Risk and Time Preferences in Older Persons:
An Experimental Module in ELSA

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Overview

- An experimental module in wave 5 of ELSA
- 1063 respondents, aged 50-75
- Designed to measure *preferences*
  - Preference for current reward/willingness to wait for a greater reward
  - Preference for certainty/willingness to bear risk in return for the chance at a greater reward
- Choice tasks (or games) with real (but small) payoffs

MOTIVATION AND RESEARCH QUESTIONS

Economic Terminology

- Risk Tolerance: willingness to bear risk in pursuit of possible reward
  - Opposite: risk aversion
  - Risk averse individuals may have a high coefficient of relative risk aversion (CRRA); risk tolerant individuals have a low CRRA
  - Very risk tolerant individuals may be risk neutral or risk loving

- Patience: willingness to delay in return for a greater reward
  - Opposite: impatience
  - Patient individuals may be characterized by a low discount rate and a long time horizon.

Motivation

- Decisions shaped by
  - Constraints
  - Expectations
  - *Preferences*
  - *Decision making ability*
- Many important decisions depend on risk tolerance and patience
- Examples:
  - how much and to save; and in what form?
  - whether to smoke, exercise, eat a healthy diet;
  - whether to undergo a risky medical procedure
- Older individuals face many such decisions

Motivation

- Cognitive ability correlated with financial behavior (eg., Banks and Oldfield, 2007, ELSA)

- Cognitive ability correlated with risk tolerance, patience (Dohmen et al, 2010, Benjamin et al, 2011)

- Risk Tolerance changes with age (Dohmen et al., 2011)

- Cognitive ability changes with age

Motivation

- Measuring Preferences:
  - Self-assessments
    - What does it mean?
    - Response scale heterogeneity?
  - Hypothetical choices
    - "hypothetical bias"
  - Incentivized Choices
- Choices may also reveal decision making ability (inconsistencies)

Research Questions

- How well do laboratory choice tasks work in the field, particular in a large scale survey of older adults?

- What are the risk and time preferences of the over 50 population in the UK?

    – (caveat: small sample)

DESCRIPTION OF THE MODULE

The Wave 5 Preference Module

- 3 Elements:
  1) Incentivized Time Preference Tasks
     - 2 sets of 6 choices (each set is a "multiple price list")
  2) Self-assessed measure of risk tolerance
     - adopted from Understanding Society
  3) Incentivized Risk Preference Tasks
     - 10 "Eckel-Grossman" tasks.
       - Baseline (Dave et al., J.Risk Uncertain., 2010)
       - Adapted Baseline (loss aversion)
       - 8 further choices ("budget constraints" Choi et al, AER, 2011)
- CASI Design (CAPI option)
- Placed at the end of the Interview

1) Screen Shot of Time Preference Task

Blaise 4.8 Data Entry - \\homerfp01\data\Workdocs\ELSA\Computing\Wave5\Risk\MM changes v11\test

Forms   Answer   Navigate   Options   Help

In two weeks	In one month
£ 25	**£ 30**

GAME 5

TYPE IN THE NUMBER BELOW WHICH CORRESPONDS TO YOUR CHOICE AND THEN PRESS THE ENTER KEY.

Would you rather be paid a one-off payment of...

○ 1. ...£25 in two weeks', or
○ 2. £30 in one month's time?

RIA4   2   a2   RIA5

23/51   test   RIA5   29/06/2009   17:42:47

Time Preference Task Payoffs (£)

Choice	In 2 Weeks (Left)	In One Month (right)	In Two Months (right)
1	25	26	
2	25	28	
3	25	30	
4	25	32	
5	25	35	
6	25	38	
7	25		26
8	25		30
9	25		35
10	25		37
11	25		40
12	25		45

Time Preference Task

- Consistency requires that once you choose delay, you must choose delay at all subsequent choices within a list.

- Given consistency, respondents may delay 0,1,2,3...6 times in each list.
  - each list classifies subjects into 7 levels of patience.

- Given consistency, and assumptions about the utility function, we can calculate a discount rate.

2) Self-Assessed Risk Tolerance

Before we move onto the next type of game, we would like to ask you whether you are generally a person who is fully prepared to take risk or do you try to avoid taking risks?

Avoid Taking Risks   *Fully Prepared to Take Risks*

0   1   2   3   4   5   6   7   8   9   10

- Taken from Understanding Society
- Very similar to the question in the German SOEP studied by Dohmen et al. (2011)

3) Screen Shot of Risk Preference Task

Incentivized Risk Task Payoffs

- "Token" turns up Yellow with 50% chance

Baseline Screen						
	A (1)	B (2)	C (3)	D (4)	E (5)	F (6)
Yellow/Blue	28/28	24/36	20/44	16/52	12/60	2/70
[Expected Value]	[28]	[30]	[32]	[34]	[36]	[36]
implied CRRA value, r	$3.46 < r$	$1.16 < r < 3.46$	$0.71 < r < 1.16$	$0.5 < r < 0.71$	$0 < r < 0.5$	$r < 0$

Incentivized Risk Task Payoffs

Baseline Screen						
	A (1)	B (2)	C (3)	D (4)	E (5)	F (6)
Yellow/Blue	28/28	24/36	20/44	16/52	12/60	2/70
[Expected Value]	[28]	[30]	[32]	[34]	[36]	[36]
implied CRRA value, r	$3.46 < r$	$1.16 < r < 3.46$	$0.71 < r < 1.16$	$0.5 < r < 0.71$	$0 < r < 0.5$	$r < 0$

Loss Aversion Screen						
	A (1)	B (2)	C (3)	D (4)	E (5)	F (6)
Yellow/Blue	10/10	6/18	2/22	-2/28	-4/35	-5/38
[Expected Value]	[10]	[12]	[12]	[13]	[15.5]	[16.5]

Payment

- Basic participation fee of £10 for the module.
- At the end of the module the CAPI program randomly picked one of the 22 tasks
- The respondent won the amount of money corresponding to their choice for this task.
- This procedure was fully explained in advance.
- By design no respondent lost more than £5 from their initial £10
- The expected payment of about £35.

FIELD OUTCOMES

Response Rate and Mode

Module Response		
Allocated to Module	1501	
- proxy interview or ELSA wave 5 unproductive for other reasons	395	
Invited to do Risk Module	1106	
- Refusals	43	
Completed Module	1063	(96.1% Response Rate)

Mode		
Computer-Assisted Self Interview (CASI)	844	79%
Computer Assisted Personal Interview (CAPI)	219	21%

Item nonresponse ("don't know")	
Self-Assessed Risk Tolerance	2
All Incentivized Time Preference Choices	1
All Incentivized Risk Choices	0

Field Outcomes

- The median time to complete the entire module was 13 minutes

- 90% of respondents took between 7 and 21 minutes

- Average payment (including participation fee): 38£
  - Min. 5£; Median 35£; Max. 80£;

