

Sources of inadequate scope sensitivity in WTP for risk reductions: An experimental approach

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Background

- WTP estimates from stated preference studies only useful if they reliably reflect preferences
- Basic test: 'more is better'
- WTP should increase roughly proportionally to the quantity of the good offered

Background

- Literature full of examples of inadequate scope sensitivity... Why are respondents overlooking quantity of the good?
- Explanation suggested by psychology literature
 - Dual process of decision making 
 - RATIONAL
 - INTUITIVE
- Particular issue for valuing complex valuation scenarios

Background

- ...for example, scenarios where the outcome is uncertain
 - Outcomes of many environmental projects are uncertain
 - Many outcomes of environmental policies reduce the risk of illness or premature mortality
- Respondents tend to find probabilities difficult to deal with
- Carson (1997) finds that scope sensitivity appears particular issue with valuing risky goods

Background

- ...also, unfamiliar goods
- Respondents don't have fully defined preferences for unfamiliar goods
- Therefore likely to be harder for respondents to state WTP
- Examples...



Health



Climate change



Ecosystems



Nuclear power

Experiment Design

Experiment design

- Study looks at the impact of risk and familiarity on scope sensitivity of WTP estimates
- Tests the following research questions:
 1. Is WTP larger risk reduc. > WTP smaller risk reduc.?
 2. Is WTP adequately more for larger risk reductions?
 3. Is scope sensitivity affected by degree of familiarity?
 4. Is scope sensitivity affected by level of risk?
- Internal and external measures of scope sensitivity

Experiment Design

- Pre-tested on 55 respondents
- Respondents recruited from UEA students (N=99)
- Computerised experiment

Experiment design

Testing the impact of familiarity

- Money stolen (£75)
- Stomach bug
- Temporarily blind

I
Familiarity
↓

Experiment design

Testing the impact of the risk denominator

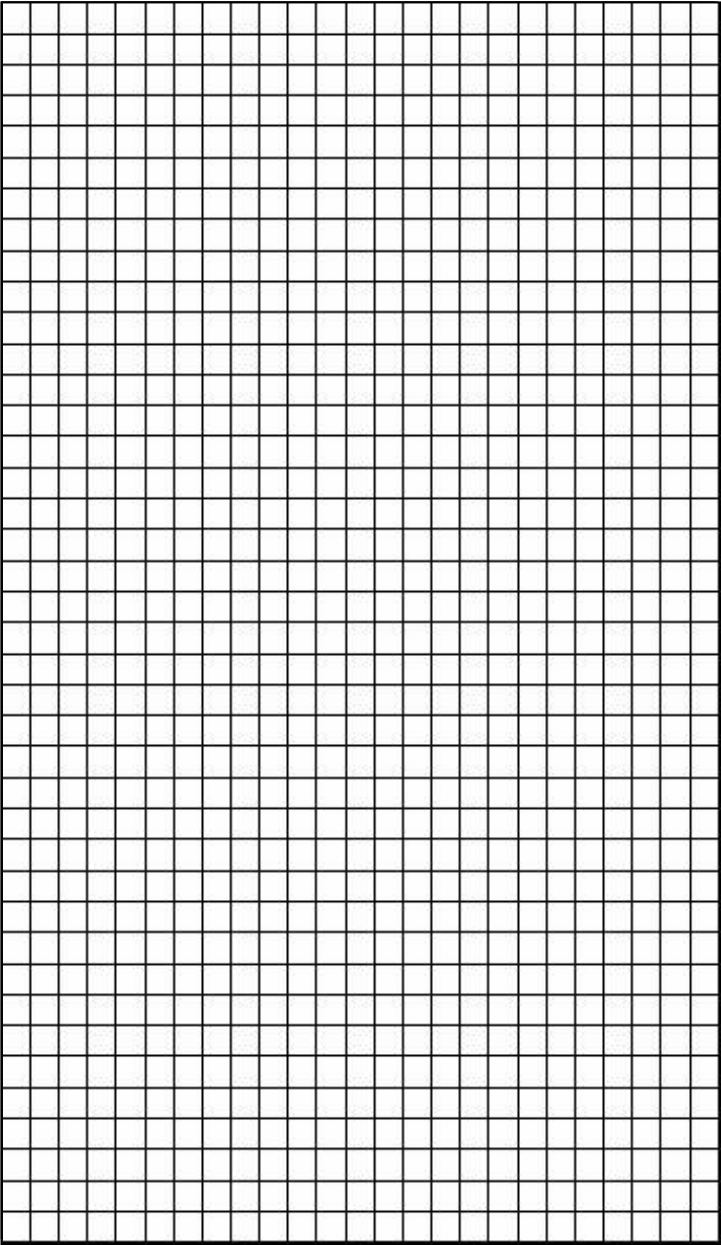
Risk in 10	Risk in 1,000
5/10 to 0/10	100/1,000 to 0/1,000
1/10 to 0/10	20/1,000 to 0/1,000

