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An addendum to: A Meta- Analysis of Hypothetical Bias Stated Preference Valuation

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Alghero, 25-27 /06/14



Outline

- The antecedent
- Goals
- Methods
- Results





The antecedent

Environmental and Resource Economics (2005) 30: 313–325

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A Meta-Analysis of Hypothetical Bias in Stated Preference Valuation

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Calibration Factor

$$CF = \frac{E(WTP)_{hypothetical}}{E(WTP)_{real}}$$

Previous reviews and meta analysis

Authors	CF	Number of observ. 😊
Harrison and Rutstrom (2008)	Range (0.75 – 26)	35
List and Gallet (2001)	Mean (3)	174
Little and Berrens (2004)	Median (3.13)	191



Murphy et al. 2005

- drawn on List and Gallet dataset
- focussed on WTP measures only (83 obs.)
- found mean CF = 2.60 (Median= 1.35)
- explored (OLS) the determinants of CF but warned that results are sensible to model specification and that the choice of explanatory variables is affected by the lack of a theory explaining hypothetical bias.





Goals

- Our point of departure is the observation that distributions of ratios of value estimates are not completely characterised by location parameters alone (such as mean or median).
- Dispersion parameters are also of crucial importance, especially in the context of joint preference estimation from merged revealed and stated preference data (e.g. Hensher, Louviere and Swait, 1999).



Inverse Relative Scale Factor

$$IRSF = \sqrt{\frac{\sigma_r^2}{\sigma_h^2}} = \frac{\sigma_r}{\sigma_h}$$

- We named the ratio inverse relative scale factor since the scale factor is usually defined as $\mu = 1 / \sigma$ (Adamowicz , Louviere and Williams, 1994) and the relative scale factor as μ_r / μ_h whilst our index is given by $IRSF = \mu_h / \mu_r$
- Our Goal is to provide some specific insights on the distribution of the IRSF distributions from a subset of 23 studies out of the original 28 considered by Murphy et al.(2005), for which relevant data on scale is available.

Methods

•3 different measures of dispersion are available across the reviewed studies depending on the estimation framework adopted

Assume

$$WTP_i = x_i' \beta + \varepsilon_i$$

Then

$$\text{VAR}(WTP) = \text{VAR}(\varepsilon) + \text{VAR}_x(x\beta)$$

1. Unconditional
or marginal
variance

2. Error term
variance

variance of the
conditional mean
with respect to x



Measures of dispersion

- variance of estimated WTP for a representative subject (at the mean values of x , \bar{x})

$$VAR(b\bar{x}|X) = \bar{x}' [\sigma_u^2 (X'X)^{-1}] \bar{x}$$



3. Parameters based
variance which again is
different from $VAR(\varepsilon)$ or
 $VAR(WTP)$



Measures of dispersion

- **observations** can also be classified according to the format in which the measure is provided

Type of distribution

Format	<u>Error</u>	<u>Parameters</u>	<u>Marginal</u>	<u>Total</u>
Confidence interval	1	5	8	14
Scale_fact	1	0	0	1
Sigma	14	0	0	20
Stand. Dev	0	8	34	36
<i>Total</i>	<i>16</i>	<i>13</i>	<i>42</i>	<i>71</i>