- Interviewer feedback was very positive

DISTRIBUTIONS

1) Time-Preference Task

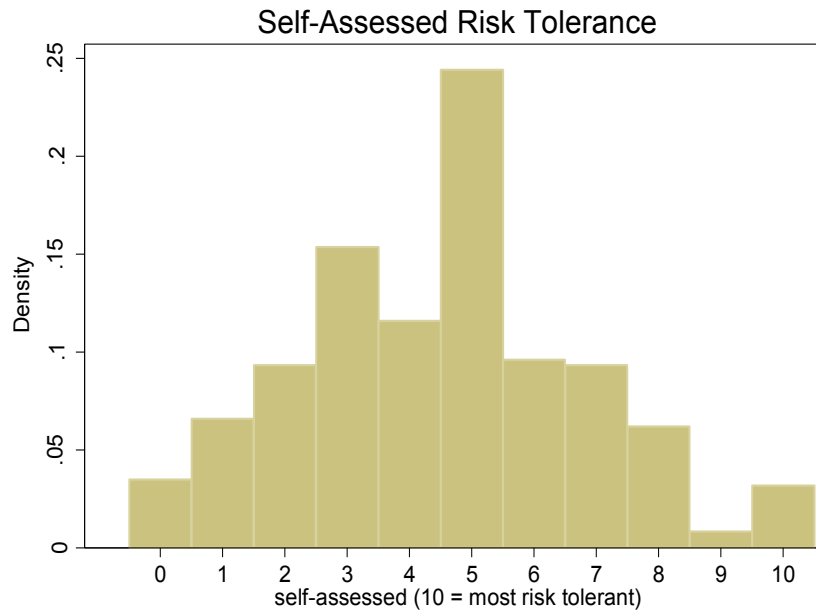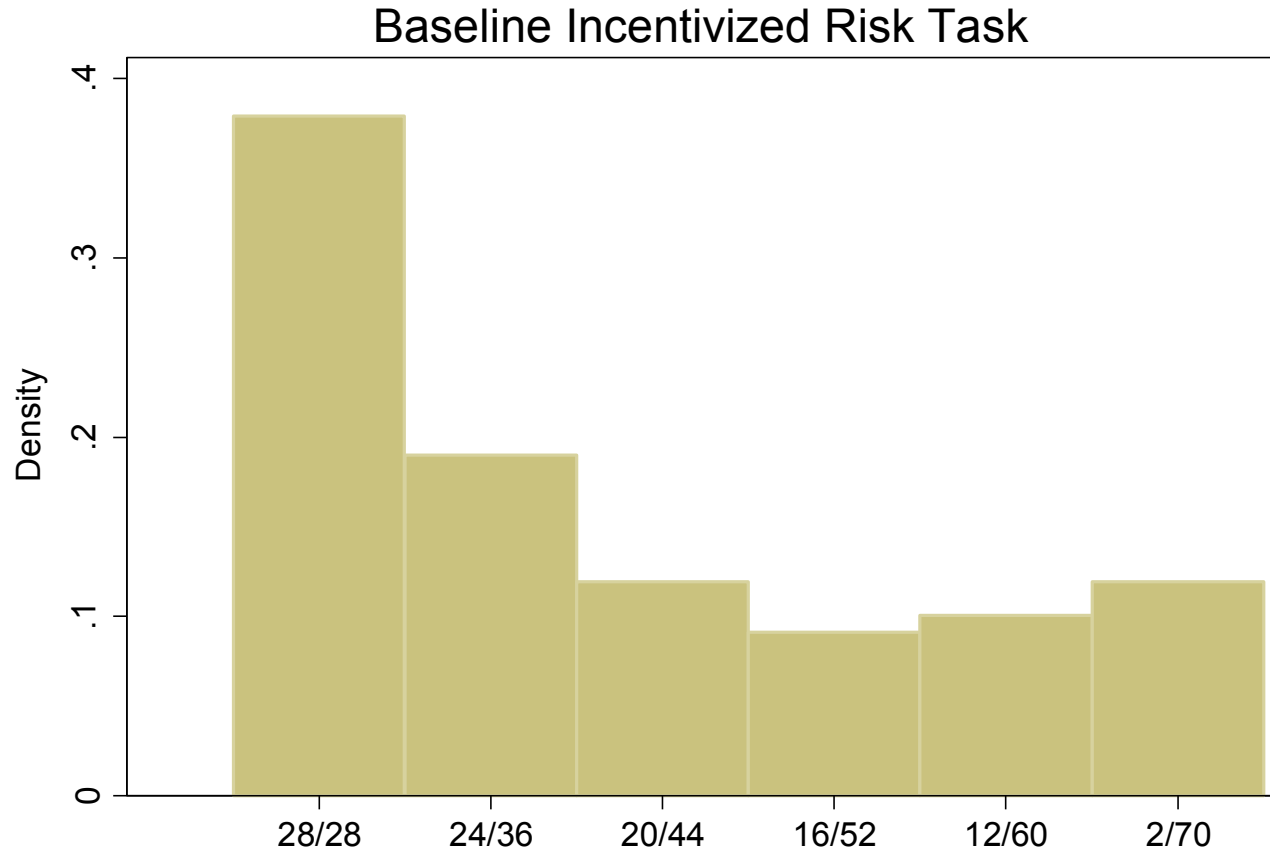time preference task

