



Stated Preferences for Conservation Policies under Uncertainty: Insights on Individuals' Risk Attitudes in the Environmental Domain



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Introduction

The consideration of (outcome) risk is increasingly recommended in stated preference (SP) studies exploring the benefits of environmental policies, whose results are often subject to uncertainty.

This is because some SP studies have compared individuals' willingness to pay (WTP) for given environmental outcomes displayed either as certain or uncertain, finding that individuals behave and choose differently when outcome certainty rather than uncertainty is displayed.

However, despite the advances in this literature, it is still not clear to what extent differences in preferences are due to the effect of uncertainty per se, which is linked to the attitude that individuals have towards risk (i.e. risk aversion, neutrality or seeking), or they are due to the fact that an uncertain policy, which may not achieve a given outcome, is perceived as less worthwhile.

Very little is known in the SP literature about risk attitudes in the environmental domain. The emerging SP literature dealing with risk has usually assumed that individuals are risk averse because, based on monetary lottery experiments, risk aversion is the standard result in economics.

However, there is a growing body of evidence that people's risk attitudes depend on individuals' socio-demographic characteristics and are domain-specific, i.e. attitudes towards risk depend on whether decisions concern finance, health or the environment, the nature of the specific good being involved, and the possible direction of the change (i.e. a gain or loss).

Given that people's attitude to risk is expected to affect preferences and behaviour, in this paper we apply a discrete choice experiment to explore social risk attitudes and the underlying drivers to better inform SP practitioners and public decision-makers in the environmental domain.

Methods

For our analysis, we explored, through a discrete choice experiment (DCE), recreationists' preferences for policies to avoid a potential decrease in the number of specialist bird species in S'Albufera wetland in Mallorca (Spain) due to climate change, which is associated with large uncertainties.

The Discrete Choice Experiment

To better understand how individuals react to information about risk, due to their risk attitude, we used split-sample treatments to compare social preferences in a certain and uncertain scenario.

In both treatments, the DCE options are described in terms of policies displaying different combinations of the same attributes. The only difference is that the specialist bird species attribute levels are presented as certain in one treatment (Fig. 1) and in a probabilistic way in the other treatment (Fig. 2). Both treatments display the same expected outcomes in terms of anticipated specialist bird species' losses resulting from no extra policy effort and in terms of policy results to either maintain or increase the number of species.

We compared preferences for the specialist bird species attribute in the certain and uncertain treatments by means of a pooled mixed logit model, while allowing for treatment-specific effects.

Fig 1. Sample choice card for the certain treatment

ATTRIBUTES	POLICY A	POLICY B	NO POLICY INTERVENTION (C)
SPECIALIST BIRD SPECIES	+5 Increase the current number by 5	= Keep the current number	-10 Decrease the current number by 10
GENERALIST MIGRATORY BIRD SPECIES	= Keep the current number	+5 Increase the current number by 5	-10 Decrease the current number by 10
WAITING TIME	≈7' Wait about 7 minutes for a seat in observation cabins	≈3' Wait about 3 minutes for a seat in observation cabins	≈15' Wait about 15 minutes for a seat in observation cabins
REST-STOP BENCHES	x2 Double the current number throughout the park	x3 Triple the current number throughout the park	= Keep the current number
ENTRANCE FEE	12€	8€	0€

Fig 2. Sample choice card for the uncertain treatment

ATTRIBUTES	POLICY A	POLICY B	NO POLICY INTERVENTION (C)
SPECIALIST BIRD SPECIES	50% chance, increase the current number by 4 50% chance, increase the current number by 6	50% chance, decrease the current number by 4 50% chance, increase the current number by 4	50% chance, decrease the current number by 16 50% chance, decrease the current number by 4
GENERALIST MIGRATORY BIRD SPECIES	= Keep the current number	+5 Increase the current number by 5	-10 Decrease the current number by 10
WAITING TIME	≈7' Wait about 7 minutes for a seat in observation cabins	≈3' Wait about 3 minutes for a seat in observation cabins	≈15' Wait about 15 minutes for a seat in observation cabins
REST-STOP BENCHES	x2 Double the current number throughout the park	x3 Triple the current number throughout the park	= Keep the current number
ENTRANCE FEE	12€	8€	0€

Results

We find that people react differently to the prospect of achieving given environmental outcomes with certainty or uncertainty, despite the expected outcomes presented in both cases being on average equal. This confirms that risk attitudes play an important role in decision-making under risk.

Interestingly, we additionally find that risk attitudes appear to be context- and individual-specific.

By relying on insights from the behavioural economics literature, we find that individuals tend to be risk averse over environmental losses and risk lovers over environmental gains, somewhat contradicting the mainstream results in prospect theory that rely on monetary lottery experiments.

Our findings also identify age and income as relevant variables to explain the deviation in respondents' behaviour under uncertainty with respect to the risk neutrality assumption.

Conclusions

- Results of this study confirm the importance of explicitly including uncertainty in SP valuation studies. Unlike previous attempts in this literature, our analysis allows linking changes in preferences only to the attitudes that individuals have towards risk. This allows us to draw more robust conclusions on the role of uncertainty in SP methods, while avoiding any other confounding effect. Additionally, this also allows to provide more accurate and policy relevant results.
- Risk attitudes and their effect on preferences are not generalizable and need to be contextualized (and tested). Presenting the policy outcomes in terms of expected results which can be achieved with certainty or assuming that respondents are generally risk averse may result in preference and WTP estimates which are not consistent with the true public preferences for the policy options considered.

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