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Public Values for Coastal Wetlands as Flood Defences

Katherine Simpson, Mikolaj Czajkowski, Nick Hanley and Jacob LaRiviere

Introduction (1)

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- Scottish coastal margin habitats are under threat from rising sea levels and habitat destruction (UK NEA, 2011).
- The Flood Risk Management (Scotland) Act 2009 places a requirement for SEPA to consider ‘natural flood management’ as part of their flood management policy.
- Managed realignment is one option to restore coastal and estuarine wetlands as part of a natural flood management strategy. The full economic benefits of wetland restoration are not well appreciated or understood (UK NEA, 2011).

Introduction (2)

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- Ask a survey respondent what they are willing to pay for an improvement in the good or service or willingness to accept in the decline of the good or service.
- Critics, most notably Jerry Hausman (2012) “Contingent Valuation from Dubious to Hopeless” in Journal of Economic Perspectives:
  - Hypothetical bias
  - Large differences between mean willingness to pay and willingness to accept
  - Scope and embedding effects

Introduction (3)

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- The principle aim of this project is to derive the public willingness to pay for a managed realignment scheme in the Tay Estuary.
- Within this overall aim a series of questions can be answered:
  - What is the public's current understanding of flood risk management in Scotland?
  - What is the public's current understanding of the benefits of managed realignment?
  - **How does information in the survey affect WTP?**

Case Study

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- Newburgh, on the Tay Estuary. According the Fife Shoreline Management Plan, the preferred flood defence option for Unit 58 is managed realignment for years 0 - 20.
- Local councils are responsible for flood defence, council tax is a feasible payment vehicle.
- Residents from the affected local authorities invited to take part through mailings, radio and newspaper advertisements.
- Online survey to allow us to embed the field experiment.

Experimental Design (1)

1. Introductory text
2. Multiple Choice Quiz 1:

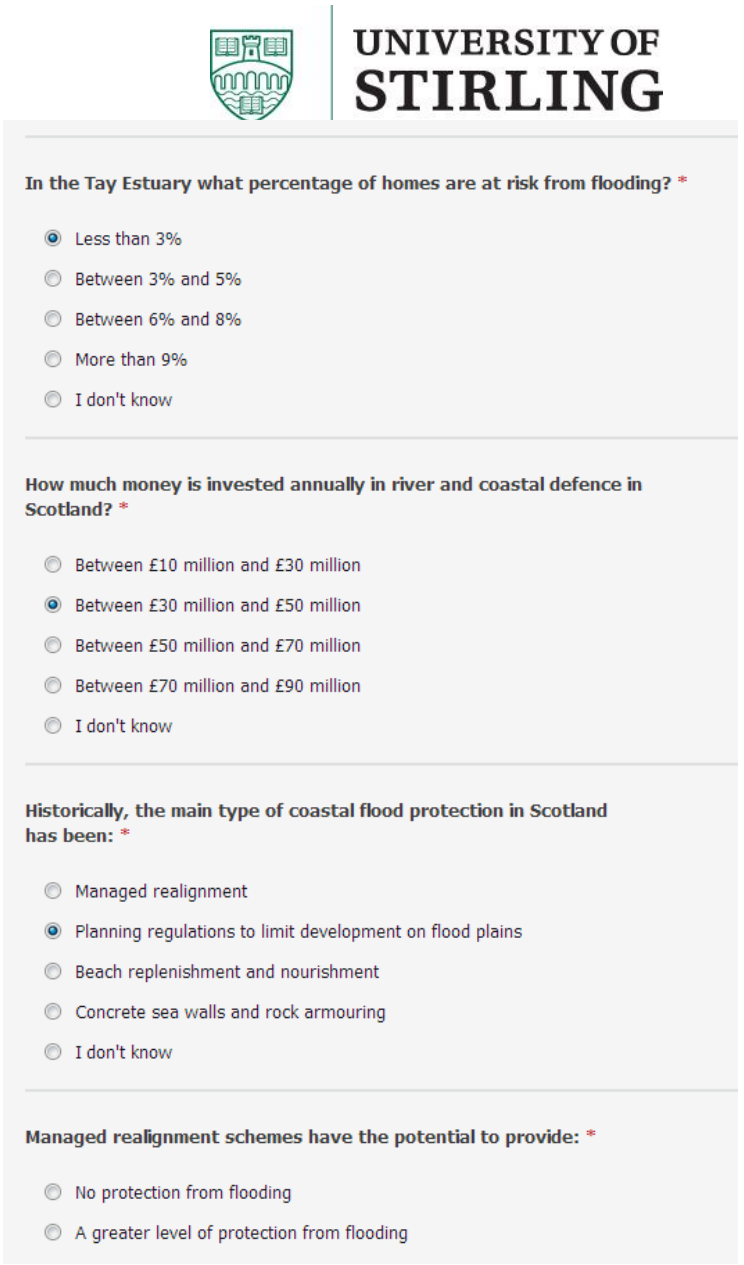
- Need to elicit prior information sets
- 9 questions related to good.
- The specific questions answered correctly and incorrectly are recorded.
- Respondents are grouped into a priori types:

  Low (0-3 correct)

  Medium (4-6 correct)

  High (7-9 correct)

  Control group who do no take the first quiz



Experimental Design (2)

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3. Respondents are assigned a treatment which is the amount of information about the attributes of the good. Treatments can be:

- Low (L – 3 pieces of information),
- Medium (M – 6 pieces of information)
- High (H – 9 pieces of information).

Bullet points and figures convey precise information about the good which corresponds to exactly one question in the multiple choice questionnaire. Crucially respondents are always given information they answered correctly first before any additional information is given.

Treatment				
	H	LH	MH	HH
	M	LM	MM	--
	L	LL	--	--
		L	M	H

Ex ante information

Experimental Design (3)

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5. All respondents are presented with the proposed managed realignment scenario.
6. Respondents receive their 3, 6 or 9 pieces of information (control group receive all 9 pieces).
7. Asked WTP using payment card format ranging from £0 to £150.
8. Respondent is given the original 9 questions, as well as a set of debriefing questions and personal characteristics.

At the end of the survey each respondent is summarised by an initial set of quiz questions (a priori information set), a type treatment pair, a treatment information set, their max WTP and a second set of quiz answers (ex post information set).

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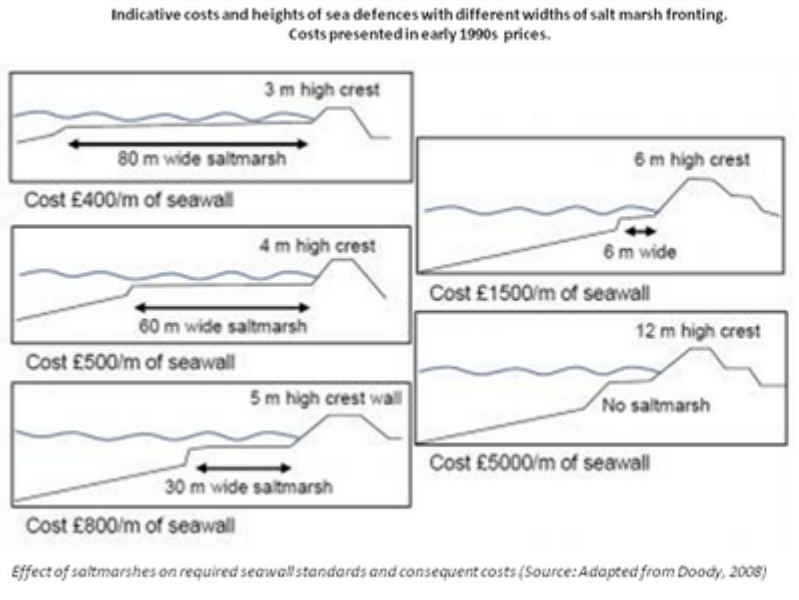
Managed realignment schemes have the potential to provide: *

- ○ The same level of protection from flooding
- ○ No protection from flooding
- ○ A lower level of protection from flooding
- ○ A greater level of protection from flooding
- ○ I don't know

Managed realignment schemes can deliver a greater level of protection against coastal flooding than traditional sea defences alone.