2) Self-Assessed Risk Tolerance
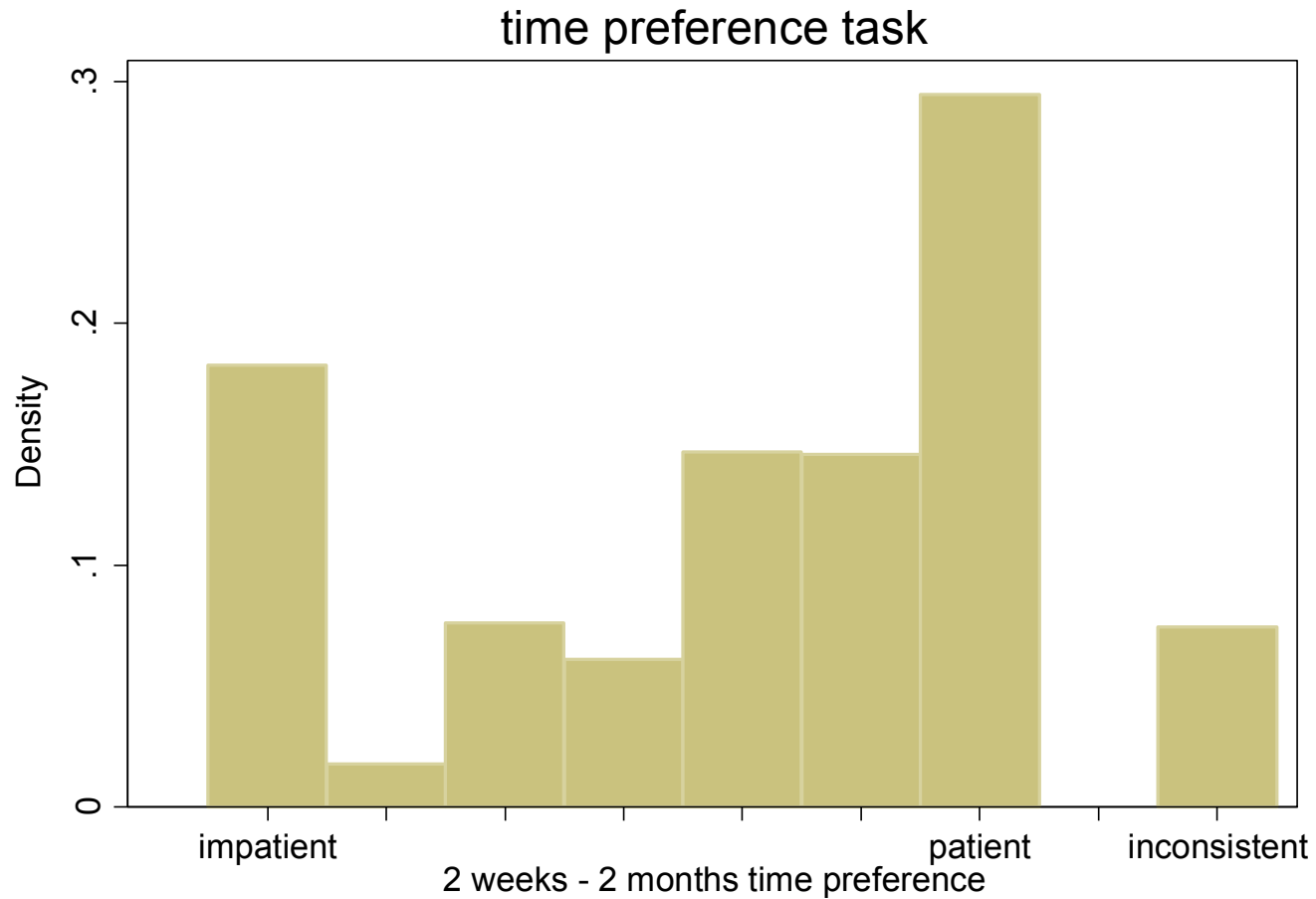
Self-Assessed Risk Tolerance
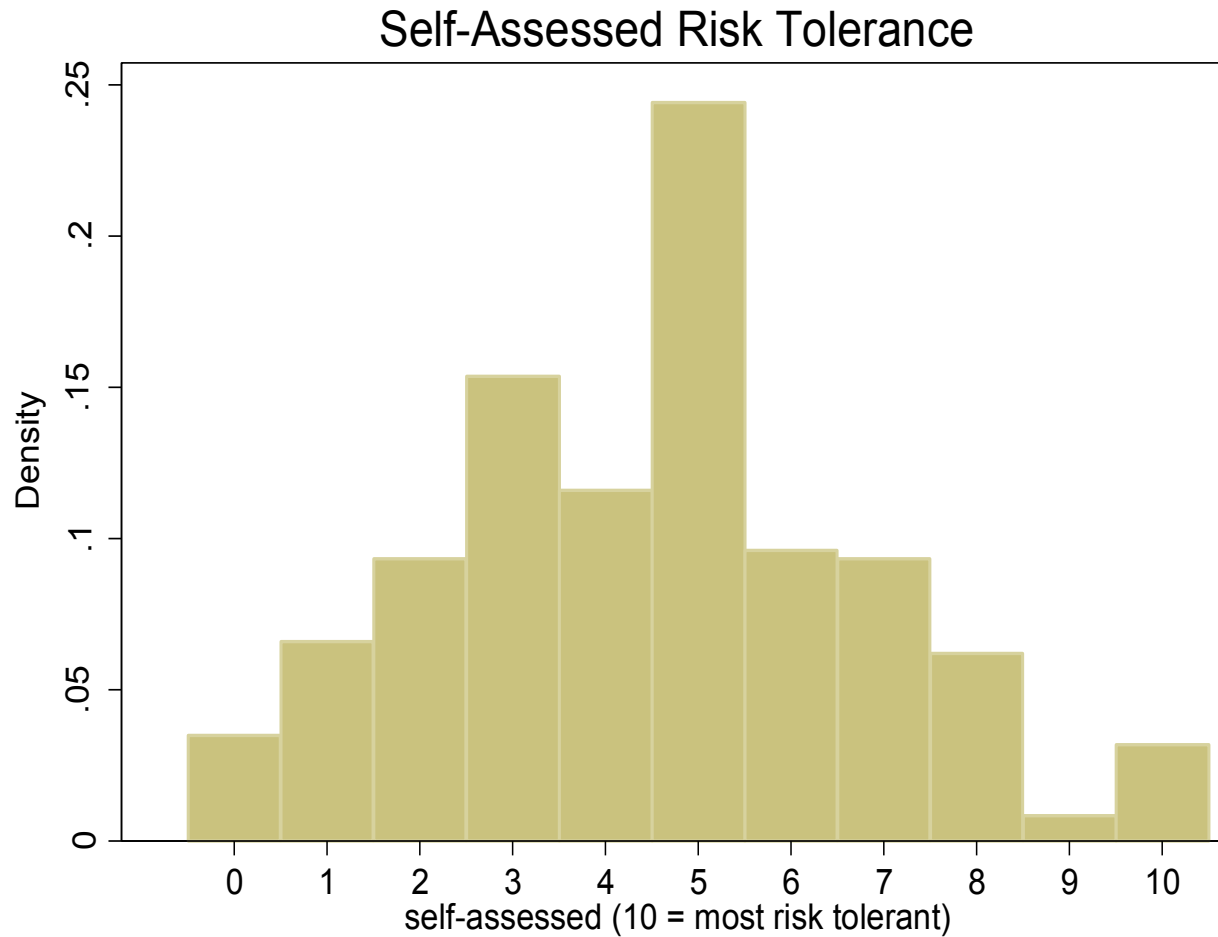
SA Risk, ELSA versus SOEP

