Experts in Experiments: How Selection Matters for Estimated Distributions of Preferences

Hans-Martin von Gaudecker
Arthur van Soest
Erik Wengstroem

Overview

- Comparing lab experiments with experiments in population representative Internet survey
- Selection effects
  - Students versus broad population
  - Nonresponse in Internet survey
- Mode/environment effects
  - Lab – lab versus Lab-Internet
  - Students in the lab versus young and highly educated Internet respondents

Parameters of Interest & Experiment

- Risk preferences:
  - Safe versus risky choices
  - Coefficient of risk aversion (curvature)
  - Coefficient of loss aversion (kink at zero)
- Nonoptimal decisions
  - Inconsistencies
  - Error variances
- Experiment: Iterative Multiple Price List Format
  - Choices between two lotteries

Main Findings

- Selection matters
  - Students make more risky choices
  - Students make fewer errors
  - But non-response in the Internet survey has no effect
- Mode effects play a minor role
  - Similar behavior of students in the lab and young highly educated respondents on the Internet
  - Similar behavior of students in the lab who get the “lab-treatment” or the “Internet treatment”

Content

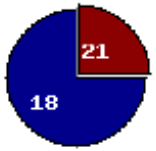
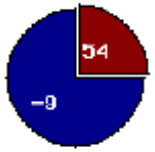
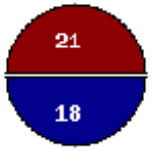
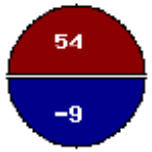
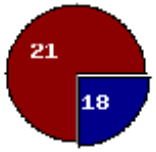
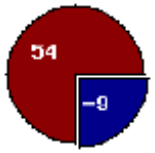
- Design of the experiments
- Comparing lab and Internet results:
  - Descriptive statistics
  - Structural model
- Selection into the Internet experiment
- Conclusions

Experiment

- Iterated Multiple Price List format (Binswanger, AJAE 1980; Holt and Laury, AER 2002)
- Seven ``Payoff configurations" with sets of choices between two lotteries (with two outcomes) that only differ in P(high payoff)
- For each payoff configuration, 4 or 8 questions (with different probabilities P(high payoff)

Progress: 70% Instructions Help

Please, make a choice between A and B for each of the decision problems below.

Option A -outcome IMMEDIATELY revealed	Option B -outcome revealed in THREE MONTHS	Choice A	B
 € 21 with probability 25% € 18 with probability 75%	 € 54 with probability 25% € -9 with probability 75%	○	○
 € 21 with probability 50% € 18 with probability 50%	 € 54 with probability 50% € -9 with probability 50%	○	○
 € 21 with probability 75% € 18 with probability 25%	 € 54 with probability 75% € -9 with probability 25%	○	○
€ 21 with probability 100% € 18 with probability 0%	€ 54 with probability 100% € -9 with probability 0%	○	○

Progress: 70% Instructions Help

Please, make a choice between A and B for each of the decision problems below.

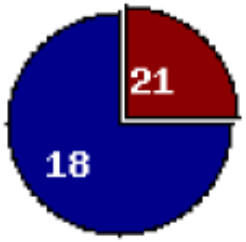
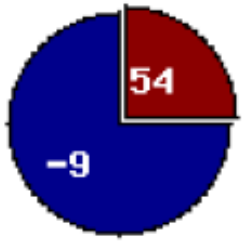
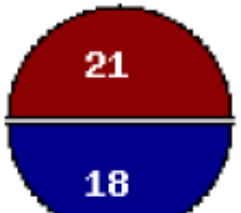
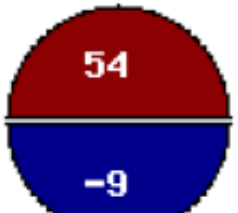
Option A **-outcome IMMEDIATELY revealed**	**Option B** **-outcome revealed in THREE MONTHS**	**Choi**
 € 21 with probability 25% € 18 with probability 75%	 € 54 with probability 25% € -9 with probability 75%	A
 € 21 with probability 50% € 18 with probability 50%	 € 54 with probability 50% € -9 with probability 50%	

Table 1: Characteristics of the Seven Payoff Configurations

Payoff Configuration	Option A			Option B		
	Uncertainty Resolution	**Low Payoff**	**High Payoff**	**Uncertainty Resolution**	**Low Payoff**	**High Payoff**
1	early	27	33	early	0	69
2	early	39	48	early	9	87
3	early	12	15	early	-15	48
4	early	33	36	late	6	69
5	early	18	21	late	-9	54
6	early	24	27	early	-3	60
7	late	15	18	late	-12	51

Note: Subjects were asked to choose between the two options on each row 4 or 8 times, with different probabilities of obtaining the high outcome. These values were shown in the high incentive and hypothetical treatments. For the low incentive treatment they were divided by three. The order was randomised.