Effect of saltmarshes on required seawall standards and consequent costs (Source: Adapted from Doody, 2008)

Results – Summary Statistics

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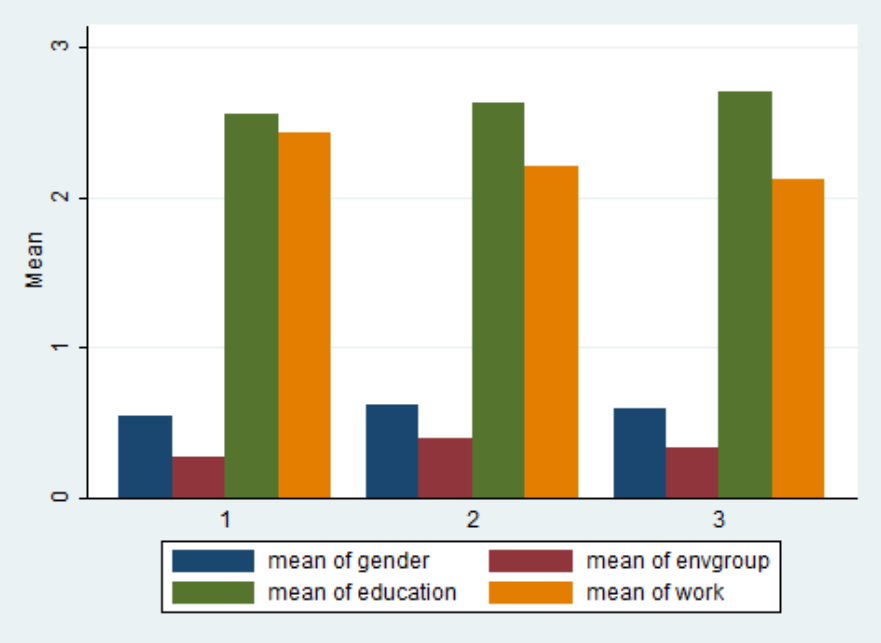
- 4000 people invited to take part, 749 partially completed the survey, 593 responses of sufficient detail to be used in the analysis.

	Mean	Std. Dev.
Age	54.13	13.37
Gender	0.58	0.49
Income	48,920.67	25900.48
Education	2.64	1.11
Work	2.22	1.43



Results – Information & Learning (1)

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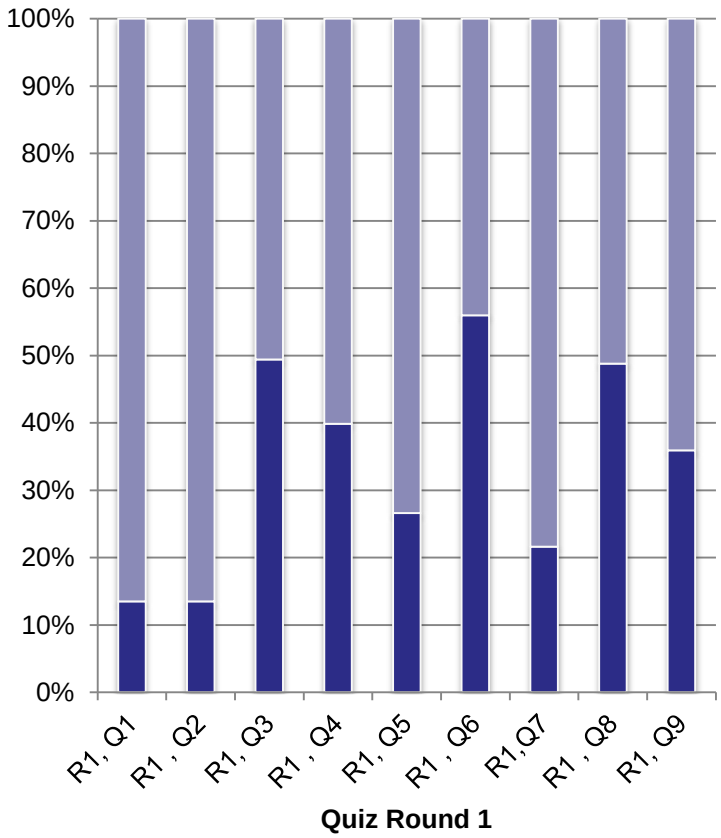