ELSA Wave 5, 50-75 years
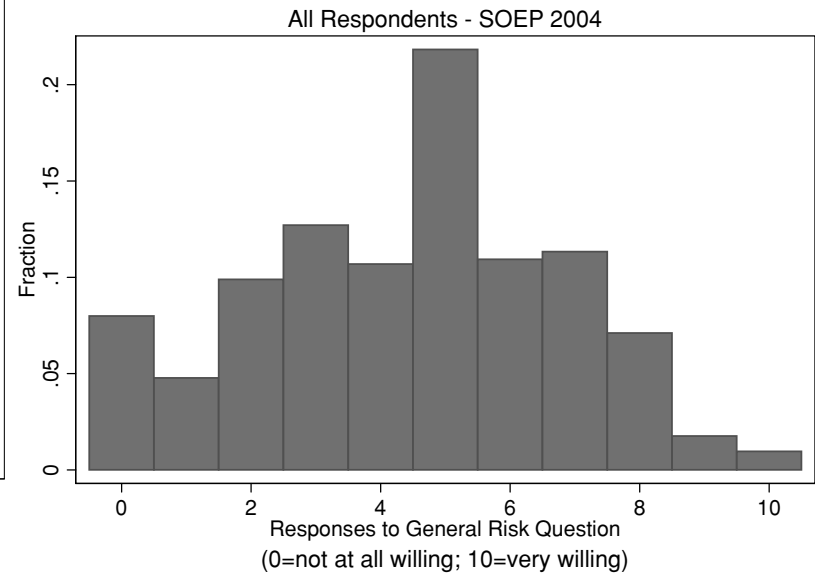
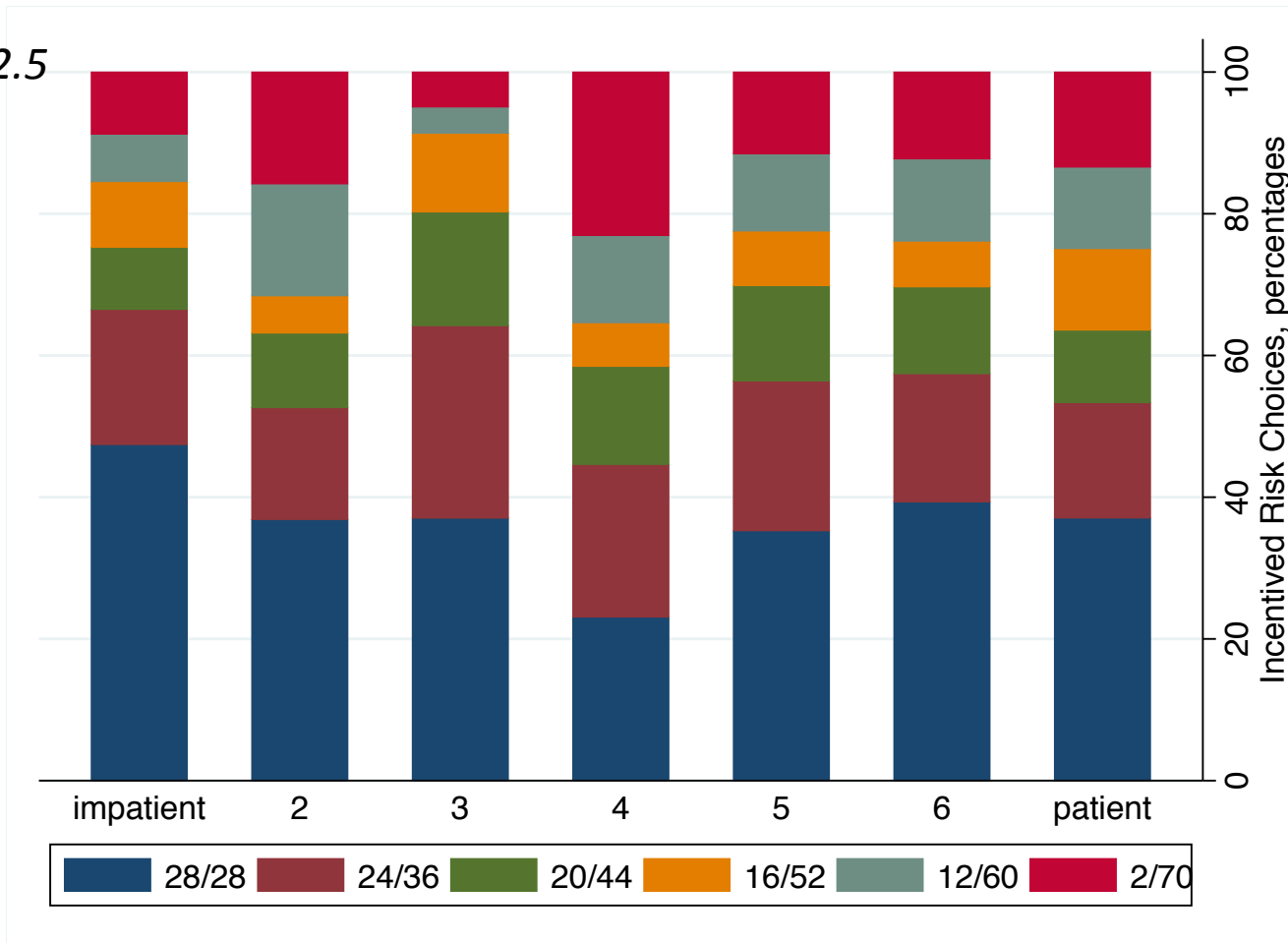Source: Dohmen et al., *JEEA,* 2001

3) Baseline Incentivized Risk Task

Baseline Incentivized Risk Task

Facing Losses, Subjects Make Safer Choices
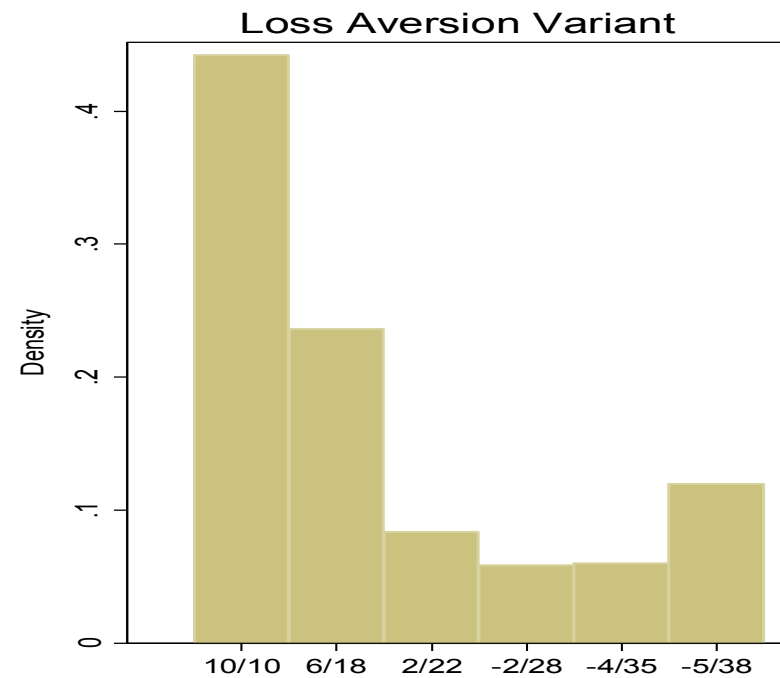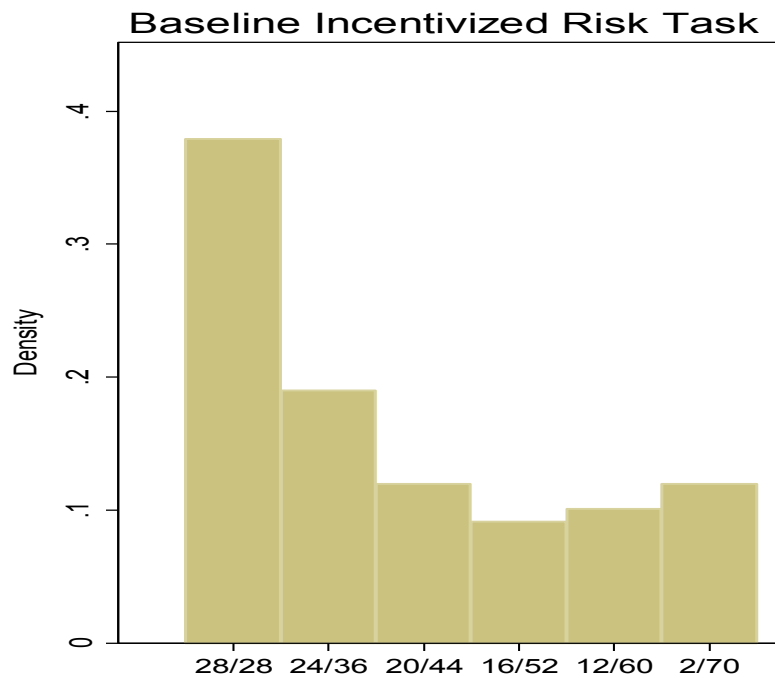
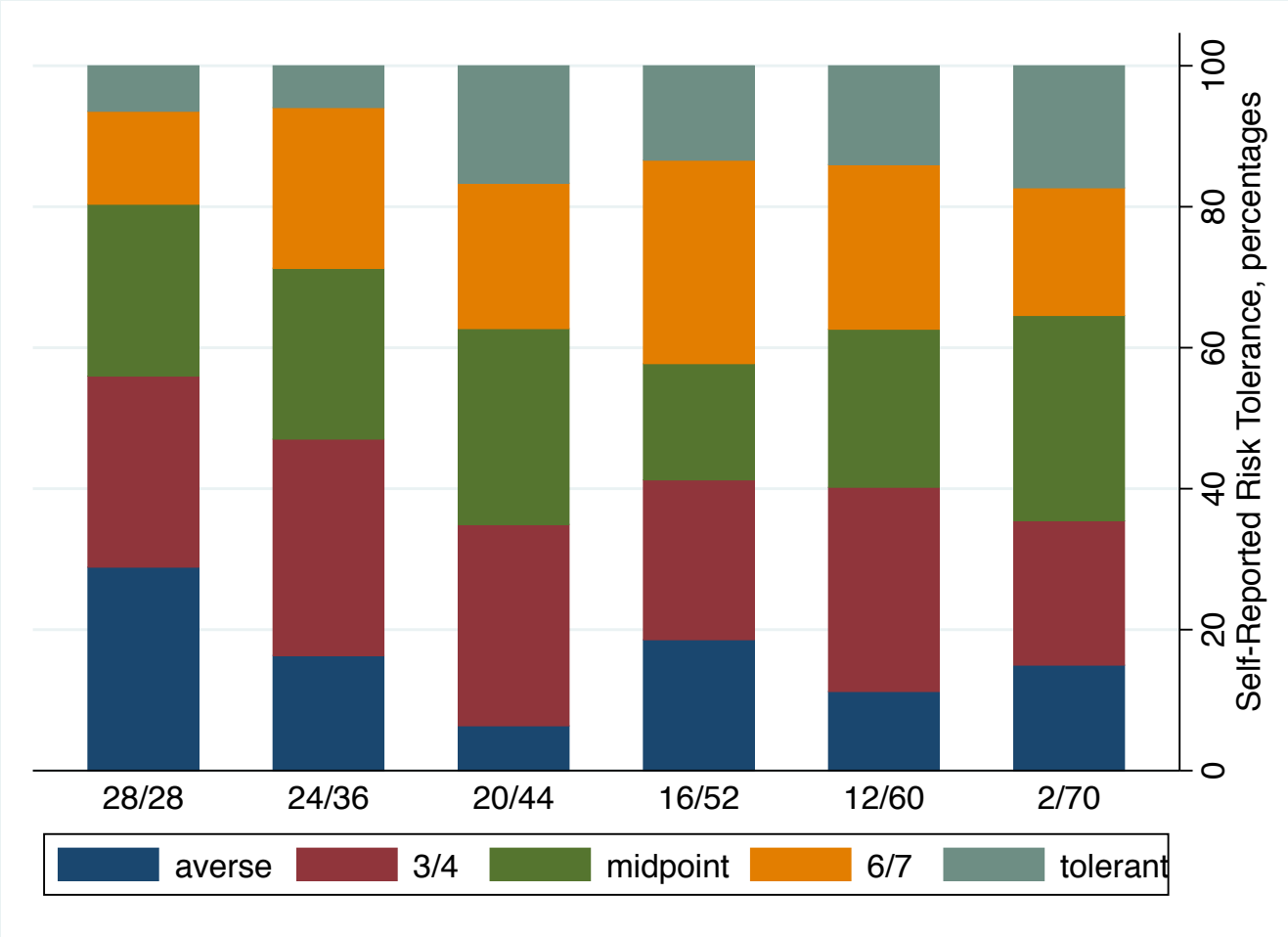# Risk Tolerant are More Patient

