily various forms of postglacial landscape and thus the most natural plant communities and animal species found in the area, as well

as 34 monument trees and a boulder. Results of the Wurm glaciation and the related geomorphological processes include e.g. a morainic plateau covering the greatest area and composed of glacial clays, sands and gravels, as well as its highest elevation Osowa Góra (132 m a.s.l.), and furrows (the so-called channels), in which at present numerous lakes are located. The Ravine Valley of the Warta is located in the eastern part of the park (Cyrul (ed.), 2000; Wyczyńscy, 2006).

Methods

Questionnaire studies were conducted on a representative group of people living in various towns located in the communes, within which the WNP is situated, and in the city of Poznań. Questionnaires were conducted in 2012, with a total of 1450 questionnaires collected. The results were verified, as a consequence incomplete and erroneously filled questionnaires were identified. Finally an ordered, verified matrix was obtained with questionnaire responses, comprising 724 records.

The questionnaire was prepared based on studies by (Gołos 2001; Georgiou 1996; Bateman 2000) and it consisted of three parts. In the first part the questions concerned the general attitude to WNP (the state of knowledge, frequency of visits, importance of WNP for visitors, etc.). The second part contained questions concerning the willingness of respondents to incur costs for the environment (voluntary allocation of financial means for the possibility to use the value of WNP or possible compensation for the prevention of use of the Park, alternatively if respondents did not declare any amount or whether they would be willing to work for WNP as volunteers). The third part comprised socioeconomic characteristics of respondents, including the sex, age, profession, net income per person in the family, education and place of residence.

In the analysed group of respondents 61% were women, while the other 39% were men. In terms of age respondents represented all age groups from below 18 to over 60 years. The most numerous groups comprised individuals aged 18–25 years (37.1%), 26–40 (23.1%) and 41–60 years (20.1%).

Among the respondents the largest number lived in cities of min. 100 thousand inhabitants (35%) and they were predominantly residents of Poznań. The other groups represented towns from 21 to 100 thousand (23.9%), towns of max. 20 thousand (23.5%) and villages (17%).

Mean net monthly income within the range of 1000 to 2500 PLN was declared by the largest number of respondents (43.4%). The largest proportion of individuals had secondary and higher education (41.8%, 36.8%,

respectively), while in terms of profession the most numerous group comprised students (34%) and office workers (16.6%).

The zero hypothesis testing whether the responses given to questions concerning propensity to incur costs for WNP depend on the age was verified using the chi-square test as the test of trait independence. Rejection of the zero hypothesis implies that the division of respondents in terms of age and referendum preferences are dependent. In turn, in an opposite situation it may not be negated that population groups and referendum preferences are independent (Farreras, Riera, Mogas, 2005).

Additionally, the values of chi-square statistics were replaced by values of the empirical level of significance (the so-called *p*-value) through the established converse left-sided probability of the chi-square distribution.

Moreover, it was tested whether there were any differences in responses to questions concerning willingness to pay for WNP considering separately individual age groups of respondents. Three groups were identified: young people (<26 years), middle-aged people (26–40 years) and older people (>40 years). These analyses were repeated in the verification of hypotheses concerning the acceptance of compensationy in the case of a hypothetical prevention of use of WNP.

Results

Table 1. Total number of responses to questions concerning willingness of respondents to pay (WTP) for the Wielkopolska National Park depending on age of respondents

		WTP		
		0	1	Total
Age of respondents	<26 years	129	298	427
	26–40 years	57	76	133
	<40 years	53	111	164
	Total	239	485	724
		$\chi^2 = 7.4$ $p = 0.025$		

When analysing results presented in tables 1 and 2 it was stated that both the willingness to pay for WNP and to accept compensation depend on the age of respondents. It was observed that among respondents the largest number of individuals below 25 years are willing to incur costs for the Wielkopolska National Park, e.g. by paying entrance fees. In turn, among individuals willing to accept compensation individuals from two age groups predominate (middle–aged and older people). It may be stated that there is

a marked dependence between age and WTA, while a change in age results in a change in the attitude to acceptance of a hypothetical compensation. The older the respondents, the lower the percentage of individuals willing to accept compensation.