Experiment design

- Risk communication

The grid flashes between
current risk level and new
risk level

Risk in 1,000



Results

Results 1

1: Is WTP larger risk reduc. > WTP smaller risk reduc.?

- Internal test of scope sensitivity: Respondents WTP more for larger risk reduction (sig. 99%)
- Tougher external test showed mixed results...

Results 1

External test of scope sensitivity

	Mean WTP (£)		Mann Whitney Test
	Larger risk reduction	Smaller risk reduction	Sig. (1-tailed)
<i>Risk in 10</i>	<i>5/10 to 0/10</i>	<i>1/10 to 0/10</i>	
Money stolen	18.35	8.47	Yes (99%)
Stomach bug	22.88	13.03	Yes (99%)
Blindness	57.36	34.84	Yes (95%)
<i>Risk in 1,000</i>	<i>100/1,000 to 0/1,000</i>	<i>20/1,000 to 0/1,000</i>	
Money stolen	8.92	7.83	Yes (99%)
Stomach bug	10.67	8.53	No
Blindness	24.44	25.64	No

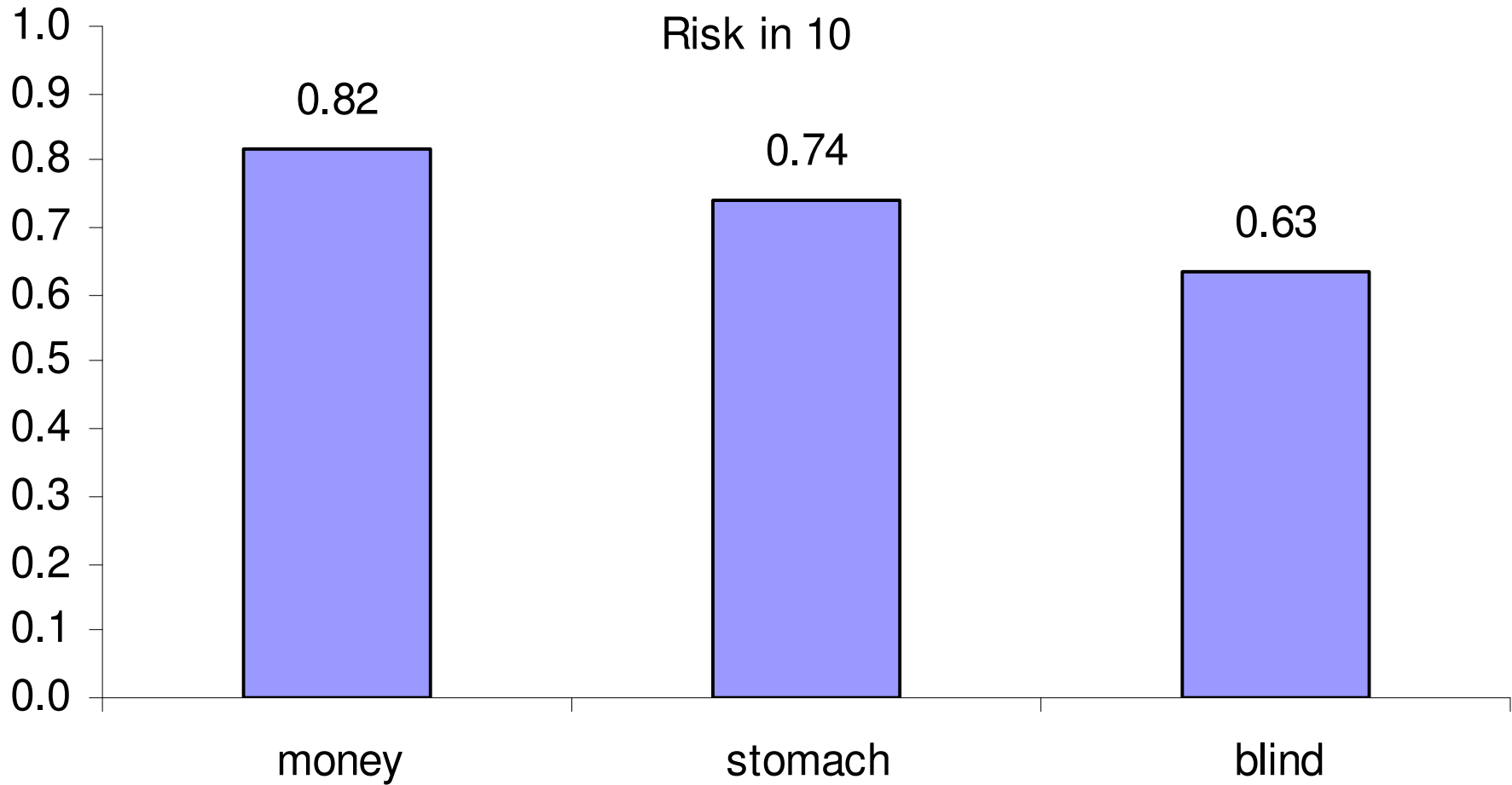
Results 2

2: Is WTP adequately more for larger risk reductions?

- Proportionality assumption fails internal and external tests (99%)
- Results 1 and 2 are inline with other studies, i.e. Hammitt and Graham (1999)
 - General evidence of weak scope sensitivity
 - External testing is mixed
 - Proportionality assumption fails