Chi2(30)=42.5
P=0.065

Incentived Risk Choices, percentages

Legend: 28/28, 24/36, 20/44, 16/52, 12/60, 2/70

X-axis (Incentivized Time Preference Choices): impatient, 2, 3, 4, 5, 6, patient

Incentivized Time Preference Choices

COMPARING INCENTIVIZED CHOICES WITH SELF-ASSESSMENTS

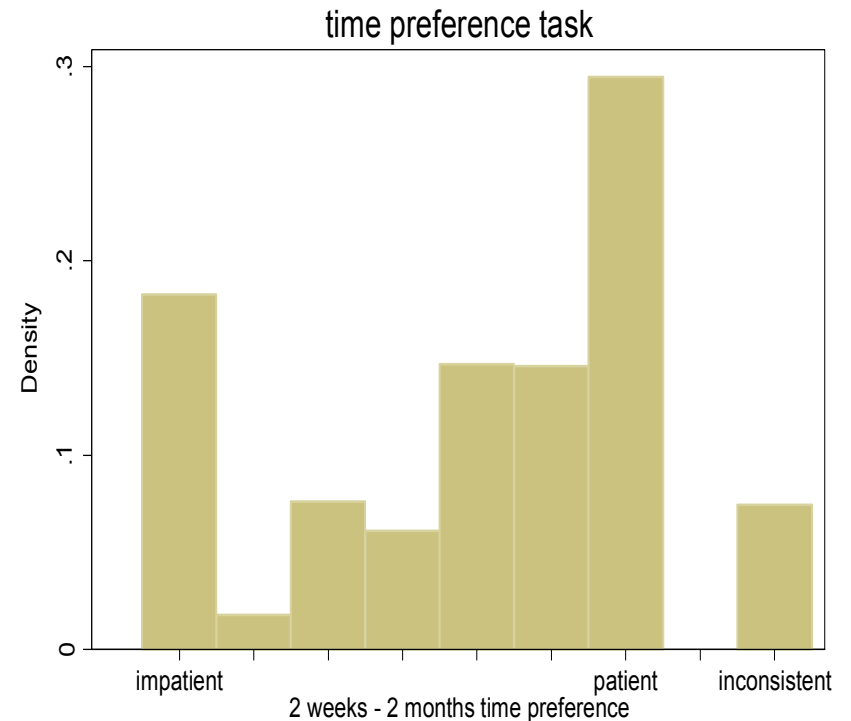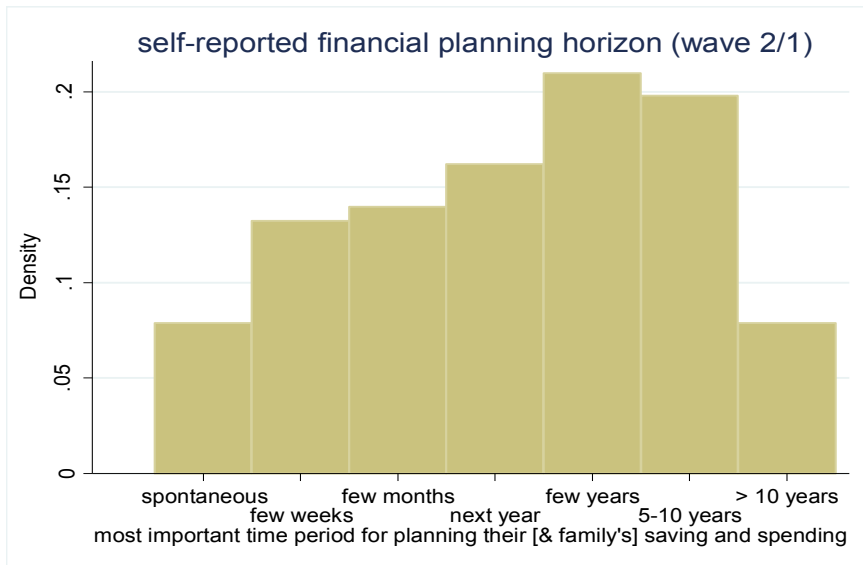# Self-Assessed Risk Measure Predicts Incentivized Choice

