Extended Abstract: Is moral motivation driving willingness to pay for species preservation?

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Introduction

Due to climate change some species will probably disappear from and new appear in Denmark. This makes valuation of species *per se* an important issue. This is a challenge for environmental valuation studies, at least for three reasons. First of all, while biodiversity preservation may involve significant use values, non-use values are likely to play a relatively larger role than for many other environmental goods: The mere continued existence of a species is assumed to represent a value for many people. If research is to address this component some form of stated preference approach is needed. Second, biodiversity preservation is loaded with tough ethical and moral questions. In stated preference valuation studies, these questions are inevitably passed on to the respondents, and this implies a major challenge for research as a fundamental necessity for valuation is that trade-offs with other goods can be reliably identified. It is not obvious that respondents can or will make reliable trade-offs between the survival of one or more species and other goods, when faced with this question, which – albeit hypothetical – can be considered a question posed at a sort of moral or ethical 'gunpoint'. Thirdly, biodiversity is a complex concept for people to relate to and even if it is a crude approximation many valuation studies cast it simply as the preservation of specific species or habitats. While this undoubtedly eases the communication, recent research suggests that the precise identification and naming of the species to be protected in itself may strengthen the perceived moral or ethical dilemma faced by respondents (Jacobsen et al., 2008). This in turn increases the challenge of valuing biodiversity protection.

Most valuation studies focus on the question of biodiversity as preservation of species versus not preserving them. The exceptions trying to value increases in population size above the point of preservation often deal with species, where increasing population levels can be an obvious 'bad'. We developed a choice experiment with focus on population size increases for species hardly considered as 'bads' and we investigate willingness-to-pay (WTP) for different levels of population changes of both common and rare species in three different habitats. We discuss the findings in terms of two theoretical sources for moral motivation: Warm glow of giving (Andreoni, 1989; 1990) and self-image compared to personal moral ideals (Brekke et al., 2003; Nyborg 2000). In the following the results will be discussed briefly. A full paper is presently under review for international publication.

The choice experiment

In a questionnaire, respondents were asked 2 × 6 choice sets, where respondents were distributed to two out of three habitats: forests, lakes and streams, and fields and meadows. Attributes and available levels are described in Table 1. In order to be specific, the names and pictures of the threatened species were shown and for half the sample, the general wildlife was exemplified by specific species. The threatened species used for the questionnaire was Dormouse for the forest, Barn owl for the field and Otter for the lakes and streams. The representatives of general wildlife were Hare, Great Crested Grebe and Great Spotted Woodpecker. The species may not have equal appeal in terms of charisma, but all of them have had some degree of media attention.

The questionnaire was sent out to a representative sample of 1,800 people in May 2005 and 862 questionnaires were completed and returned which equals an overall response rate of almost 48%. A total of 116 returned and completed questionnaires dealt with a sub-sample version with higher attribute levels for population increase in general wildlife. The full sample thus consists of 746 respondents answering 8,447 choice questions, as not all respondents completed all 12 choices.

Table 1 Attributes and levels in the CE questionnaire

ATTRIBUTE	LEVEL	VARIABLE
ACCESS: Access to habitat	Unrestricted access (status quo) Reduced access (No access in 25% of all of the specific habitat from April to November) No access (No access in 25% of all of the specific habitat all year)	N/A *HABITAT_REDACC* *HABITAT_NOACC*
THREATENED: Increases in population size of a threatened species related to the habitat	Threatened with extinction (status quo) Rare, but not threatened with extinction Common	N/A *SPECIESNAME_RARE or THREATENED_SPECIES_RARE* *SPECIESNAME_COMMON or THREATENED_SPECIES_COMMON*
GENERAL WILDLIFE: Increases in population size of general wildlife in the specific habitat	Population size as of today (status quo) Population increase by 25% A sub-sample was asked increases of ×2 Population increase by 50% A sub-sample was asked increases of ×4	N/A *HABITATNAME_25 or GENERAL_WILDLIFE_25* *HABITATNAME_50 or GENERAL_WILDLIFE_50*
COST: Annual tax increase	0 (status quo) 100 DKK 250 DKK 500 DKK 1,000 DKK 2,000 DKK	*TAX*

(100 DKK equates approx. 13 Euro)

Results

Table 2 shows the results for a mixed logit model, parameter estimates as well as WTP.

Table 2 Main panel model. Based on Mixed logit.

