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The role of altruism in non-market valuation. An application to the Białowieża Forest.

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Abstract

The purpose of this study is to investigate the impact of an individual trait of altruism on social preferences and hence willingness to pay (WTP) for changes in forest management strategies in the Białowieża Forest in Poland. We used data from a discrete choice experiment (CE), where attributes described changes in the quality of the forest and recreation and were framed to capture the respondents' non-use and use motivations. Patterns in the individual differences in altruistic behavior were elicited using a self-reported questionnaire developed by Rushton et al. (1981) concerning the frequency of an engagement in different altruistic behaviors. The application of the choice experiment technique allowed for the disentangling of the effect of a trait of altruism with regard to different attributes and their levels. The parameterization we employed in the survey was a WTP-space model (Train and Weeks 2005). Results show that the level of altruism has a significant effect on the valuation of restrictions in the forest visitor numbers; however, the altruism influence on the existence and bequest value from improving nature preservation depends on the current status of the forest.

Keywords:

altruism, Choice Experiment, forest naturalness, number of visitors, use and non-use value, WTP-space model

JEL:

Q23, Q51, Q56, Q57

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1. Introduction

An increase in the quality of the environment and its services is beneficial to society. These benefits, however, are often not directly reflected in market prices. Economic sciences have developed methods that allow one to estimate the economic value provided by non-market goods and services by using either the revealed or stated preferences of individuals. An important issue in aggregating social benefits estimated from non-market valuation studies is whether desires for an improved environment come only from egoistical preferences or whether altruistic motives also play a role in this valuation. A distinction between different altruistic motives is relevant for a cost-benefit analysis, as its inclusion in some cases can lead to double counting.

Altruism is present when people are concerned for the welfare of others. The implication of altruism in economics is that the welfare of others enters an individual's utility function. Several types of altruistic motive can be distinguished, as outlined by Andreoni (1990) and Jones-Lee (1991). Altruistic motives can be divided into pure altruism, in which concern for other people respects their preferences and paternalistic altruism in which concern for other people ignores their preferences. Evidence that altruistic motives can be relevant to the individual's decision on willingness to pay (WTP) for environmental policy actions are provided by *inter alia* Cooper et al. (2004), Popp (2001) and Vázquez and Carmelo (2004).

Chilton and Hutchison (2000) pointed out that in non-market valuation studies assessing benefits from a publicly-provided environmental good opens up the possibility that respondents perceive an opportunity to enjoy moral satisfaction from hypothetical contributions to the provision of the good, which sometimes can be misinterpreted as a form of altruism. This, however, is a private benefit named by Andreoni (1990) as the "warm glow", which is driven by egoistic motives. If the individual cares for both private and public benefits, then such preferences are termed as impure altruistic.

For several decades there have been discussions on whether there is consistency in individual altruistic behavior, and if so, how a trait of altruism can be elicited. Rushton et al. (1981) developed the self-reported altruism scale to investigate if there were consistent patterns to individual differences in altruistic behavior. Their results from the self-reported altruism scale were positively correlated with peer-ratings of how altruistic a person seems and with revealed other altruistic behavior such as possession of a medical organ-donor card. The results indicate a broad-based trait of altruism in individuals, i.e., that some people are consistently more generous, helping and kind than others.

The overall objective of this study is to investigate the impact, if any, of an individual trait of altruism on social preferences and hence a willingness to pay (WTP) for changes in forest management strategies in the Białowieża Forest in Poland. We used data from a discrete choice experiment (CE), where attributes described changes in the quality of the forest and recreation. Patterns in individual differences in altruistic behavior were estimated using a self-reported questionnaire concerning the frequency of an engagement in different altruistic behaviors developed by Rushton et al. (1981). Using the choice experiment technique allowed for the disentangling of the effect of a trait of altruism with regard to different attribute levels. The parameterization we employed in the survey was a WTP-space model (Train and Weeks 2005). The advantage of this approach is the WTP distribution as specified by the researcher directly, instead of this distribution being derived from the

estimated distribution of coefficients, which takes place in models in preference space. Additionally, the WTP-space model enables one to take taste and scale heterogeneity into account.