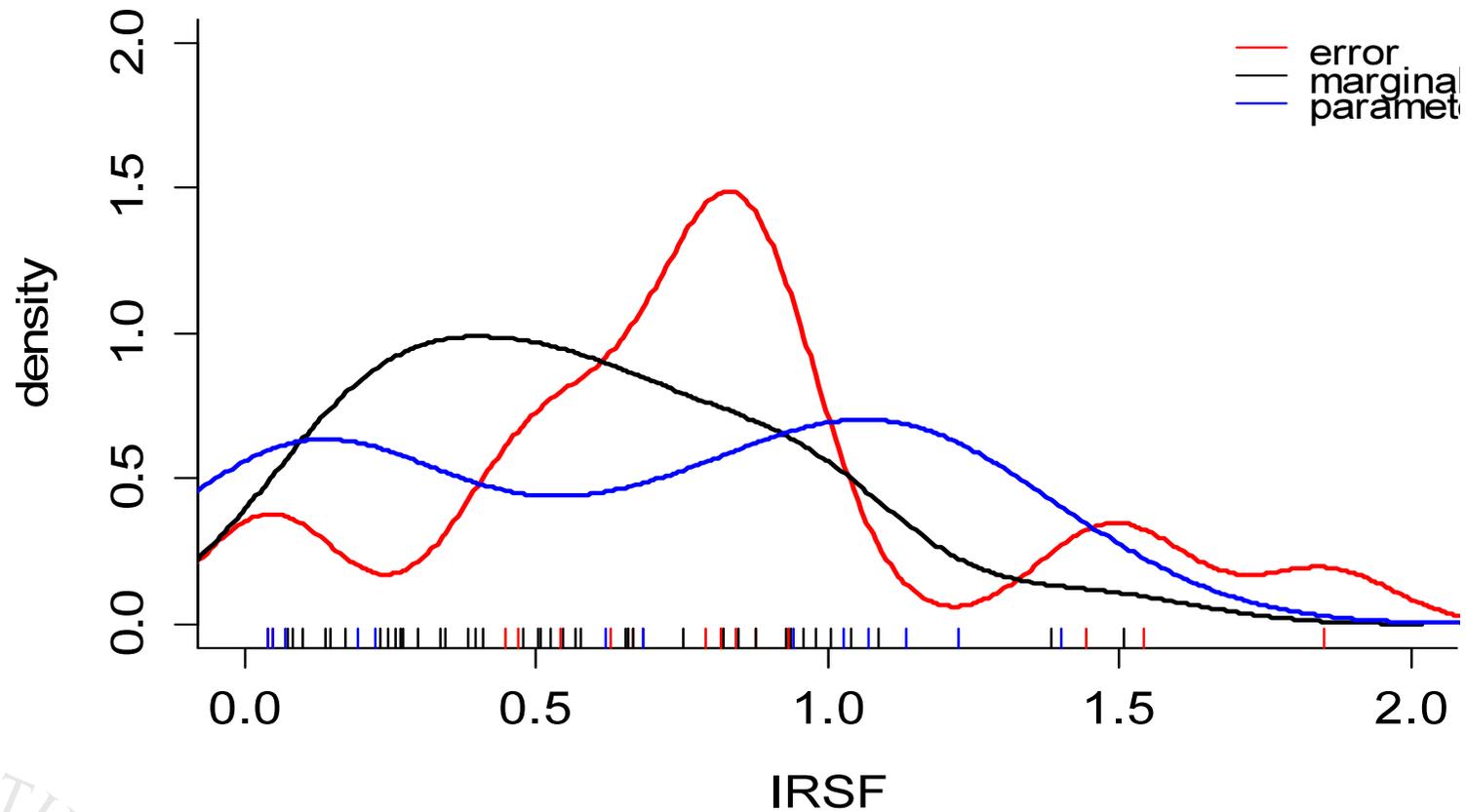
Results

- summary statistics

	Type of distribution			
	error	parameters	marginal	<i>Total</i>
min	0.45	0.04	0.07	0.04
max	1.85	1.40	1.51	1.85
mean	0.90	0.67	0.58	0.67
med	0.82	0.69	0.54	0.66
st.dev	0.39	0.50	0.35	0.41

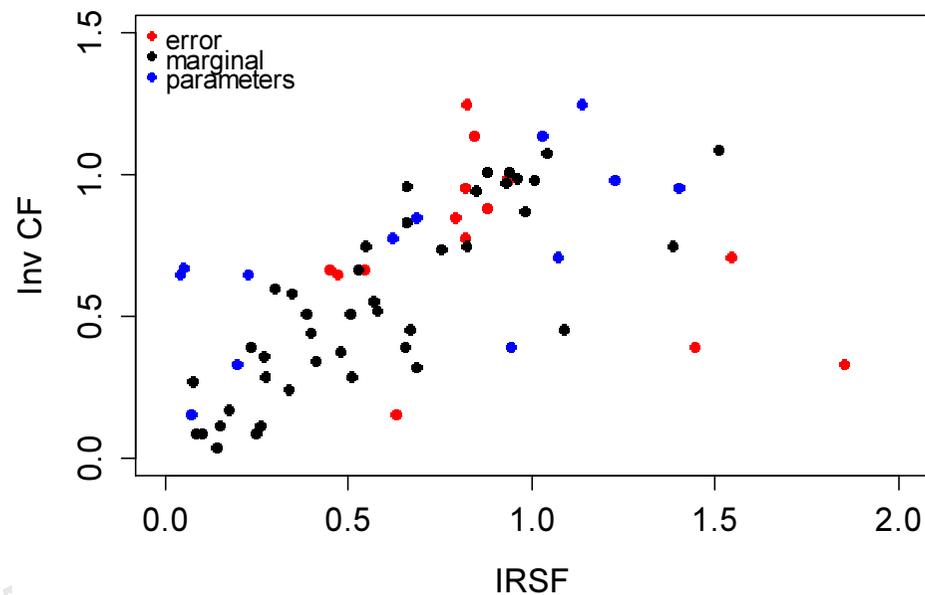
Results

- empirica density functions



Results

- covariation btw ICF & IRSF



	ρ	CI
error	-0.13	(-0.56 , 0.36)
parameters	0.66	(0.18 , 0.89)
marginal	0.81	(0.67 , 0.90)
all	0.58	(0.41 , 0.72)



Results

- determinants of IRSF
Marginal type only

Variable	Estimate	Std. Error	t value
(Intercept)	0.15	0.06	2.33
ICF	0.81	0.09	8.61
Choice	-0.08	0.09	-0.82
Private	-0.12	0.09	-1.28
Student	0.02	0.06	0.28
Within	0.19	0.09	1.95
Calibrate	0.19	0.08	2.46



R²= 0.77





Conclusions

- Building on Murphy et al (2005) our study provides some insights on the distribution of the inverse relative scale factor across 25 stated preference studies.
- The results show that, on average, the IRSF is about 0.6-0.7 and is correlated with the ratio between real and hypothetical average WTPs. However there are important differences in the distribution of the IRSF depending on which type of WTP dispersion measure is considered

