Preference Uncertainty in Choice Experiments

Sonia Akter, Jeff Bennett and Michael Ward

Environmental Economics Research Hub

THE AUSTRALIAN NATIONAL UNIVERSITY

What is Preference Uncertainty?

Value Uncertainty → WTP□

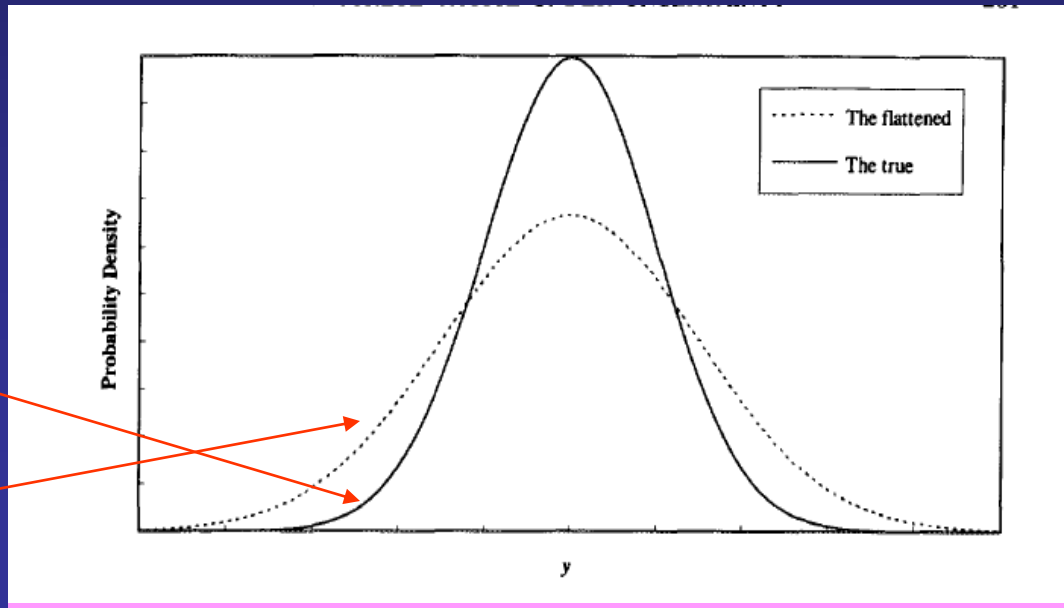
$\delta < WTP < WTP + \delta$

stochastic disturbance term.