The rest of the article is structured as follows: Section 2 describes the case study area. In the section 3, the modeling approach is presented. Section 4 reports the design of the experiment, the sampling procedure and the survey administration, while Section 5 presents the results of the econometric analysis of responses. Finally, Section 6 offers some concluding remarks.

2. The Białowieża Forest

The analysis is conducted in the context of the Białowieża Forest in Poland, which is an ancient woodland straddling the border between Belarus and Poland. It is one of the last and largest remaining parts of the immense primeval forest that once spread across the European Plain. The Białowieża Forest is a total of 105,582 ha, with 62,219 ha in Poland and 87,363 ha in Belarus. The Białowieża Forest is the most recognized and ecologically valuable forest in Poland. Despite some visible signs of human activity, it is still commonly considered a natural lowland forest. It is especially regarded for its natural dynamics as well as its richness of species, and its ecological structures and functions.

The Białowieża National Park was established in 1921 and was the first national park in Poland. The National Park with natural reserves outside the Park covers 35% of the Białowieża Forest. These parts of the forest have remained practically unaffected by human activity for hundreds of years. This is due to the fact that this forest originally belonged to the kings of Poland and then the tsars of Russia and was used by them as hunting grounds, where the removal of wood was prohibited.

A significant part of the Białowieża Forest has, however, been subjected to human activity and commercial use. Currently, 50% of its territory consists of a typical commercial forest where management is focused on sustainable timber production. The last part of the Białowieża forest (about 15%) is a second-growth forest. During and shortly after the First World War, exploitation took place in this part. The area was then logged and has not been reforested. The current forest is a product of natural regeneration. The oldest trees in this part are around 80-90 years old. Though the second-growth forest is not as unique as the forest of the National Park and the preserved areas outside the Park it is particularly valuable due to the fact that one can observe how forests evolve in places devoid of human interference. The trees, bushes and other plants growing there came about naturally and adapted to the local conditions without human intervention. Even though no logging currently takes place there, according to Polish law this part of the forest can be used for commercial purposes.

The Białowieża Forest is a popular place for Polish and foreign visitors. For several years, an increased number of visitors to the Białowieża Forest has been noted; especially in summer and autumn. More than 100,000 people visit the Białowieża Forest each year. During Polish public holidays in May and August, the forest is visited by 10,000 people each day. In the future, without any changes in forest management policy, this number is likely to increase. A high number of visitors can cause a decrease in the quality of recreation (the problem of overcrowding) and will affect the environmental quality of the forest.

From the early 1990s environmentalists and various NGOs have been trying to convince decision makers to establish the National Park on the territory of the entire Białowieża Forest; so far, unsuccessfully, mainly due to the local opposition, which benefits from timber production.

3. Method

The choice experiment method is based on the characteristics theory of value and assumes that any good or any service, e.g., an environmental good or an environmental quality, can be described in terms of its characteristics (Louviere et al. 2000). In surveys using choice experiments respondents face a series of choice sets that consist of two or more policy options with different attribute levels. Based on the observed choices it is possible to infer which attributes significantly influence a decision to support one of the presented programs. Additionally, if one of the attributes is a cost, respondents' WTP measures for changes in attributes' levels or for an entire policy option can be calculated (Holmes and Adamowicz, 2003).

Capturing heterogeneity among respondents to a CE has been an important research topic within the last decade and it is increasingly being investigated whether this heterogeneity is caused by differences in taste or differences in scale variation. The multinomial logit (MNL) model assumes that respondents do not vary with respect to either taste or scale. Historically, efforts to overcome the limitations of the MNL model were mainly concerned with taste heterogeneity; particularly by employing the random parameter logit (RPL). In these models, scale is generally normalized to one assuming that all individuals respond to the choice experiment with the same consistency, i.e., identical error variances.

Some researchers (e.g., Louviere and Eagle 2006), however, have stressed that scale matters and might even be more important than taking taste heterogeneity into account. As a result of this strand of research, Fiebig et al. (2010) as well as Greene and Hensher (2010) have operationalized models that supposedly take scale heterogeneity into account. Among them are the scale heterogeneity model (S-MNL) the generalized mixed (GMX) logit model and the WTP-space model. In this study we decided to employ the last of these models.