VARIABLE	PARAMETER ESTIMATE		STD ERROR	WTP (EURO)	WTP (EURO)
TAX	-0.200	***	0.01		
ASC1	-0.5496	***	0.1637		
Heterogeneity	3.5876	***	0.1542		
ACCESS_NO	-0.8004	***	0.0759	-52.34	-52.85
Heterogeneity	0.9085	***	0.0870	(-61.74 – -42.93)	(-62.99 – -42.69)
ACCESS_RED	-0.5176	***	0.0704	-33.84	-30.97
Heterogeneity	0.8142	***	0.0852	(-42.66 – -25.02)	(-40.66 – -21.26)
_THREATENED_SPECIES_RARE	1.4796	***	0.0759	96.76	91.78
Heterogeneity	0.3916	*	0.1592	(87.13 – 106.37)	(80.96 – 102.59)
THREATENED_SPECIES_COMMON	1.1572	***	0.0765	75.67	69.99
Heterogeneity	0.8459	***	0.0854	(65.87 – 85.46)	(58.93 – 81.05)
GENERAL_WILDLIFE_25	0.8404	***	0.0700	54.96	53.58
Heterogeneity	0.5160	***	0.1082	(45.96 – 63.94)	(44.38 – 62.76)
GENERAL_WILDLIFE_50	0.5236	***	0.0743	34.24	33.52
Heterogeneity	0.8988	***	0.0784	(24.82 – 43.65)	(23.82 – 43.21)
N	8764			X^2	7090.04
LL	-6083.22			Adjusted R^2	0.366632

Note The 95% confidence intervals for WTP (in parenthesis) are approximated using the Delta method (Greene, 2002) and refer to the estimation uncertainty of the sample estimates of the mean, and not the distribution of the mean in the population. WTP is converted from DKK into EUR by the rate of 7.58. One asterisk indicates significance at the 95% level, two asterisks at 99% and three asterisks at the 99.9% level.

Discussion

For the access attributes, we find internal sensitivity to scope across all three habitats: the respondents require a larger compensation the more severe the reduction in access rights is. We also find that

access to forest is valued higher than access to the other habitats, and access to open area lowest. These results are in accordance with findings from Danish recreational research studies showing that forests are the preferred nature type for recreation (Jensen, 1998). This seems to also affect the General Wildlife attribute, where population increases in forest wildlife are valued highest. These observations are all nicely in line with expected behaviour and document incentive compatibility with respect to the choice between costs (restrictions on access and tax increases) and benefits (in-creased population for threatened and/or general wildlife). This is further confirmed by an analysis parting 'wildlife users' from 'wildlife less-users', where we find that the former group attaches significantly higher value to the General Wildlife attributes.

This is all in line with ex ante expectation, but looking at the two wildlife attributes a surprising and repeated pattern is seen – a small population increase is valued higher than a larger increase. Furthermore, for a split where population levels for General Wildlife were increased by 100 % and 300 %, we see even lower WTP-estimates (not shown). If such an increase in general wildlife is a good thing, these results are not consistent with external sensitivity to scope.

One could argue that an implication of the results shown here is that respondents should derive utility from reducing a 'common' species to the level of 'Rare but not threatened', e.g. the starling. Paradoxical they should at the same time gain utility from moderate increases in general wildlife. One may also argue that for 'common' species which have grown in significantly numbers, like e.g. the roe deer in Denmark (Olsen et al., 2002), respondents should be willing to pay for reducing the populations.

However, based on experience and focus groups interviews from this and several other studies involving biodiversity protection (Jacobsen et al., 2008; Lundhede et al., 2007), we find it highly unlikely that people would express a positive WTP for reducing the population level of a 'common' species to the level implied by 'rare'. Rather, they would express a need for compensation for agreeing to such an action. The same would most likely be true for any suggestions of reducing the population levels of groups of General Wildlife. The reason why we expect such a response in obvious conflict with the response patterns here is that the suggestion would be perceived as 'morally wrong' and hence the respondent would not agree to it – even if the direct utility effect of reducing the population was zero or even slightly positive. Consequently, some sort of moral motivation may play a role. As Nyborg (2000) argues, people are told to 'do the right thing', implying giving support to good things. It could be in the form of a 'warm glow of giving' (Andreoni 1990) equivalent to a 'purchase of moral satisfaction' (Kahnemann and Knetsch 1992), or it could be in form of 'improved self-image' from making an effort consistent with the pursuit of what the respondent perceive to be the ideal effort (Brekke et al. 2003).