CentERpanel

- Random sample of the Dutch population ages 16 and older
- Sampling weights to correct for selective participation in the ongoing panel
- 2299 participants logged in for the experiment
- 291 decided not to participate
- 80 dropped out after having started
- 138 “speeded through” the experiment

Laboratory Experiment

- 178 students in 16 sessions
- Lab-lab treatment with experimenter and without help screens
- Lab-Internet treatment without experimenter and with help screens (mimicking the Internet experiment)
- Hypothetical treatment with show up fee (which is not given in Internet experiment)
- Low incentive treatment and high incentive treatment as in Internet experiment

Violations of Dominance or Monotonicity (%)

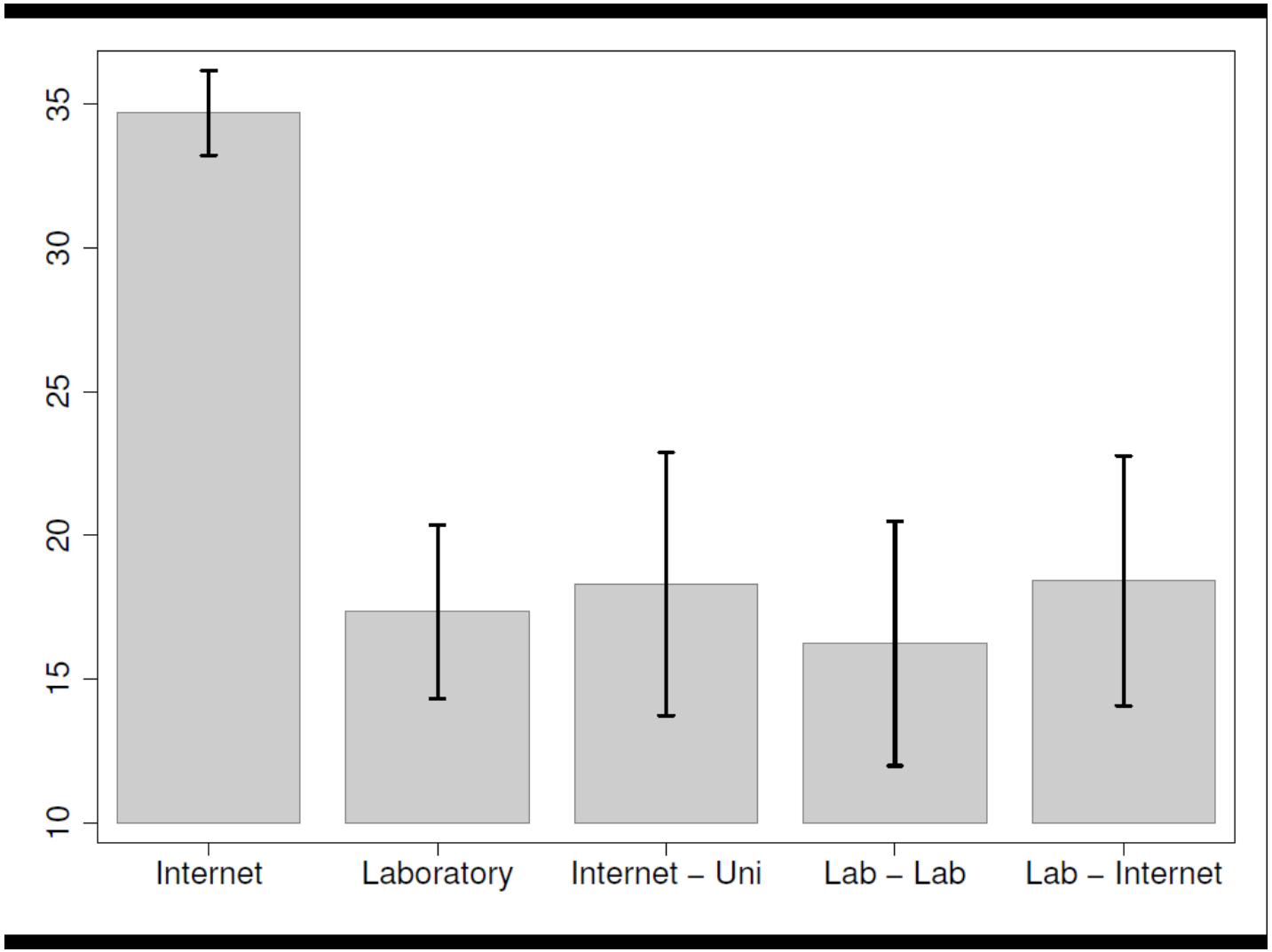
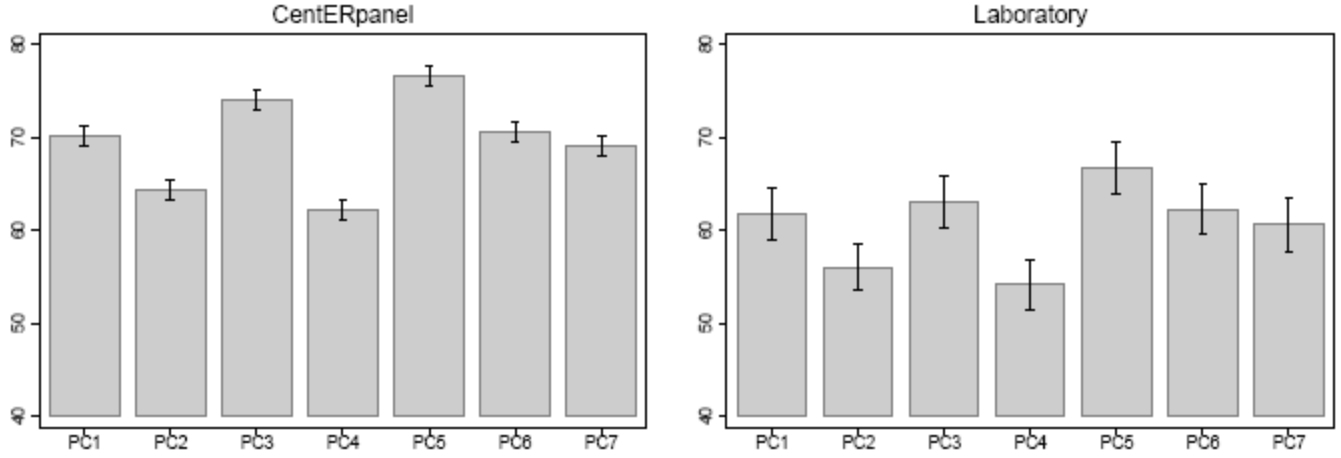