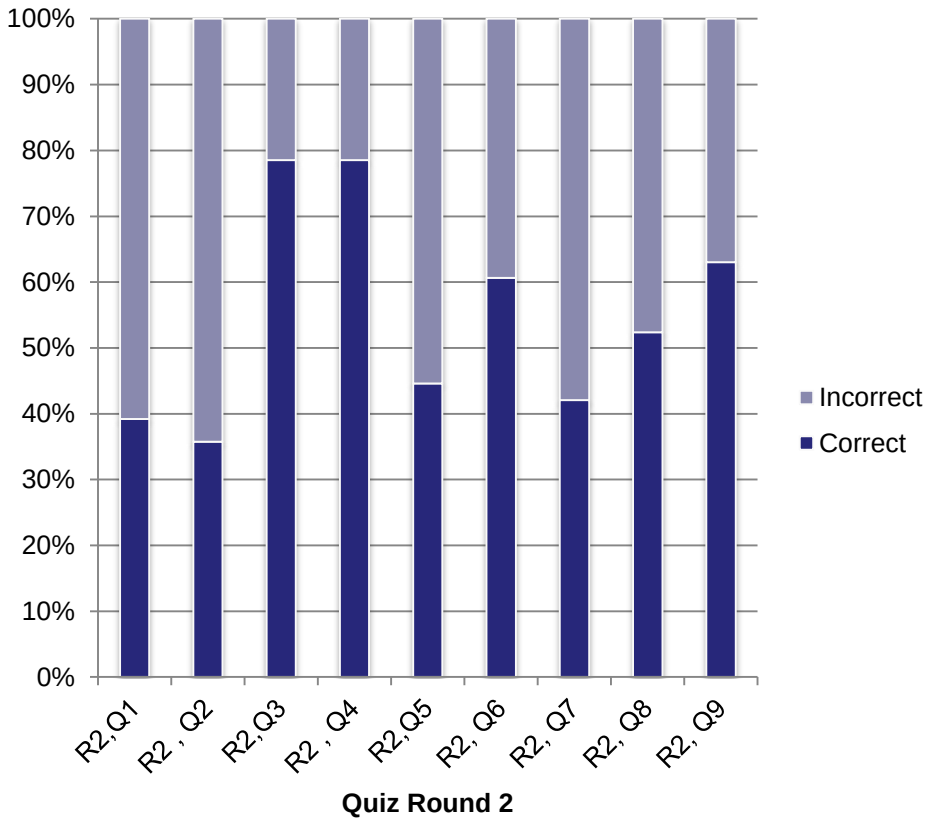

Results – Information & Learning (2)

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Score on Treatment Group Conditional on Being Treatment

VARIABLES	(1)	(2)	(3)	(4)
LL	3.531***	3.886***	3.429***	4.919***
	(0.148)	(0.508)	(0.210)	(0.606)
LM	4.400***	5.180***	4.525***	6.275***
	(0.252)	(0.586)	(0.316)	(0.627)
LH	4.986***	5.719***	4.563***	6.538***
	(0.333)	(0.586)	(0.431)	(0.683)
MM	5.446***	5.824***	5.132***	6.464***
	(0.164)	(0.534)	(0.246)	(0.612)
MH	6.300***	6.756***	6.135***	7.565***
	(0.191)	(0.536)	(0.249)	(0.653)
HH	8.167***	8.405***	8.143***	9.234***
	(0.200)	(0.539)	(0.244)	(0.736)
Observations	482	431	247	179
R-squared	0.867	0.885	0.877	0.915

Results – Willingness to Pay (1)