The WTP-space model proposed by Train and Weeks (2005) enables the separation of scale randomness from the randomness of marginal utility coefficients. The advantage of this model is that the WTP distribution can be specified directly, instead of specifying the distribution of coefficients in the utility function and deriving the distribution of willingness to pay.

Let us specify the utility function as separable in price, ρ and non-price x attribute:

$$U_{njt} = -\alpha_n \rho_{njt} + \beta'_n x_{njt} + e_{njt} \quad (1)$$

where alternatives are indexed by j , choice situations by t , α_n and β_n are parameters that represent the tastes of the person n and vary randomly over decision-makers and e_{njt} is a random term. We assume e_{njt} is distributed extreme value with variance given by $\mu_n^2(\pi^2/6)$ where μ_n is an individual scale parameter.

Train and Weeks (2005) show that dividing equation (1) by μ_n does not affect behavior and results in a new error term that has the same variance for all individuals:

$$U_{njt} = -\lambda_n \rho_{njt} + c'_n x_{njt} + \varepsilon_{njt} \quad (2)$$

where the utility coefficients are defined as $\lambda_n = \alpha_n / \mu_n$ and $c_n = \beta_n / \mu_n$. The error term is IID extreme value with constant variance equal to $\pi^2/6$. Equation (2) is named by Train and Weeks (2005) as the model in preference space.

Using the fact that the WTP for an attribute is given by $\omega_n = \frac{c_n}{\lambda_n}$, equation (2) can be rewritten:

$$U_{njt} = \lambda_n (\omega'_n x_{njt} - \rho_{njt}) + \varepsilon_{njt} \quad (3)$$

Train and Weeks (2005) name this the utility in WTP space.

In this study, we employed a specific form of the WTP-space model with normal marginal WTPs. Green and Hensher (2010) showed that by imposing some restrictions such model can be derived from the generalized multinomial logit specification.

4. Survey

4.1. Experimental design

The experimental design of our study utilized both the optimal-in-difference design (Street et al., 2007; Street et al., 2005) and the efficient design (Ferrini et al., 2007; Sándor et al., 2001). The two designs were generated and applied separately for each sub-sample. In the optimal-in-difference design we generated 12 choice tasks that consisted of three alternatives. The utility function associated with the first (status quo) alternative was assumed to be of the constant only form. The utility function associated with the other two alternatives included dummy-coded attribute levels and one continuous variable – cost. The D-optimality of the final design was calculated as 94.160129%.

The efficient design used the same attributes, attribute levels, number of alternatives and choice tasks as the optimal-in-difference design. We utilized priors obtained from an MNL model estimated on the results of a pilot study conducted on a sample of 100 respondents. In order to account for uncertainty associated with our priors we employed the Bayesian approach (Bliemer et al., 2008) in which we assumed all priors to be normally distributed with means estimated from the multinomial logit (MNL) model and standard deviations equal to 0.25 of each parameter mean. The design was optimized for the MNL model with d-efficiency used as optimization criterion (Scarpa et al., 2008). The optimization was conducted with respect to a Bayesian median of 1,000 Halton draws.

The final design comprised 24 choice sets¹. Each set comprised two policy options and a business-as-usual option. In addition, each respondent was presented with a counterbalanced design in which the order of choice tasks was randomized and the order of alternatives was randomized. We have taken steps to ensure that each choice task and each alternative was presented on every position a comparable number of times.

¹ In order to allow for optional preference stability tests, in each of the design-specific sub-samples the 12 choice tasks were repeated, so that each respondent faced a total of 24 choice tasks. An investigation of the preference stability is beyond the scope of this paper.

4.2. Choice attributes

The choice experiment comprised five attributes, from which one – forest naturalness in the National Park and natural reserves – could take only one level². The other attributes were the future naturalness level of the current part of the Białowieża Forest under commercial management, the future level of naturalness of the second-growth part of the Białowieża Forest, the maximum visitor number for the entire Białowieża Forest, and the cost expressed as annual tax increases per household.

Table 1. Attributes and levels in CE.