Table 3: Relative frequency of inconsistencies by type of error and subsample

Sample	# Obs.	Dominance	Within	Between	Total
Internet	1787	12.6%	4.9%	24.5%	34.7%
Laboratory	178	1.5%	2.0%	14.6%	17.3%
Internet - Uni	96	4.2%	1.9%	14.4%	18.3%
Lab - Lab	88	1.6%	1.9%	13.9%	16.2%
Lab - Internet	90	1.5%	2.0%	15.2%	18.4%

Note: The figures represent frequencies of the different types of errors as a percentage of the number of possible violations. The fractions of violations for the dominance category were obtained by dividing the total number of dominance violations in each category by the total number of screens shown to each subject on which dominance violations could be made. The numbers for the within category are calculated as the number of within violations, divided by the total number of screens shown to each subject. The figures of the last column were obtained by dividing the number of between errors by the number of times the second screen was displayed to subjects. A maximum of one error was counted for each payoff configuration.

Figure 3: Mean switch points in the CentERpanel and laboratory experiments



Note: The numbering of the payoff configurations (PC) conforms to those in Table 1. "Switch points" are defined as the the mean of the 'lowest' and 'highest' switch points discussed in the text and depicted in the Online Appendix, Figures 7 and 8, respectively. Error bars depict 95% confidence intervals.

Structural Model

(simplified version of Gaudecker et al., forthcoming)

Utility function with risk aversion (CARA) and loss aversion:

$$u(z,\gamma,\lambda) = \begin{cases} -\frac{1}{\gamma}e^{-\gamma z} & \text{for } z \geq 0 \\ \frac{\lambda-1}{\gamma} - \frac{\lambda}{\gamma}e^{-\gamma z} & \text{for } z < 0 \end{cases}$$

Fechner errors (iid logistic) on the difference between certainty equivalents (CE)…..

$$\Delta \mathrm{CE}_{ij} = \mathrm{CE}(\pi_j^B, \gamma_i, \lambda_i) - \mathrm{CE}(\pi_j^A, \gamma_i, \lambda_i),$$

$$Y_{ij} \quad = \quad \mathbb{I}\left\{\Delta \mathrm{CE}_{ij} + \tau\, \varepsilon_{ij} > 0\right\}$$

… and “trembling hand” errors, so that likelihood contributions are:

$$l_{ij}\left(\pi_j^A, \pi_j^B, Y_{ij}, \tau, \gamma_i, \lambda_i, \omega_i\right) =$$
$$(1-\omega_i)\,\Lambda\left((2Y_{ij}-1)\frac{1}{\tau}\Delta\mathrm{CE}_{ij}\left(\pi_j^A, \pi_j^B, \gamma_i, \lambda_i\right)\right) + \frac{\omega_i}{2},$$

$$\Lambda(t) = (1+e^{-t})^{-1}$$

Three random coefficients:

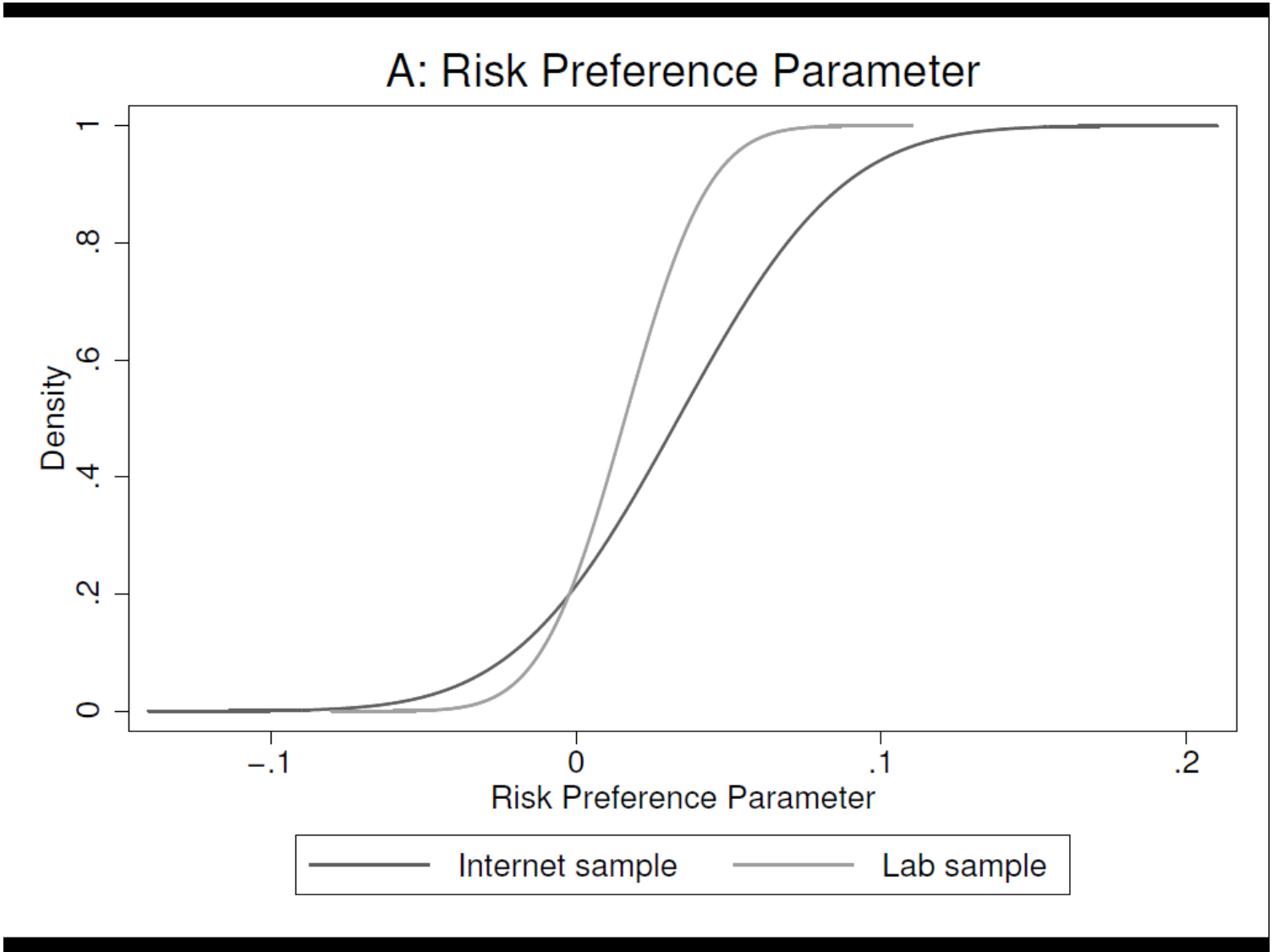
$$\gamma_i,\ \lambda_i,\ \text{and}\ \omega_i$$

$$\eta_i \quad = \quad g_\eta(X_i^\eta \beta^\eta + \xi_i^\eta), \quad \eta_i \in \{\gamma_i, \lambda_i, \omega_i\}$$