Chi2(50)=127
P<0.001
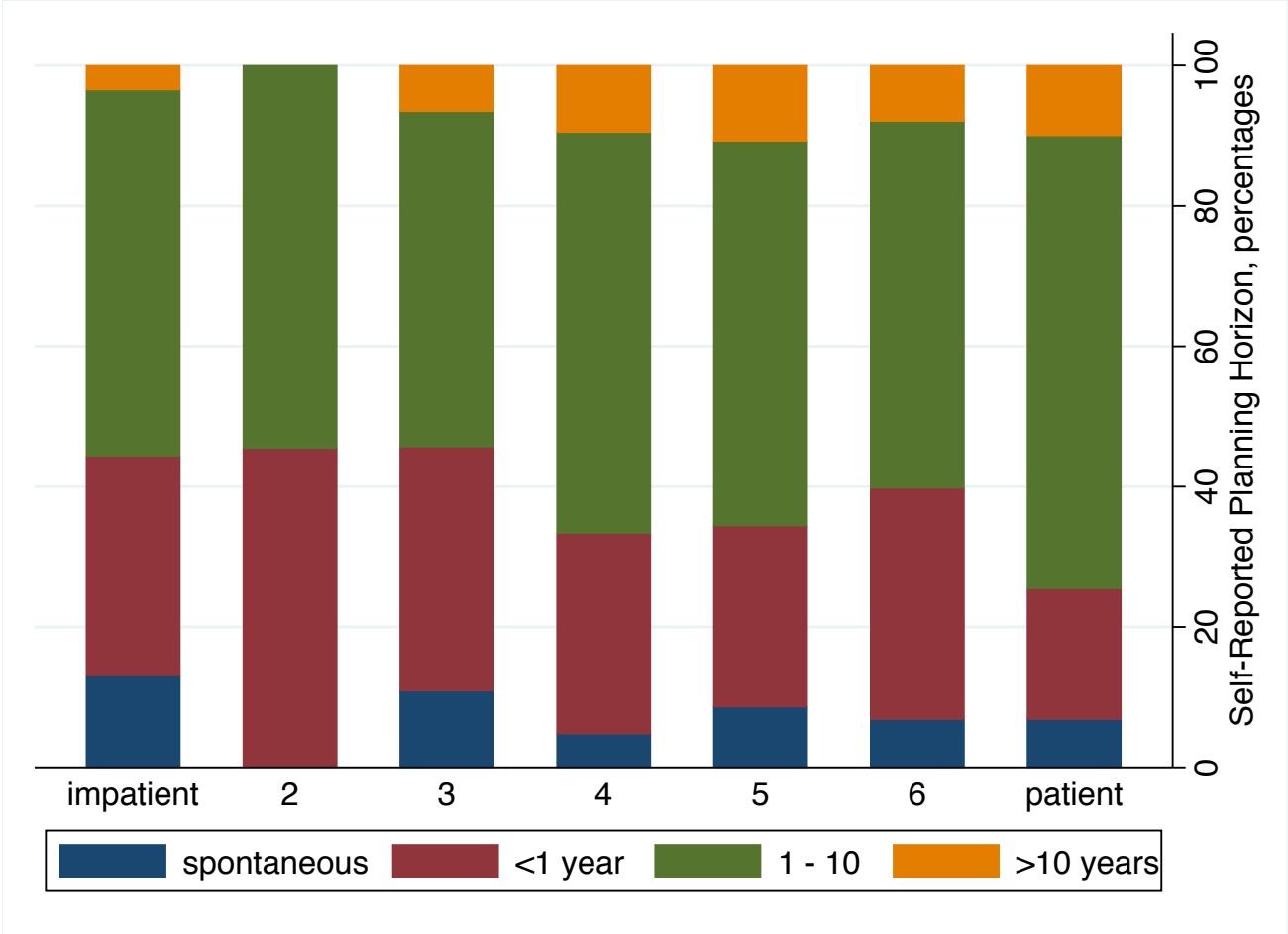
Self-Reported Time Horizon (not from this module)

Self-Reported Time Horizon
(not from this module)

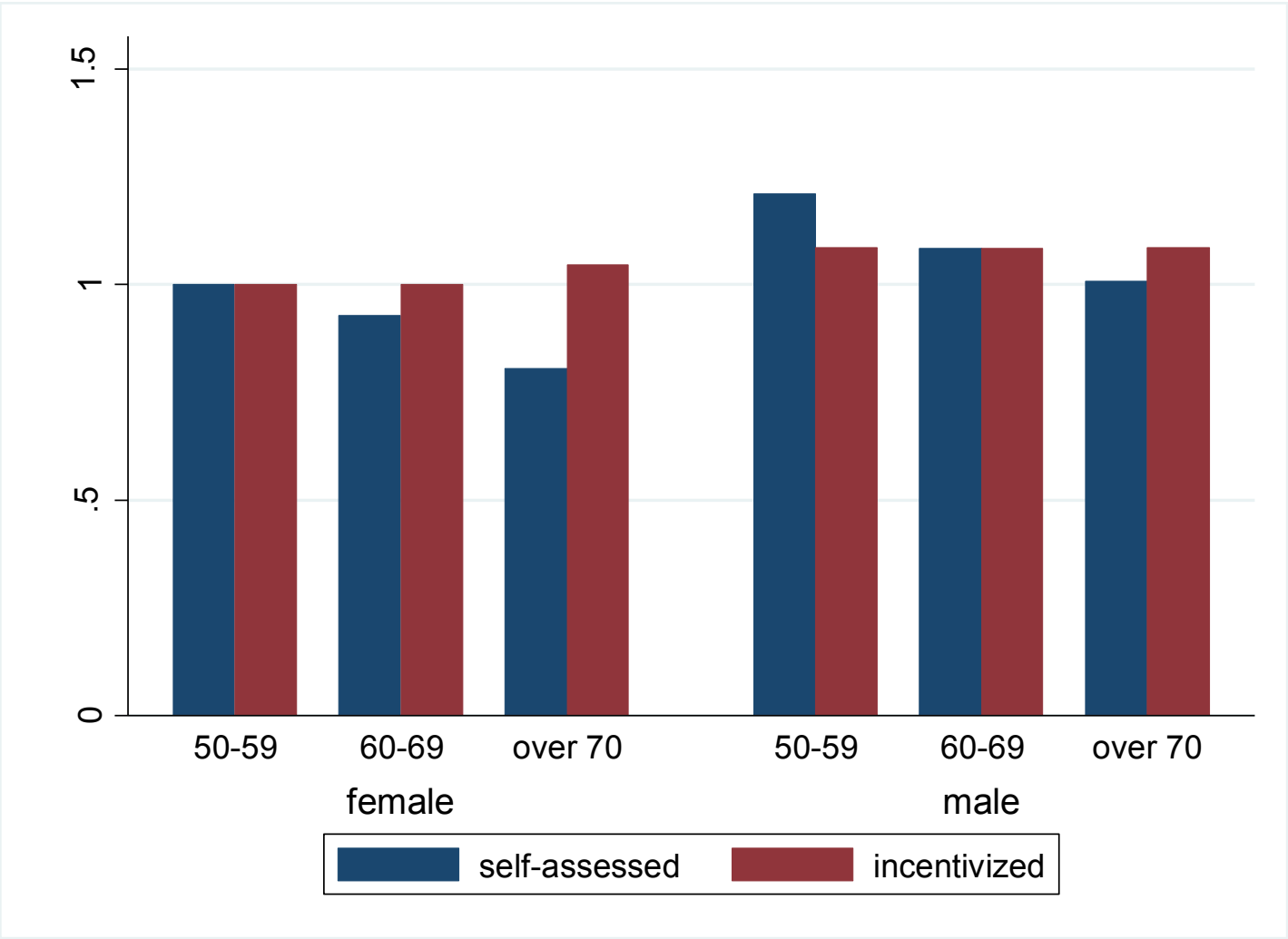self-reported financial planning horizon (wave 2/1)