Attributes		Levels
Forest naturalness	National Park and Natural Reserves (35% of the Białowieża forest)	High level of naturalness (SQ)
	Commercial forests (50% of the Białowieża forest)	High level of naturalness in 250 years, Low level of naturalness (SQ)
	Second-growth forests (15% of the Białowieża forest)	High level of naturalness in 150 years, Low level of naturalness (SQ)
Recreation – max visitor number		Lack of restrictions on visitor numbers (SQ), Max 5,000 people per day, Max 7,500 people per day
Annual cost per household		0zł (SQ), 25zł, 50zł, 75zł, 100zł

We have adopted the following definition of a forest characterized by a high level of naturalness. It is the forest where ecological processes occur without human intervention, where there is a substantial share of trees older than 100 years, where the age of the trees varies naturally, and where there are significant quantities of dead wood. All the above elements are responsible for creating conditions for life for many rare species of animal, plant and fungus.

In the scenario presented to respondents, for increasing the naturalness of the Białowieża Forest in the parts outside the National Park and nature reserves, two management programs were considered: commercial use or passive use, resulting in a low and high level of naturalness, respectively; however, the high level of naturalness in the case of the second-growth forest was predicted to be reached in 150 years; whereas, the adequate time horizon for a commercial forest was defined as about 250 years.

Regarding the recreation attribute, we decided to check if people were willing to pay for restrictions in visitor numbers, bearing in mind that these restrictions can affect them personally. This would require the implementation of an entrance card system. The idea to restrict visitor numbers was motivated by the likelihood of the recreational overuse of the

² We decided to include this attribute in the choice sets to show respondents the entire picture of the current and future forest management of the Białowieża forest. It is very unlikely that in future the area currently under passive protection could be subject to less stringent protection

Białowieża Forest in the near future and, therefore, a decrease in recreation quality. Additionally, the high number of visitors would not remain without an impact on the environmental quality of the forest. The survey scenario, attributes and their levels were consulted with experts from the Białowieża National Park and from the State Forests National Forest Holding.

	Program A No additional protection measures	Program B Additional protection measures	Program C Additional protection measures
National Park and Natural Reserves (35% of the Białowieża forest)	HIGH level of naturalness		
Commercial forest (50% of the Białowieża forest)	LOW level of naturalness	HIGH level of naturalness	HIGH level of naturalness
Second-growth forest (15% of the Białowieża forest)	LOW level of naturalness	LOW level of naturalness	HIGH level of naturalness
Restriction in visitor numbers	LACK of constraints	MAX 7,500 people per day	MAX 5,000 people per day
Annual cost per household	0zł	50zł	100zł
Your choice	☐	☐	☐

Figure 1. Example of choice set.

4.3 Summary of data collection

A few one-to-one in-depth interviews were conducted by the research team members to fine-tune the survey instruments (structure, wording, used visual materials – maps and photos). A pilot survey was carried out in November 2011. Interviews were conducted by a professional polling agency, using the computer-assisted personal interviewing (CAPI) system. In total, 100 questionnaires were collected. The pilot results were used as priors for the final choice experiment design and for the final correction of the questionnaire.

The main survey was carried out by the professional polling agency in December 2011. The data were collected through a national online survey of the Polish population. The final sample was quota-controlled for sex, age, region and agglomeration size. A total of 1,000 interviews were collected.

5. Results

5.1 Descriptive statistics of the sample

Table 2 reports the socio-demographics of the analyzed sample. 52% per cent of the respondents were women, and the average age of a respondent was 40 years. Around 48% had higher education and the median of net monthly individual income was 1,500zł (364€). Sixty-eight per cent of respondents reported that they had never visited the Białowieża forest in their life, 15% declared they were there once and 2% stated that they had visited more than five times.

Table 2. Descriptive statistics of the analyzed sample

	%	Mean	Median	Min	Max
Women	50				
Age		40	45	20	59
Education					
- Primary	10				
- Secondary	42				
- High	48				
Net monthly household income in zł			3500	500	>10,500
Net monthly individual income in zł			1500	500	>10,500
Visits to the Białowieża Forest					
0	68				
1	15				
2-5	15				
6-10	1				
More than 10	1				

Note: Number of respondents, N=1,000. Nominal exchange rate 1€ = 4.12zł.