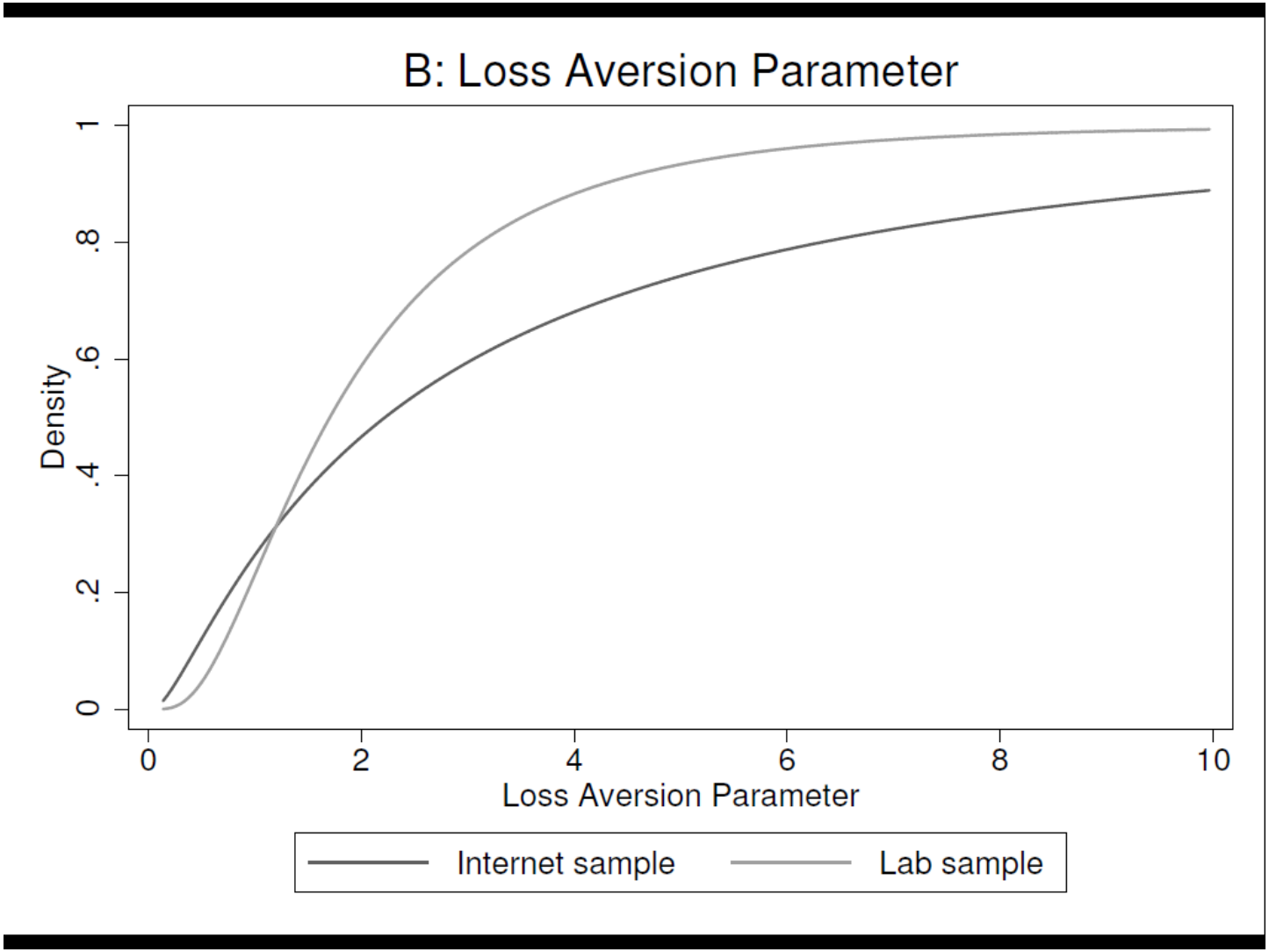
Estimation Results

Covariate	γ	λ	ω
Constant	0.0360***	2.25***	0.0788***
	(0.0012)	(0.106)	(0.0084)
Internet university subsample	-0.0174***	-0.305	-0.0557***
	(0.0036)	(0.356)	(0.0094)
Participant in Lab experiment	-0.0186***	-0.765***	-0.0687***
	(0.0043)	(0.270)	(0.0074)
Low incentive treatment†	2.57***	1.08***	1.24
	(0.0747)	(0.0324)	(0.158)
σ	0.0376***	1.19***	2.07***
	(0.0008)	(0.0404)	(0.113)

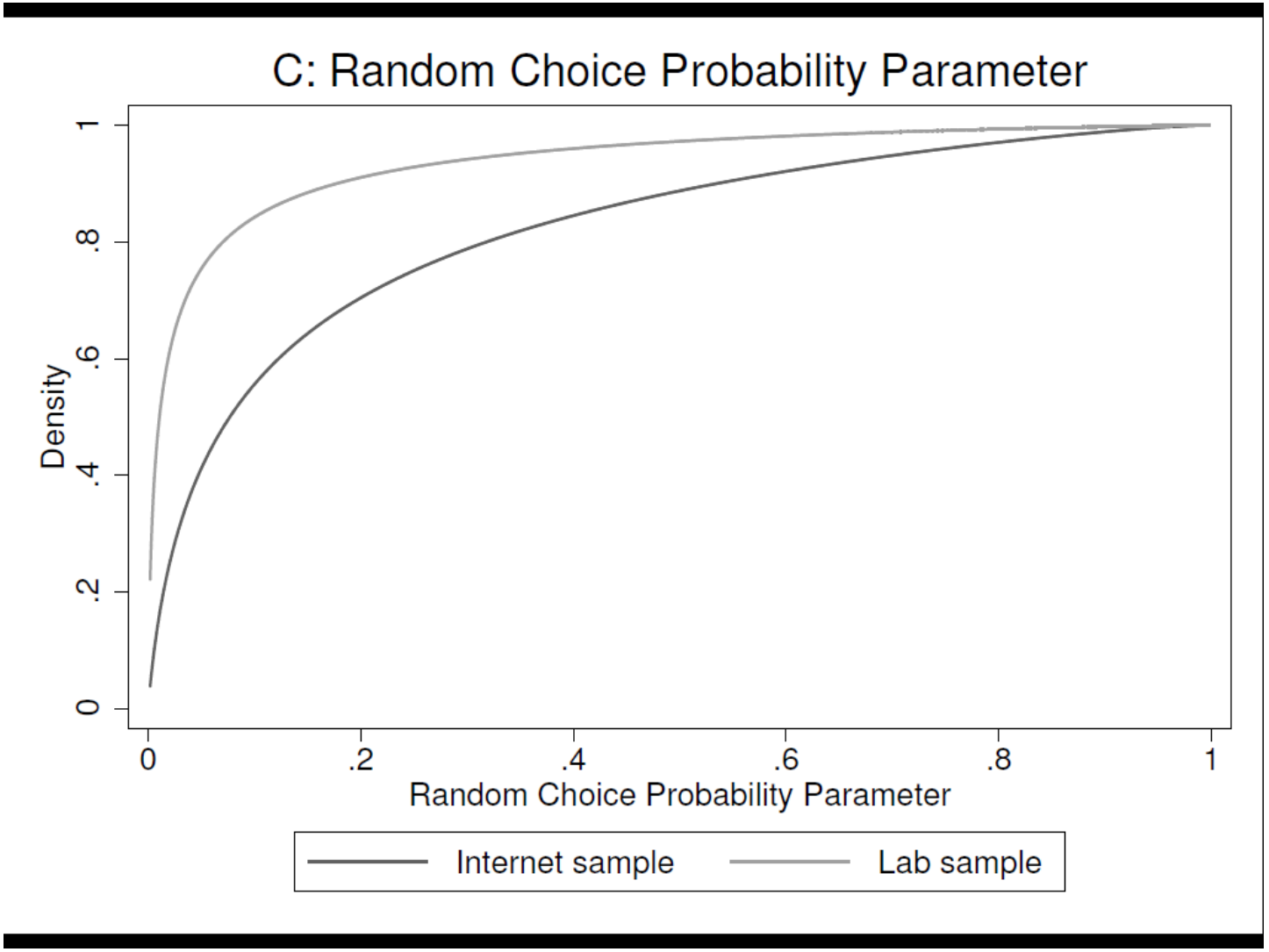
Cumulative density of risk aversion parameter γ