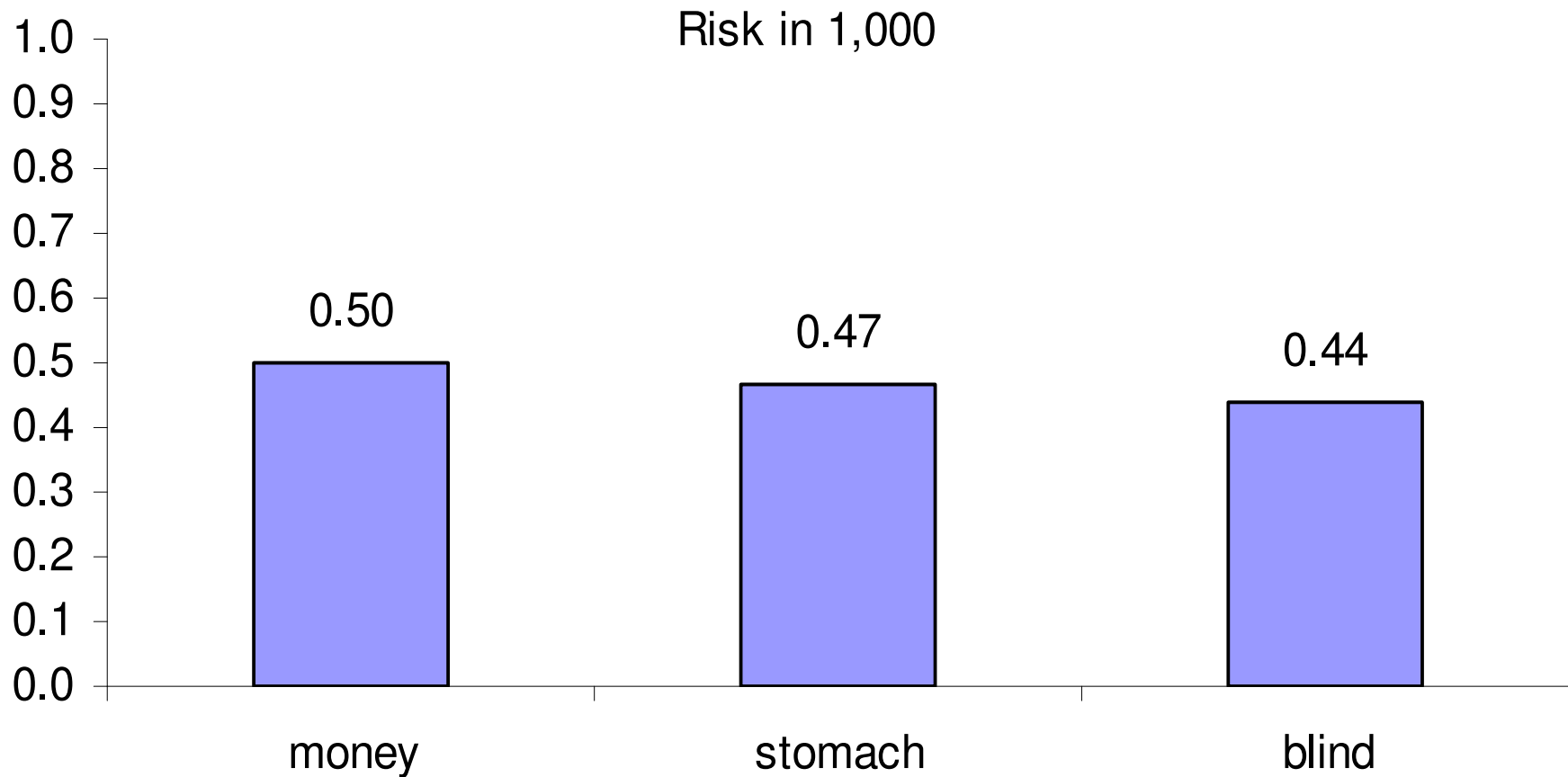
Results 3

Ratio of WTP for larger risk reduction and 5 times smaller risk reduction



Results 3

Ratio of WTP for larger risk reduction and 5 times smaller risk reduction



Results 3

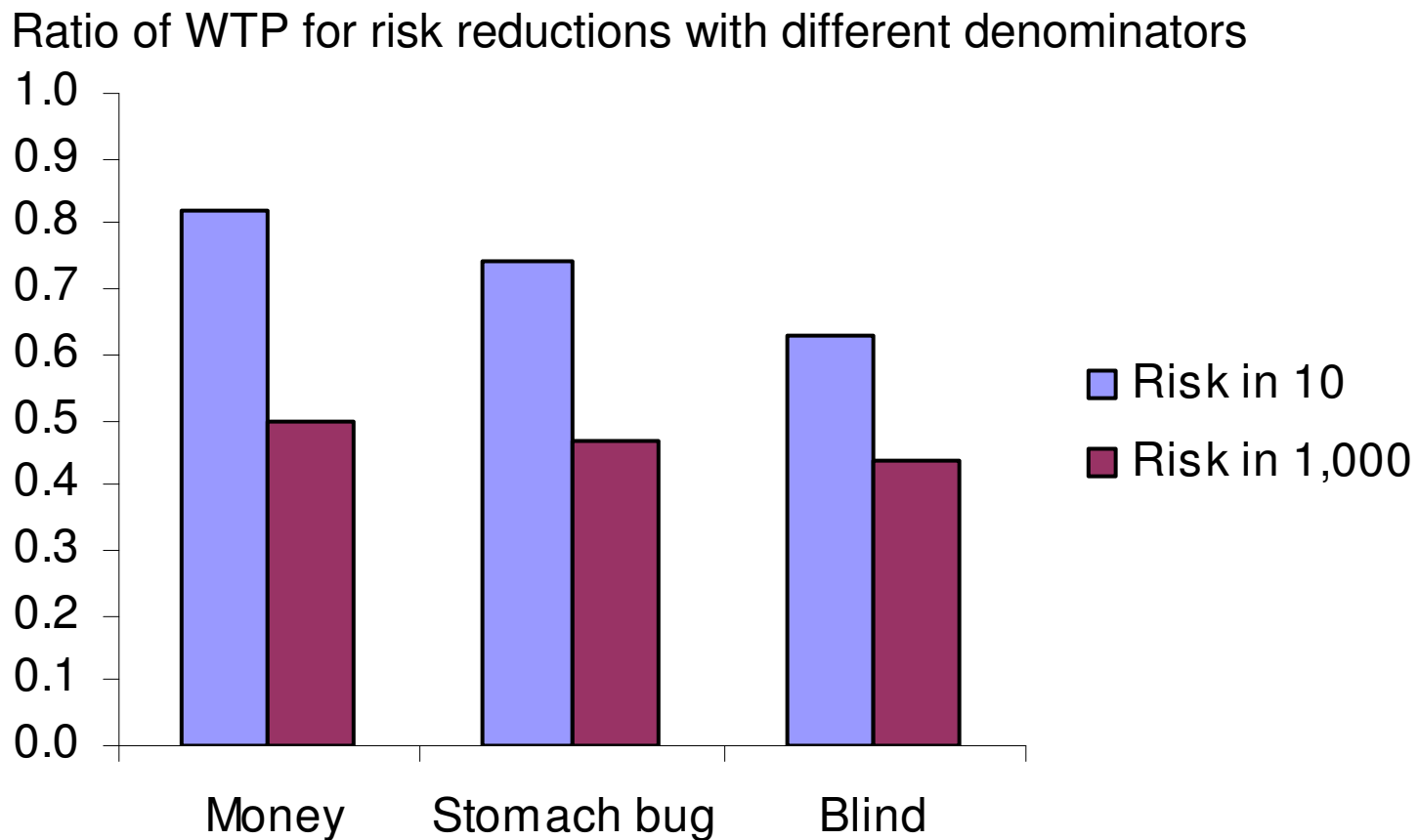
3. Are WTP estimates less scope sensitive when the good is less familiar?

Wilcoxon signed rank test of difference in ratio between scenarios

	stomach- £	blind - stomach	blind- £
	Risk in 10		
Asymp. Sig. (2-tailed)	No (p=.163)	No (p=.362)	Yes (p=.007)
	Risk in 1,000		
Asymp. Sig. (2-tailed)	No (p=.707)	No (p=.521)	Yes (p=.077)

Results 4

4. Are WTP estimates less scope sensitive when the risk denominator is larger?



Results 4: Risk

**Wilcoxon signed rank test of difference in ratio
between risk denominators**

	Money	Stomach	Blind
Z	-4.244	-3.167	-2.021
Asymp. Sig. (2-tailed)	Yes (99%)	Yes (99%)	Yes (95%)

Conclusions

Conclusions

- Some (but not all) of WTP sums satisfy ‘weak’ test of scope sensitivity
 - Internal tests show $WTP_{Larger} > WTP_{Smaller}$
 - External test mixed
 - Satisfied for familiar risks
 - Move to denominator in 1,000 fails for less familiar goods
- Same stated WTP estimates do not satisfy the ‘strong’ scope sensitivity test
- Evidence that familiarity does affect SS
- Evidence that risk denominator does affect SS

Conclusions

- For valuation scenarios that are unfamiliar and/or risk denominator is large then cognitive burden of question may be excessive
- ⇒ Respondents may be unable or unwilling to rely on rational process of decision making
- Widespread evidence of this would call into question the reliability of stated preference where valuation scenario is unfamiliar and/or involves large risk denominators.

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