Composite error term: $e = \varepsilon + \delta$

Without preference uncertainty

With preference uncertainty



Maximum likelihood estimate of the valuation distributions

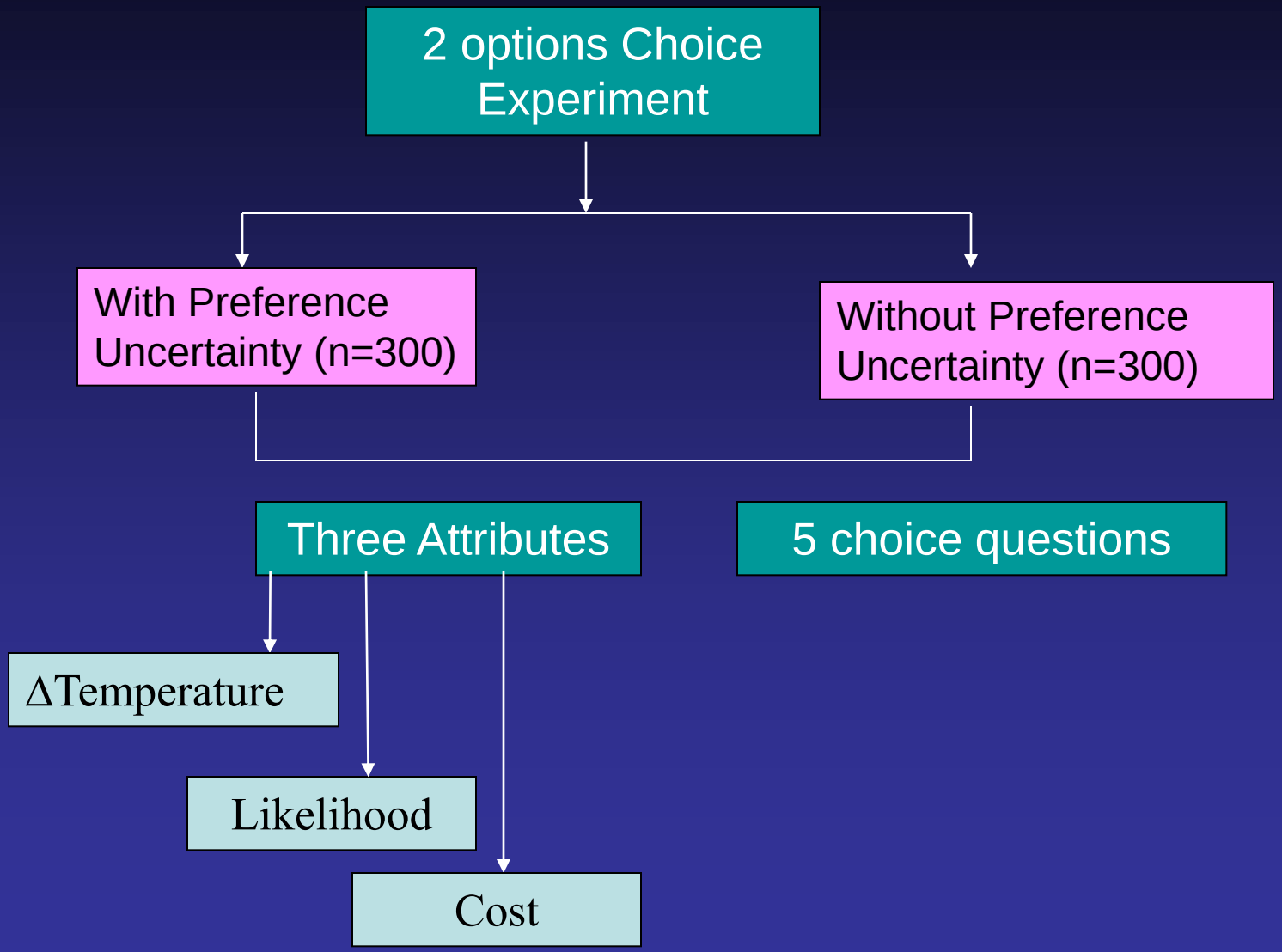
THE AUSTRALIAN NATIONAL UNIVERSITY

Objective of the Study

Re-examine two questions:

- Procedural invariance of preference uncertainty question in choice experiment studies.
- Relationship between repeated choice question and preference uncertainty.

Case Study: Household preferences for the Carbon Pollution Reduction Scheme (CPRS) in Australia

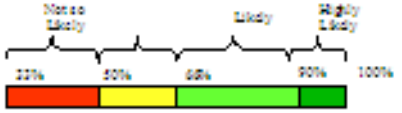


THE AUSTRALIAN NATIONAL UNIVERSITY

Split Sample 1

Split Sample 2

	1. How much average temperature is expected to rise in 100 years time?	2. How likely that 1. will happen?	3. How much the scheme will cost your household per month? [*Note that this is not a tax or levy. The increase in cost is due to the rise in prices of necessary goods and services.]
☐ No Scheme	5 °C to 6 °C	Likely (66% to 90% chance)	$ 0
☐ Scheme A	1 °C to 2 °C	Likely (66% to 90% chance)	$ 300



19. On a scale 1 to 10, how certain are you of your answer to the previous question? Please circle the number that best represents your answer.

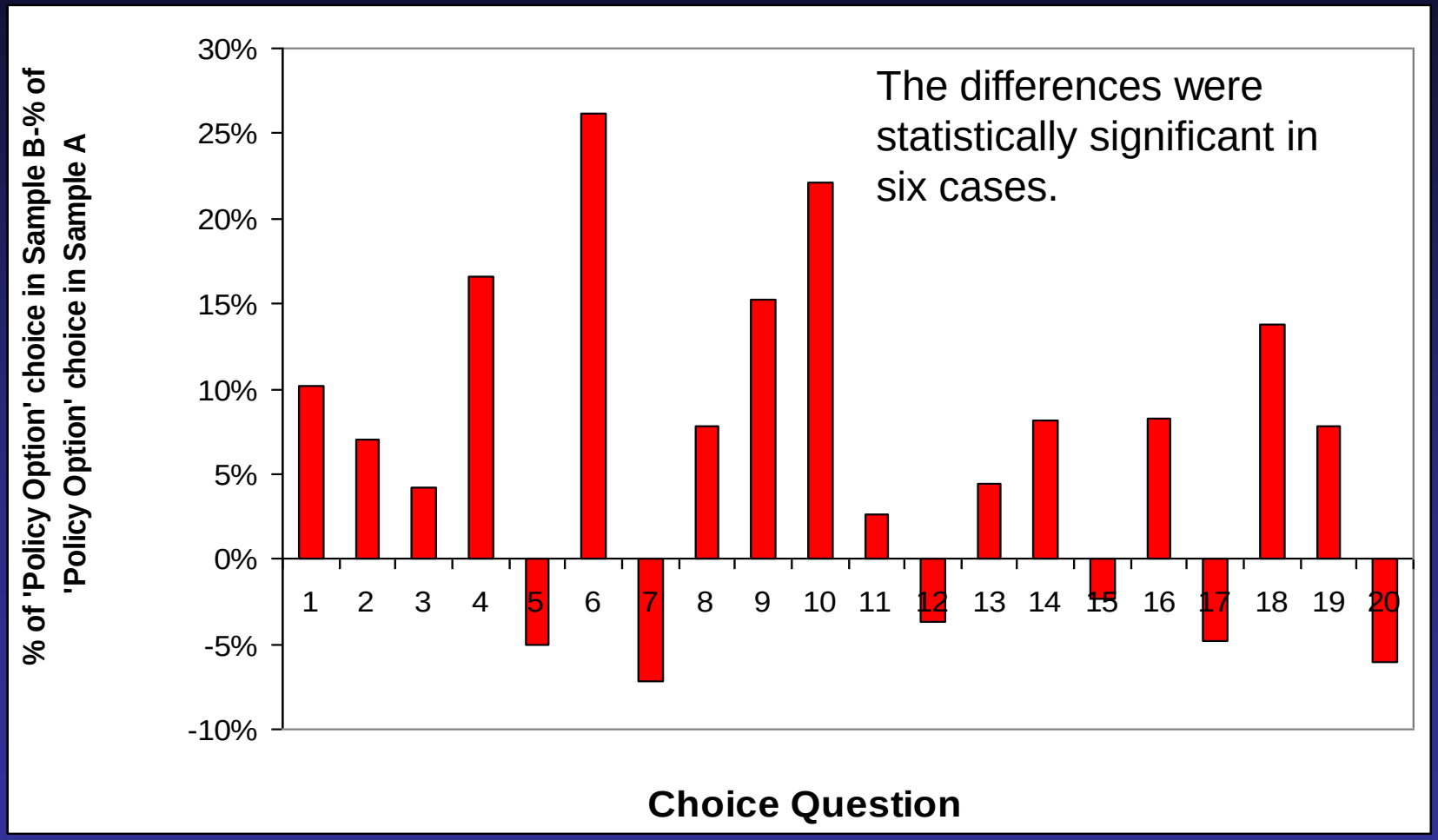
1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Not at all certain — Very Certain