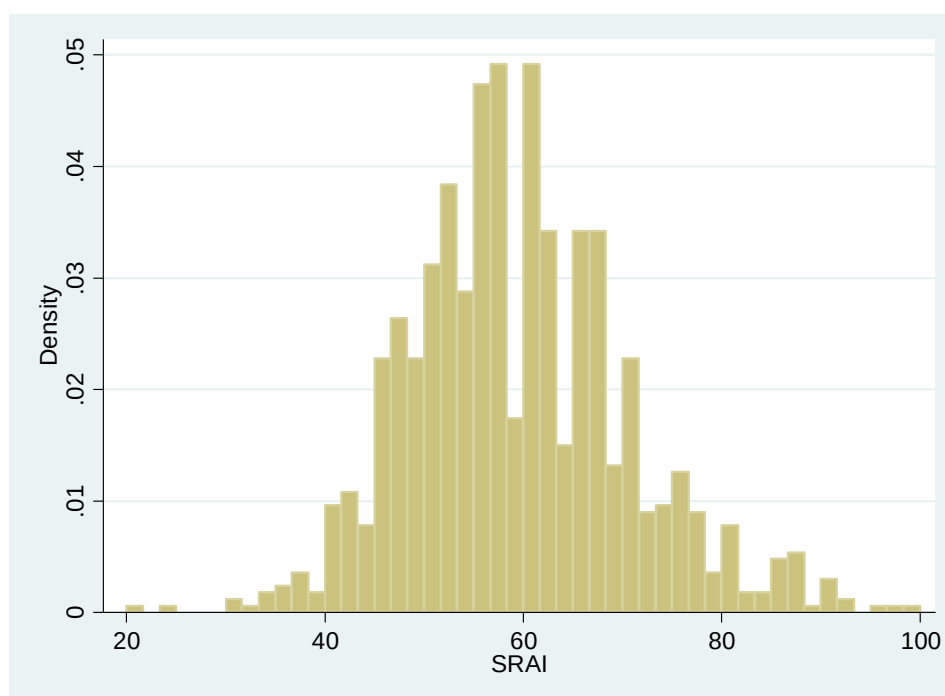
5.2. The measurement of altruism

To indicate the altruism trait of individuals in the analyzed sample we used the Self-Reported Altruism (SRA) Scale developed by Rushton et al. (1981). The SRA Scale consists of the 20 the altruistic behavior items shown in table 3. Respondents were instructed to rate the frequency with which they had engaged in altruistic behaviors, such as, e.g., giving money to charity, using the categories “never”, “once”, “more than once”, “often” and “very often.” Responses were coded from 1 to 5, such that higher numbers correspond to the higher frequency. The answers to the statements were aggregated to the Self-Report Altruism Index (SRAI). The Cronbach’s alpha for the SRA scale shows that it did pass the test for internal consistency.

Table 3. Item-total correlations and Cronbach's alpha for SRA Scale (Rushton et al., 1981).

Items	correlation
1. I have helped push a stranger's car out of the snow.	0.536
2. I have given directions to a stranger.	0.534
3. I have given change to a stranger.	0.529
4. I have given money to a charity.	0.569
5. I have given money to a stranger who needed it (or asked me for it).	0.469
6. I have donated goods or clothes to a charity.	0.591
7. I have done volunteer work for a charity.	0.330
8. I have donated blood.	0.625
9. I have helped carry a stranger's belongings (books or parcels, etc.).	0.541
10. I have delayed an elevator and held the door open for a stranger.	0.459
11. I have allowed someone to go ahead of me in a queue (at a photocopying machine, at a supermarket checkout).	0.616
12. I have given a stranger a lift in my car.	0.566
13. I have pointed out a clerk's error (in a bank, at the supermarket) in undercharging me for an item.	0.575
14. I have loaned a neighbor whom I didn't know too well an item of some value to me (e.g., a dish or tools, etc.)	0.604
15. I have bought 'charity' Christmas cards deliberately because I knew it was a good cause.	0.595
16. I have helped a classmate who I did not know that well with a homework assignment when my knowledge was greater than his or hers.	0.600
17. I have without being asked, voluntarily looked after a neighbor's pets or children without being paid for it.	0.654
18. I have offered to help a handicapped or elderly stranger across a street.	0.499
19. I have pointed out a clerk's error (in a bank, at the supermarket) in undercharging me for an item.	0.577
20. I have loaned a neighbor whom I didn't know too well an item of some value to me (e.g., a dish or tools, etc.)	0.498
Cronbach's alpha	0.8724