Cumulative density loss aversion parameter λ



Cumulative density trembling hand parameter ω



Self-selection into the Internet Experiment: Three Steps

1. Dutch adults are contacted at random and participate in the CentERpanel or not

   → Sample weights

2. CentERpanel participants learn about the nature of the experiment and then decide to participate or not

   → Multinomial logit (& sample weights)

3. Some participants drop out or speed through

   → Multinomial logit (& sample weights)

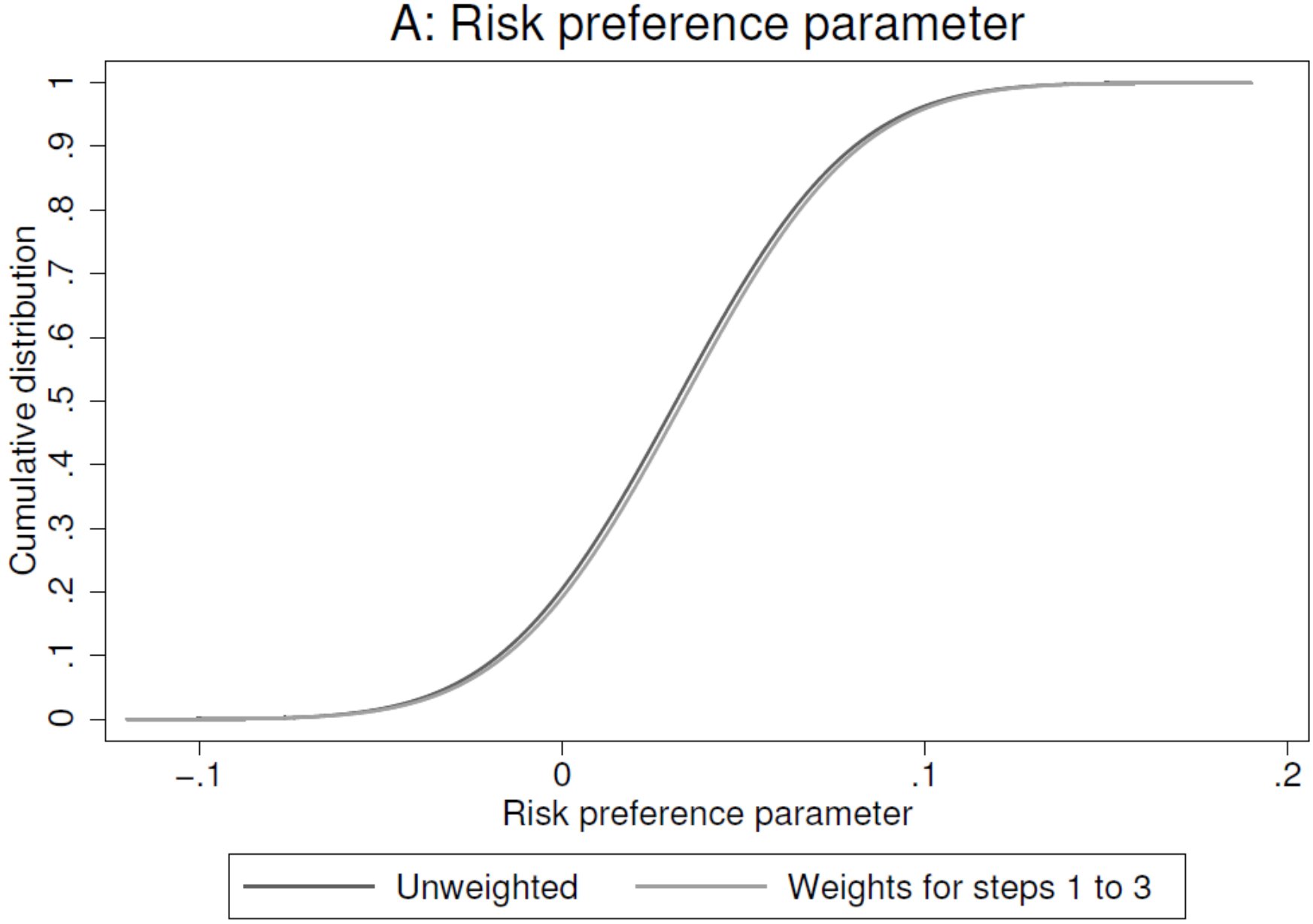
Multinomial logit model for steps 2 and 3: part I