THE AUSTRALIAN NATIONAL UNIVERSITY

Respondent characteristic		Without Preference Uncertainty Sample	With Preference Uncertainty Sample
Female (%)		55	55
Age (%)	18 to 24 years	16	18
	25 to 34 years	34	29
	35 to 44 years	27	22
	45 to 54 years	17	16
	55 to 64 years	5	12
	65 and above	1	4
Education (%)	Junior high school	7	11
	Senior high school	19	21
	Diploma or certificate	28	31
	University–undergraduate	27	24
	University–postgraduate	19	12
	Other	1	1
Average household income (AUS$/year)		67,600 –83,199	67,600 –83,199
Proportion of respondents who heard of the IPCC (%)		13	15
Proportion of respondents who heard of the CPRS (%)		54	48
Climate change is caused by human action (%)	Strongly disagree	5.0	4.5
	Disagree	6.1	4.5
	Neither agree nor disagree	19.4	21
	Agree	46	47
	Strongly agree	23.7	24

Difference in the percentage of 'Policy Option' choices between with and without preference uncertainty question



Sample A = The sample split without preference uncertainty question.
Sample B = The sample split with preference uncertainty question.

Results (1): WTP for Climate Change Mitigation

	Mean Implicit Price AUD/hh/month	P value
Without Preference Uncertainty Question	23 (90% C.I. 1 to 44)	0.03
With Preference Uncertainty Question	57 (90% C.I. 34 to 79)	

THE AUSTRALIAN NATIONAL UNIVERSITY

Results (2): Why are you uncertain about your decision?

- I was asked too many questions (26%).
- I am uncertain about my future employment/financial condition (46%).
- I am not convinced about the success of the policy (47%).
- I think I should change my lifestyle rather than paying for the CPRS (30%).
- I did not like the idea of placing a monetary value on climate change (29%).

THE AUSTRALIAN NATIONAL UNIVERSITY

Results (3): Random Effects Ordered Probit Regression Results

Variable	Coefficients (SE)
Temperature*Probability	-0.048*** (0.01)
Cost of the policy (AU$/month)	-0.005 (0.001)
Square of policy cost	-0.38-E-05 (0.28-05)
Respondents have heard of the CPRS	0.33** (0.17)
Respondents complained about the questionnaire	-0.50** (0.20)
Respondents were not convinced about the success of the policy	-0.30* (0.18)
Age	0.23*** (0.05)
Education	0.60*** (0.04)

THE AUSTRALIAN NATIONAL UNIVERSITY

Results (3): Random Effects Ordered Probit Regression Results (continued…)

Variable	Coefficients (SE)
Choice Question 2	0.52*** (0.11)
Choice Question 3	0.38*** (0.10)
Choice Question 4	0.41*** (0.09)
Choice Question 5	0.26*** (0.10)
Individual specific error term (RHO)	1.8*** (0.07)

THE AUSTRALIAN NATIONAL UNIVERSITY

Implications of the Results

- Preference uncertainty questions are not procedurally invariant.
- Repeated choice questions have benefit (preference learning) but also imposes significant cost (increased preference uncertainty).
- Some of the sources of uncertainty are fundamental. Therefore, cannot be eliminated.