In the analyzed sample, the mean of the SRAI score was 59 and the median 58. Graph 1 shows the distribution of the self-reported altruism index.



Graph 1. Distribution of SRAI in the analyzed sample.

Table 4 presents the division between people with an SRAI lower than 50 and equal to and higher than 50. The higher SRAI indicates a higher trait of altruism. The higher altruism group contains slightly more women, older people, people with higher education and richer people.

Table 4. Altruistic preferences groups.

	SRAI < 50 (19%)		SRAI ≥ 50 (81%)	
	Share	Mean	Share	Mean
Women	49%		51%	
Age		37		43
Education				
- Primary	12%		10%	
- Secondary	46%		41%	
- High	42%		50%	
Low net monthly household income (lower than 3,500zł)	37%		41%	
Net monthly individual income (lower than 1,500zł)	18%		21%	

We found significant positive correlation The Self-Report Altruism Index is correlated significantly positively with age and the environmental concerns measured using the New

Environmental Paradigm (NEP) scale. In both cases, however, these correlations are quite low.

Table 5. Correlations among measures.

	SRAI	NEP	Age	Men	Educ.	Income
SRAI	1.0000					
NEP	0.1311*	1.0000				
Age	0.1826*	0.0319	1.0000			
Men	-0.0267	-0.1555*	0.1069*	1.0000		
Education	0.0613	0.0566	-0.1590*	-0.0955*	1.0000	
Income	0.0379	-0.1537*	-0.0500	0.1635*	0.1832*	1.0000

* Significant at 0.01 level.

5.3. Estimation results

Table 6 reports the parameter estimates for the WTP-space model. We used a specific form of the WTP-space model with normal marginal WTPs distribution. In terms of the choice experiment analysis to be reported, the SRAI index for each respondent enters via the interaction effects on the estimated choice models. The choice probabilities were approximated by simulations based on 800 Halton draws.

Table 6. Results of the model in WTP space.

Parameters	WTP-space (in 100zł)			
	Beta		Altruism effect	
Mean				
High level of naturalness (commercial forest)	0.2712***	(3.72)	0.0018	(1.59)
High level of naturalness (second-growth forest)	0.1284*	(1.82)	0.0060***	(5.27)
Restriction in visitor number to up to 5,000 people per day	-0.2494***	(-3.14)	0.0051***	(4.09)
Restriction in visitor number to up to 7,500 people per day	-0.0105	(-0.11)	0.0026*	(1.68)
Standard deviation				
High level of naturalness (commercial forest)	0.7217***	(34.85)		
High level of naturalness (second-growth forest)	0.7636***	(31.78)		
Restriction in visitor number to up to 5,000 people per day	0.5246***	(21.54)		
Restriction in visitor number to up to 7,500 people per day	0.7101***	(29.23)		
Scale				
Variance in the scale parameter (tau)		1.2595 ***		(27.85)
Model statistics				
Number of observation		72000		
Log likelihood		-16983.431		

Notes: The model was estimated using STATA12 and the STATA module created by Gu et al. (2013). T-values are presented in brackets. ***, **, * indicate significance of the parameters at 1%, 5% and 10% level, respectively.

The estimation results show that all the attributes but one are significant. The results indicate that respondents value the changes in the ecological quality of the Białowieża forest. Annually, they are willing to pay 38zł (9.2 Euro) to reach a high level of naturalness in the commercial part of the forest and 48zł (11.7 Euro) to achieve this goal in the second-growth forest. The WTP estimates show expected direction, since in the first case, the changes in the naturalness level will require a longer period of time than in the other.