Table 2. Total number of responses to questions concerning compensation for hypothetical prevention of use (Willingness to Accept – WTA) of the Wielkopolska National Park depending on the age of respondents

		WTA		
		0	1	Total
Age of respondents	<26 years	199	228	427
	26–40 years	87	46	133
	<40 years	104	60	164
	Total	390	334	724
		$\chi^2 = 22.2$ $p = 0.001$		

Table 3. Total number of responses to questions concerning valuation of WTP depending on the division in terms of age and education of respondents

		WTP		
age	education	0	1	Total
<26 years	vocational	24	58	82
	secondary	68	176	244
	higher	37	64	101
Total		129	298	427
26–40 years	vocational	2	6	8
	secondary	12	16	28
	higher	43	54	97
Total		57	76	133
<40 years	vocational	7	18	25
	secondary	20	26	46
	higher	26	67	93
Total		53	111	164
Grand Total		239	485	724
vocational		$\chi^2 = 0.072$		$p = 0.964$
secondary		$\chi^2 = 6.22$		$p = 0.044$
higher		$\chi^2 = 5.5$		$p = 0.064$

Table 4. Total number of responses to questions concerning valuation of WTA depending on the division in terms of age and education of respondents

		WTA		
age	**education**	**0**	**1**	**Total**
<26 years	vocational	41	41	82
	secondary	100	144	244
	higher	58	43	101
Total		199	228	427
26–40 years	vocational	4	4	8
	secondary	18	10	28
	higher	65	32	97
Total		87	46	133
<40 years	vocational	13	12	25
	secondary	34	12	46
	higher	57	36	93
Total		104	60	164
Grand Total		390	334	724
vocational		$\chi^2 = 0.031$	$p = 0.984$	
secondary		$\chi^2 = 20.2$	$p = 0.001$	
higher		$\chi^2 = 1.94$	$p = 0.378$	

Analysis of questionnaire results concerning WTP and WTA (table 3 and 4) and division in terms of age separately for each homogeneous group in terms of education showed an interaction of these factors. It was recorded that approx. 2/3 individuals with vocational education in each age group are willing to pay for WNP. In turn, ½ of individuals in each of these groups are willing to accept hypothetical compensation, while the other ½ are not. Among individuals with secondary education the largest number of individuals willing to incur costs for the Wielkopolska National Park belongs to the group of young people, while among indiivduals with higher education it was in the group of older people.

In turn, when analysing the group of individuals with higher education no significant differences were found between an additional division in this group in terms of age in responses to questions concerning WTA. Approximately 50% individuals in each of the distinguished age groups were not willing to accept hypothetical compensation.

In contrast, the greatest differences in responses to questions concerning WTA were found in the group of individuals with secondary education. It was

found that in that group willingness of accept hypothetical compensation for the prevention of use of WNP decreases with age. In the group of individuals below 26 years of age the percentage of such respondents was 60%, while those aged over 40 years it was 26%.

Discussion

Presented results confirmed a dependence between the age of respondents and their education and willingness to incur costs for the Wielkopolska National Park and to accept hypothetical compensation in the case of prevention of use of the Park. Among the confirmed characteristics affecting WTP we may mention the age of respondents and the place of residence. Similar willingness was confirmed by studies in Lithuania on a group of respondents aged 26–35 years with high incomes and those coming from cities, declaring higher values of WTP than the other groups of respondents (Mizaras, Kavaliauskas, Cinga, Mizaraite, Belova, 2015). In studies conducted in Denmark the value of WTP was positively correlated with annual income and the level of education of respondents: the higher the income or education, the greater the declared value of WTP. Investigations conducted by (Nielsen, Olsen, Lundhede, 2007) also showed that women are typically willing to declare higher amounts of WTP than men. The above-mentioned dependencies may not always be confirmed, as indicated by the results of American studies, in which it was stated that the age and education were not related to the amount of declared WTP (Majumdar, Deng, Zhanga, Pierskalla, 2011). In Poland greater incomes of respondents influence the increase in declared WTP amounts, although it is with a simultaneous reduction of frequency of visits to the forest (Bartczak 2015). A study by (Gołos, Ukalska, 2016) confirmed that the greatest increase in the probability of the declaration of WTP>0 was recorded among respondents, for which the greatest element determining the attractiveness of recreation in the forest is the peace and quiet, and individuals declaring rest in the middle of the forest. Studies conducted in the Wielkopolska National Park showed that willingness to pay for the Park depends mainly on the knowledge of respondents on the nature value of the park, their membership in ecological organisations and on their opinion on the financial requirements of environmental protection. In turn, the level of expected compensation in the case of hypothetical prevention of park use depends on the age of respondents, mean net income per family member, opnions on financial requirements of environmental protection and on the distance from WNP (Zydroń, Kayzer, 2015).

Conclusions

1. Studies conducted using the contingent valuation method showed that respondents differ in their evaluation of WNP value depending on their age and education.
2. Among all the analysed age groups individuals with secondary education declare the greatest willingness to incur costs (Willingness to Pay – WTP) for WNP (with the greatest willingness recorded among individuals below 26 years of age).
3. Acceptance of compensation (Willingness to Accept – WTA) for the prevention of use of WNP is expressed particularly by individuals with secondary education aged below 26 years, while in the other age groups an opposite trend was observed.

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The contribiution of the authors

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