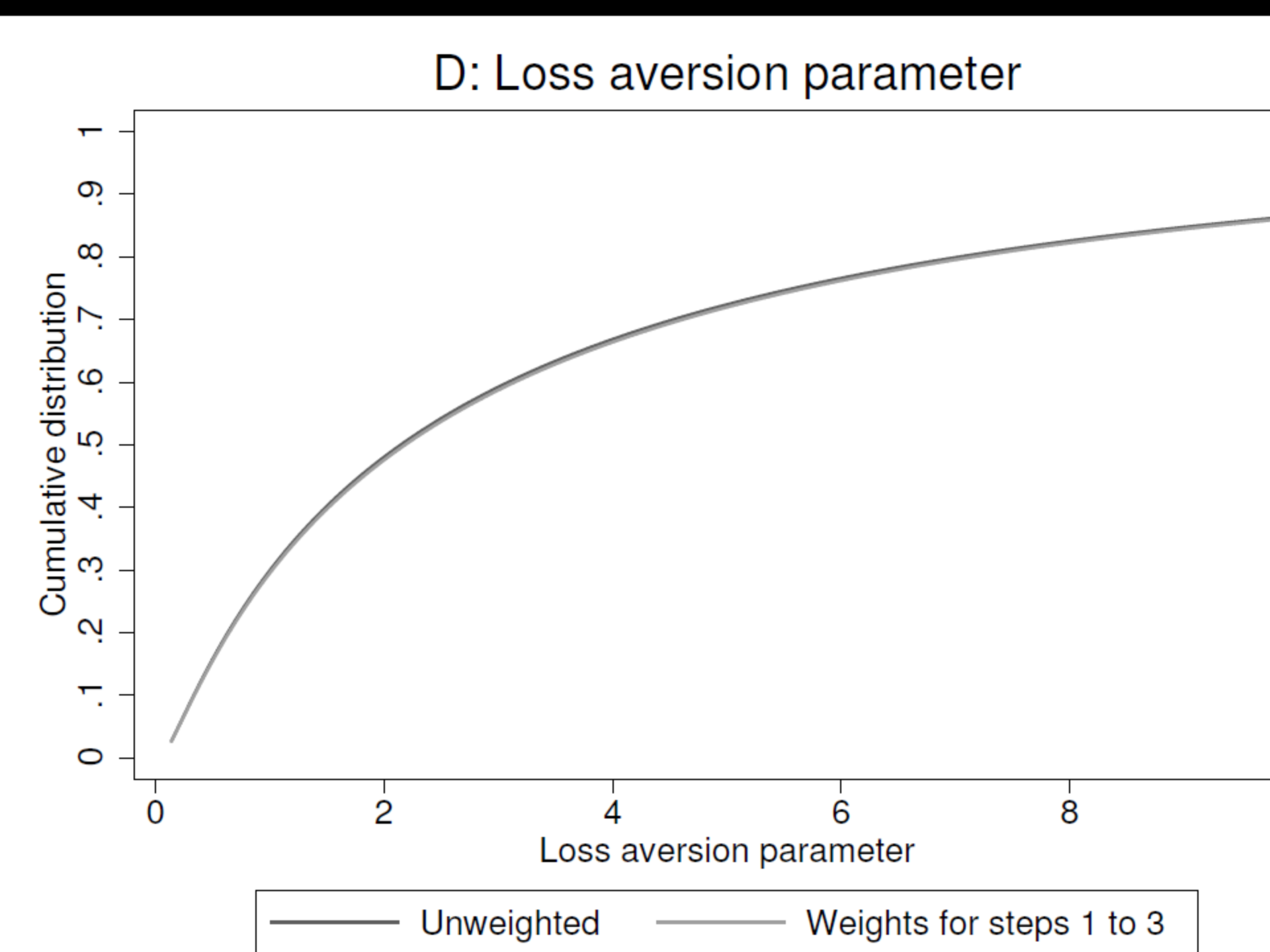
Table 5: Self-selection into the CentERpanel experiment