The estimation results also suggest that people with the lower altruism index are opposed to paying for restrictions in visitor numbers, and those characterized by the higher altruism trait are for paying. The mean WTP to the more severe restriction in forest visitors (the limit set at up to 5,000 people per day) is about 5zł (1.3 Euro); whereas, the less restrictive constraints (a maximum visitor number of 7,500) appeared to not to affect the respondents' choices and their willingness to pay.

Table 7. WTP estimates

Attributes	WTP in zł	
	SRAI = 0	SRAI = 59 (mean)
High level of naturalness (commercial forest)	27.12	37.74
High level of naturalness (second-growth forest)	12.84	48.24
Restriction in visitor number to up to 5,000 people per day	-24.94	5.15

The statistical significance of the coefficients associated with the standard deviation indicates that there is substantial heterogeneity with respect to the preferences for increased protection in the Białowieża Forest and introducing restrictions on forest access. The very high standard deviation estimates indicate that for a group of respondents the WTP values are negative. This confirms that changes in the Białowieża Forest management are perceived as a relatively controversial issue by the society. Additionally, the significance of the tau scale coefficient suggests substantial heterogeneity in individual scale coefficients.

The interesting finding with respect to the present paper is that we observe a significant positive altruism effect in the WTP value, which indicates that the more altruistic the individual is, the weaker is her opposition to a restriction on visitor numbers, and those with SRAI higher than 48 are willing to pay to impose the restrictions. Since the respondents were asked to take into account the fact that these restrictions in recreation may affect them personally, the positive interaction effects can be interpreted as meaning that people with a higher level of altruism are more willing to constrain their own behavior in order to increase the quality of recreation for others.

With respect to the increased level of naturalness in the economic forest part of the Białowieża, the individual trait of altruism seems not to affect the respondents' WTP. However, in the case of the second-growth forest the interaction effect is positive and significant. This can be interpreted as meaning that people do reveal altruistic preferences in respect of the existence and bequest value of this part of the Białowieża forest, i.e., they do care about other people's non-use values.

6. Summary and conclusions

In this study we investigated the influence of the altruistic personality on the valuation of non-use changes in environmental quality and changes in recreation quality, which can be associated with respondents' use value. We employed the discrete choice model with attributes defined as an increase in the forest naturalness reached in the long-term and a restriction in forest visitor numbers. The study is focused on the Białowieża forest; one of the most recognized and ecologically valuable forests in Europe, which is a popular place for Polish and international visitors and which, in the near future, may face the problem of heavy recreational overuse.

The key finding of this study is that altruism has an impact on the amount people are willing to pay to avoid policy actions that may change their and the others' use value. On the other hand, wheatear the trait of altruism affects social preferences concerning changes in an existence and bequest value associated with the increased naturalness level in the forest depends on the baseline level of the forest naturalness. The obtained results suggest that regarding existence and bequest values people reveal altruistic preferences and perceive these values from the social perspective in the case of the forest already characterized by the high level of naturalness. For the economic forest altruistic concerns for future generations are not present during the valuation of environmental changes. The latter is in line with the findings of Popp (2001), which indicate that under some conditions altruistic concerns do not affect future generations.

We also found that people are for imposing restrictions in forest visitor numbers, even they were informed that these restrictions can affect them personally. Such restrictions, however, are necessary if we wish to ensure a high quality of recreation and avoid the problem of over-crowding in the forest. Regarding altruism, we found that respondents who were characterized by a higher altruism index were in general more in favor of introducing restrictions in visitor numbers. This result may indicate that the more altruistic people are, the more willing they are to accept constraints in their own behavior in order to improve the quality of other people's recreation; however, they agree with a lower number of forest visitors in total. This would suggest that for the altruistic person the recreation quality factor is more important than unconstrained access to the forest. The other possible explanation is that environmental concerns are positively correlated with the general altruism level. In this case, a restriction in visitor numbers can be seen as providing greater chances for improving, or at least not reducing, environmental quality. This is a direction we would like to develop the study in future, i.e. to compared those to internal motivation – altruism and environmental concerns and their effects on WTP for use and non-use values.

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