time preference task

Self-Reported Time Horizon and Incentivized Time Choice Weakly Related
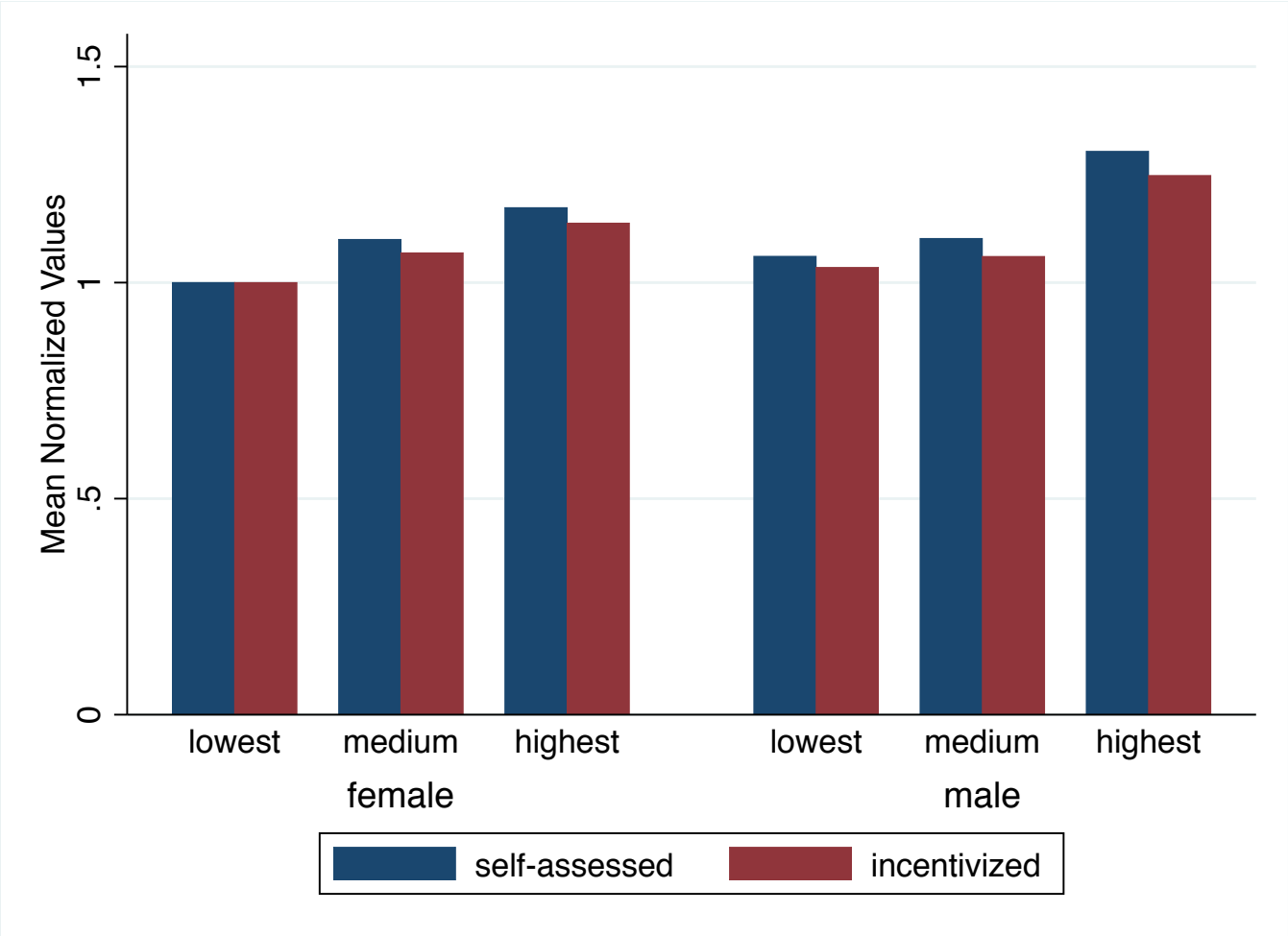
Chi2(36)=47.9
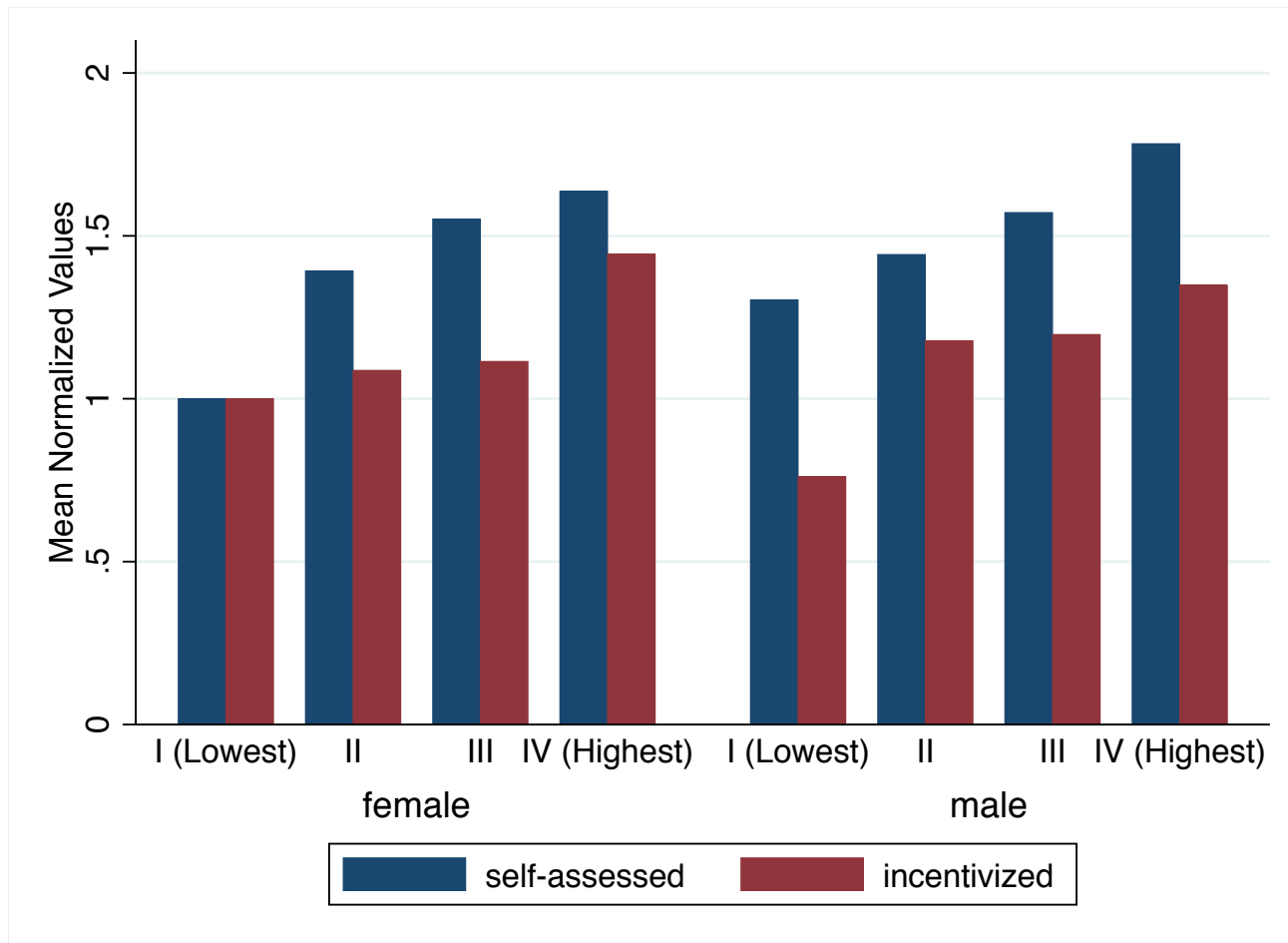*P=0.09*