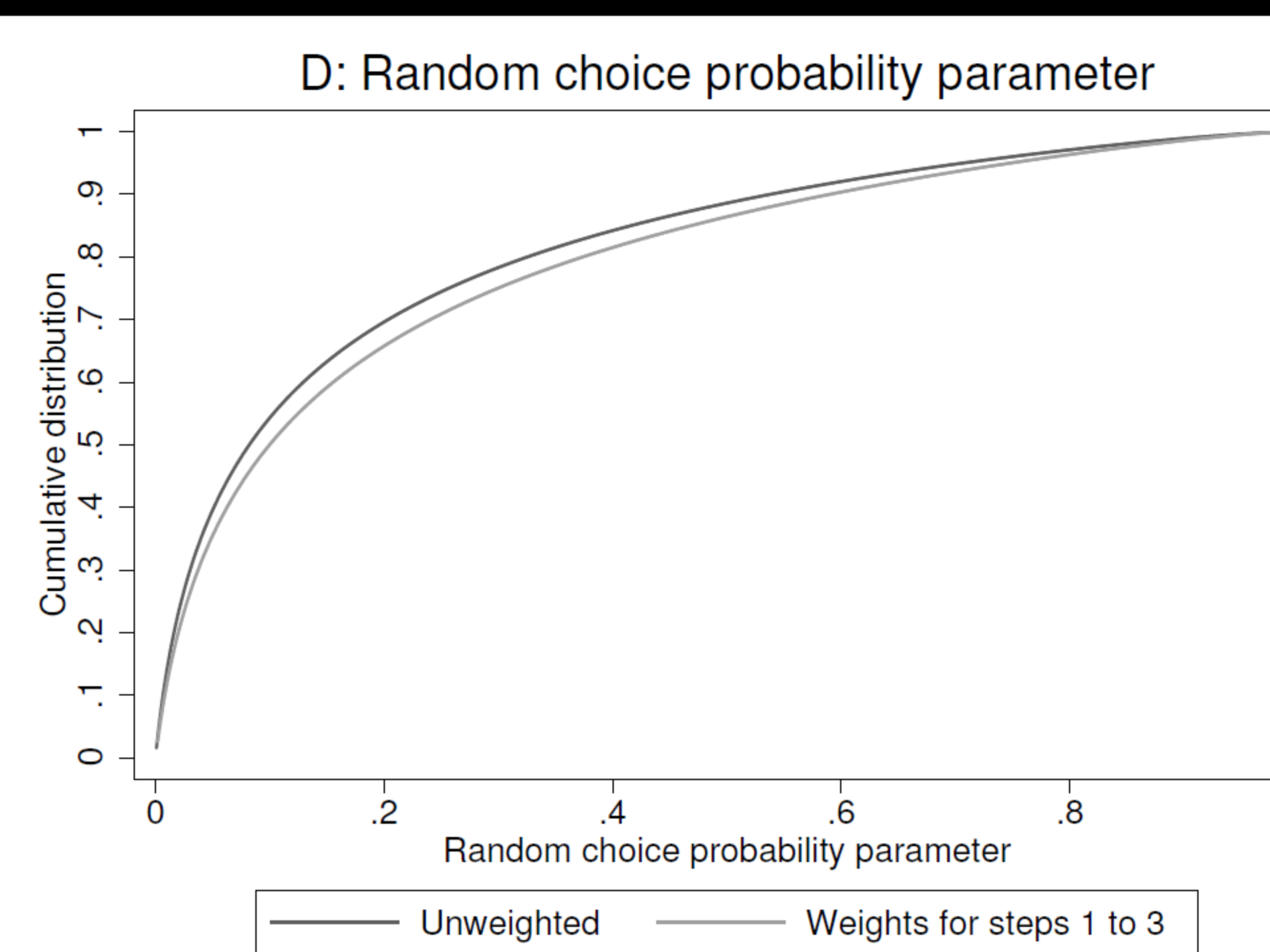
Specification	NP (1)	DO/SP (2)	NP (3)	DO/SP (4)
Low incentive treatment	-1.043***	-.219	-1.103***	-.310
	(.163)	(.174)	(.193)	(.215)
High incentive treatment	-.699***	-.277	-.847***	-.318
	(.156)	(.183)	(.195)	(.231)
Female	.388***	.273*	.393**	.222
	(.137)	(.152)	(.165)	(.190)
Primary / lower secondary education	.853***	.463*	.741**	.599*
	(.280)	(.277)	(.362)	(.357)
Higher sec. educ. / interm. voc. training	.580**	.337	.571	.255
	(.285)	(.267)	(.360)	(.346)
Higher vocational training	.458	-.222	.442	-.174
	(.294)	(.299)	(.368)	(.372)
Age 35-44 years	.335	-.449**	.373	-.502*
	(.242)	(.196)	(.311)	(.264)
Age 45-54 years	.578***	-1.075***	.706**	-1.077***
	(.221)	(.222)	(.283)	(.287)
Age 55-64 years	.486**	-1.321***	.737**	-1.283***
	(.231)	(.262)	(.289)	(.319)
Age 65 years and older	1.137***	-1.179***	1.353***	-1.425***
	(.232)	(.278)	(.303)	(.359)

Multinomial Logit Results, Continued

Working	-.390**	-.111	-.046	.006
	(.174)	(.179)	(.224)	(.240)
Unemployed and looking for a job	.068	.188	.125	.109
	(.416)	(.438)	(.524)	(.573)
Net household income $\in$ [22k Euros; 40k Euros)			.163	.132
			(.188)	(.217)
Net household income at least 40k Euros			-.022	.481
			(.276)	(.293)
Assets worth $\in$ [10k Euros, 50k Euros)			-.168	.409
			(.280)	(.275)
Assets worth $\in$ [50k Euros, 200k Euros)			.216	.070
			(.214)	(.252)
Assets worth more than 200k Euros			.207	.347
			(.241)	(.293)
Household financial administrator			-.353**	-.293
			(.172)	(.202)
Employer offers savings plan			.107	-.590
			(.296)	(.401)
Has sav. plan via employer			-.830***	.114
			(.321)	(.413)
Has sav. acc. or similar			.163	.177
			(.346)	(.413)
Holds stocks, or similar			-.410**	.007
			(.184)	(.210)
Constant	-2.467***	-1.634***	-2.551***	-1.864***


A: Risk preference parameter
Cumulative distribution
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
−.1
0
.1
.2
Risk preference parameter
Unweighted
Weights for steps 1 to 3


D: Loss aversion parameter
Cumulative distribution
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
0
2
4
6
8
Loss aversion parameter
Unweighted
Weights for steps 1 to 3


D: Random choice probability parameter
Cumulative distribution
0
.1
.2
.3
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.5
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.8
.9
1
0
.2
.4
.6
.8
Random choice probability parameter
Unweighted
Weights for steps 1 to 3

Conclusions

- Selection matters
  - Students make more risky choices
  - Students make fewer errors
  - But non-response in the Internet survey has no effect
- Mode effects play a minor role
  - Similar behavior of students in the lab and young highly educated respondents on the Internet
  - Similar behavior of students in the lab who get the "lab-treatment" or the "Internet treatment"

All these results suggest that experiments in a representative Internet panel (based upon a