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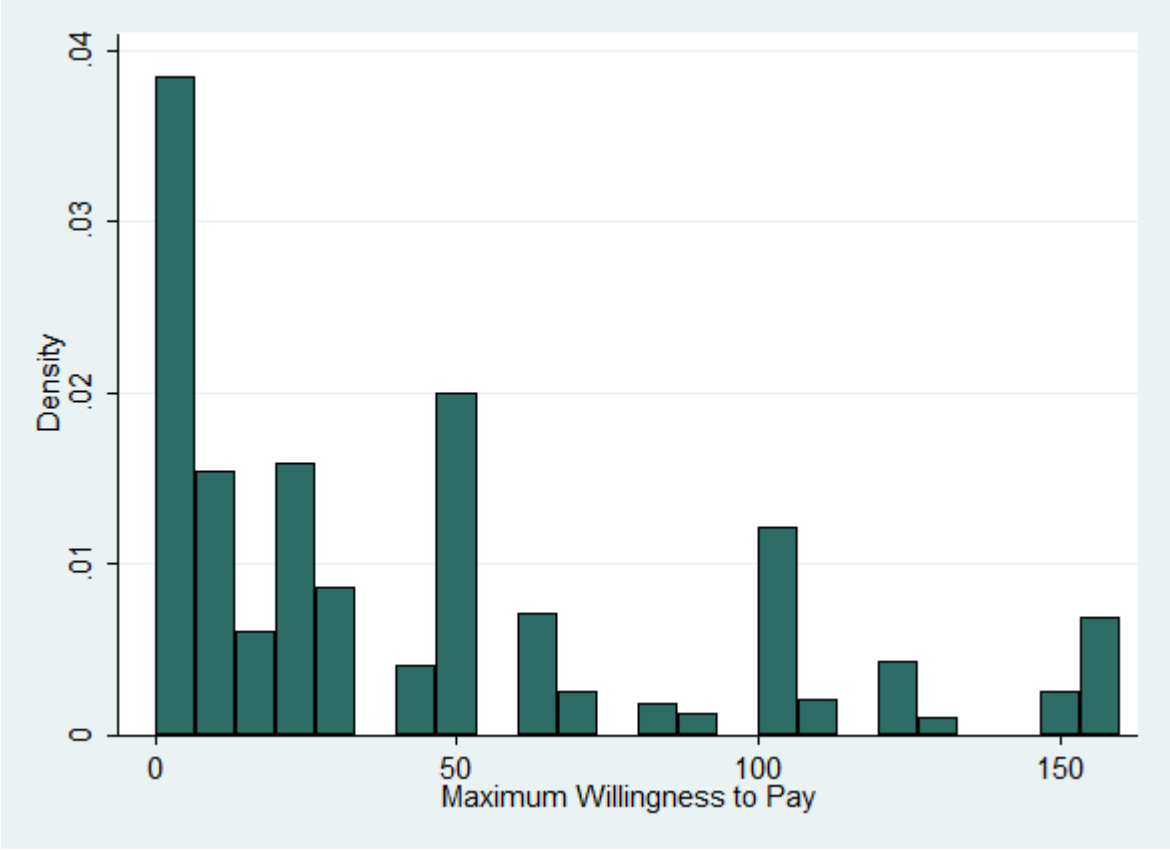

Results – Willingness to Pay (2)

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WTP on Treated vs Untreated				
	(1)	(2)	(3)	(4)
VARIABLES				
Treated	11.63**	8.917*	15.94**	11.07*
	(5.232)	(5.247)	(6.320)	(6.143)
Constant	33.15***	-8.377	23.78***	-31.71***
	(4.824)	(9.089)	(5.855)	(11.18)
Observations	593	478	593	478

Willingness to Pay (3)

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VARIABLES	model
Learning Effect (Q2 score – Q1 score)	2.623** (1.085)
Agree property at risk from flooding	22.36** (10.49)
Strongly agree property at risk from flooding	18.79 (12.26)
Worried that flood risk increasing	29.26*** (9.784)
Very worried flood risk increasing	37.23*** (12.29)
Member of environmental groups	16.52*** (4.905)
Income	0.000400*** (8.91e-05)
Unconfident results will be used in policy	23.88* (12.30)
Confident results will be used in policy	35.99*** (11.65)
Very confident results will be used in policy	45.57*** (14.39)
Constant	-33.75*** (11.94)
Observations	409

Conclusions

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- Many respondents unfamiliar with flood risks, flood defence and the associated costs and benefits of new schemes.
- We find that agents do indeed learn about the good on stated preference surveys and this affects WTP.
- Significant differences in WTP between those who take first and second quiz.
- This is the first evidence we are aware of in the literature which isolates the effect of *learning* information on a stated preference survey on WTP estimates.