Supporting measures to saving a species from extinction may be perceived as the morally correct action, but supporting increases in the population level to a level of 'Common' may not add much utility in terms of moral motivations. Similarly for the General Wildlife attribute; respondents may conclude that the status-quo level is not entirely consistent with 'doing the right thing', and hence opt for the higher attribute levels, but not necessarily for the highest level. Thus, we suggest that utility effects of moral motivations are likely causes for the observed patterns, in combination with the direct utility effect of the aggregated change in the environmental goods. However, the difference between a moral motivation in the form of 'warm glow' and in the form of 'self image' suggests two possible interpretations – an interpretation with 'warm glow' and decreasing utility gain from population levels and an interpretation with 'self-image' and increasing utility gain from population levels.

An interpretation with 'warm glow' and decreasing utility gain

If we believe that the moral motivation in play here is Andreoni's 'warm glow of giving', then one could argue that this effect should be at least non-decreasing for any attribute level above status quo. With this interpretation, respondents experience a utility increase from an environmental change as such, but they do find larger increases to be 'less of a good' than smaller increases. The implication is

that people may simply prefer ‘rare’ species to ‘common’, and ‘less common’ to ‘very common’. From a use perspective an extreme example of the additional value associated with ‘rare’ or ‘less common’ species is reflected in the behaviour of ornithologists who are willing to travel significant distances to see rare birds. For more ordinary recreational users, there may also be significantly larger values associated with the encounter of ‘less common’ species than ‘very common’. The decrease in WTP could also reflect that respondents perceive larger wildlife populations as a possible ‘bad’ – even if the species in question here are nothing like the European wolf (Boman and Bostedt, 1999). But it may be that people just generally feel more at ease with animal populations not being much larger than they are – the very low WTP we obtain for doubling or quadrupling the populations seems to lend support to this, and the heterogeneity parameters suggest that a large group of the respondents may attach negative values to these extreme increases.

The combined effect of these two utility components is that respondents will state the highest WTP for the lowest attribute level consistent with ‘doing the right thing’ – and will state a lower WTP for all higher levels. This goes for both attributes and is consistent with the results.

An interpretation with ‘self-image’ and increasing utility gain from population levels

It can, however, also be argued, that the marginal utility effect of increases in wildlife populations should at least be non-negative. Furthermore, one could argue that the moral motivation effect could take a form related to that of Brekke et al. (2003), where an individual will enjoy a positive utility gain from making an effort towards the preservation of a public good consistent with the individuals’ self-image and the perceived socially ideal effort, but may in fact derive a negative utility effect from committing to efforts and improvements in excess of what the individual perceive as socially ideal. For example, if people perceive overall resources of society as limited, they may think that much higher population levels of all kinds of animals is an unrealistic option within the overall re-sources available. Not wanting to appear either out of touch with reality, naïve or as ‘eco-fundamentalists’ they opt for the middle ground available in the choice sets. Simply to preserve their self-image as a (concerned but realistic) citizen, even if higher population increases do imply a higher use value.

On the other hand, while Brekke et al. (2003) concerned actual work effort made in contributing to a public good, our results concern responses in a hypothetical setting with hypothetical costs. Thus, the real-world limits on resources could be argued to be of little relevance to the respondent, and one could argue that respondents shopping for moral satisfaction in the sense of Kahneman and Knetszch (1992) would go for the highest population levels. This would suggest that the former interpretation is the more likely one. This would in turn seem to lend credibility to the incentive compatibility of CE and at the same time suggest that higher population increases are indeed perceived as less of a good than are lower population levels – perhaps even a ‘bad’.

Concluding remarks

The implication of our model is that when economists frame biodiversity valuation studies in terms of species survival, they are essentially asking respondents to perform a valuation at sort of a ‘moral gun-point’, where respondents’ idea of what is considered ‘the right thing to do’ will urge them to raise the bid with increases in the environmental good. Hence, there is a significant difference between asking respondents what they are willing to pay for saving a species, and what they think about increasing the population of a species above the minimum viable population. Another finding is that WTP consistently decreases with population increases above the threshold of signalling support to ‘do the right thing’. This may indicate that many people are in fact not too happy to have population levels of wildlife increase much above its current level.

With population changes caused by climate change this is a new challenge – not only will the population level change, but also citizens perceived utility of a given level. This finding also asks for more research – by environmental economists as well as sociologists.

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