CORRELATES OF PREFERENCES AND CHOICE CONSISTENCY

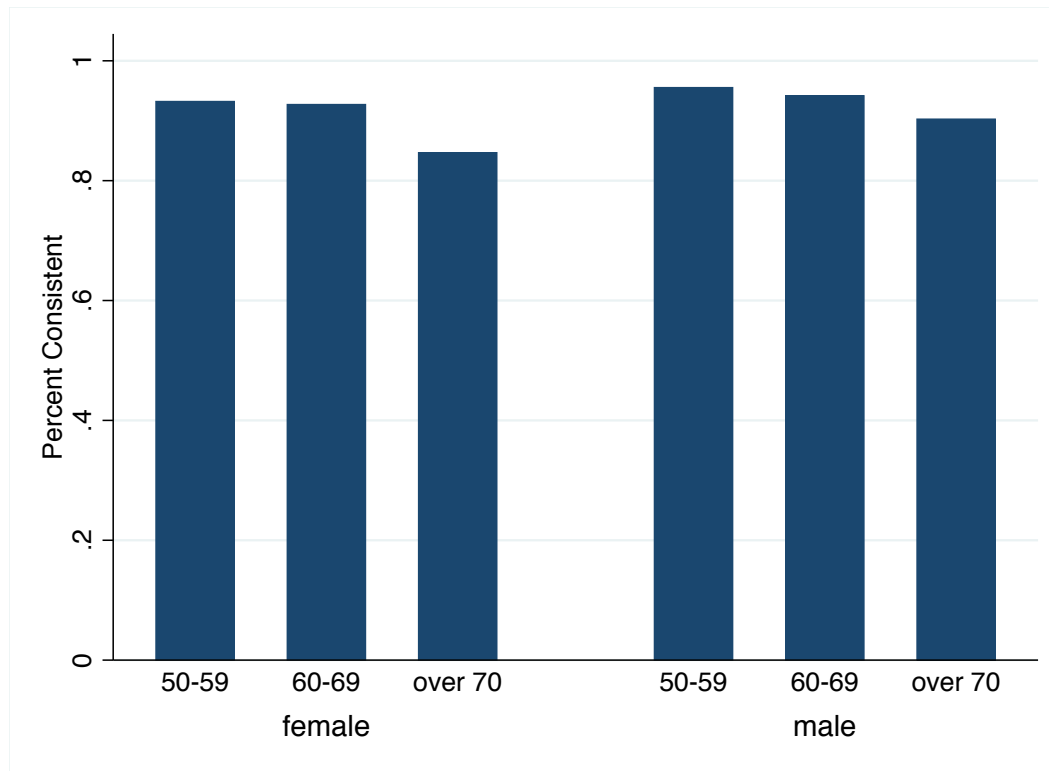# Risk Tolerance by Gender and Age

Patience by Gender and Education

Patience by Gender and Numeracy

Summary of Associations

	Risk Tolerance		Patience	
	Self-Assessed	Incentivized Choice	Self-Assessed	Incentivized Choice
Gender	p < 0.001	p = 0.09		
Age	p = 0.003			
Education	p = 0.026		p < 0.001	p = 0.002
Numeracy	p <0.001		p < 0. 001	p < 0.001

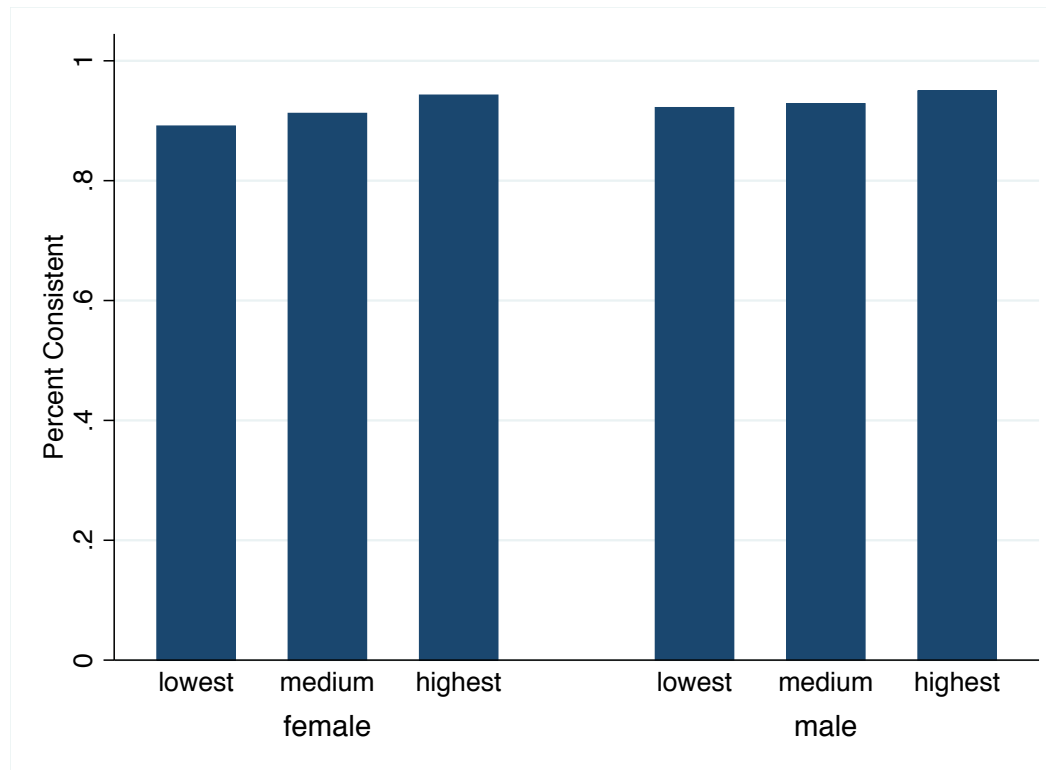# Time Choice Consistency by Age and Gender

chi2(2) = 7.21
p = 0.027

chi2(2) = 2.93
p = 0.23

Time Choice Consistency by Gender and Education
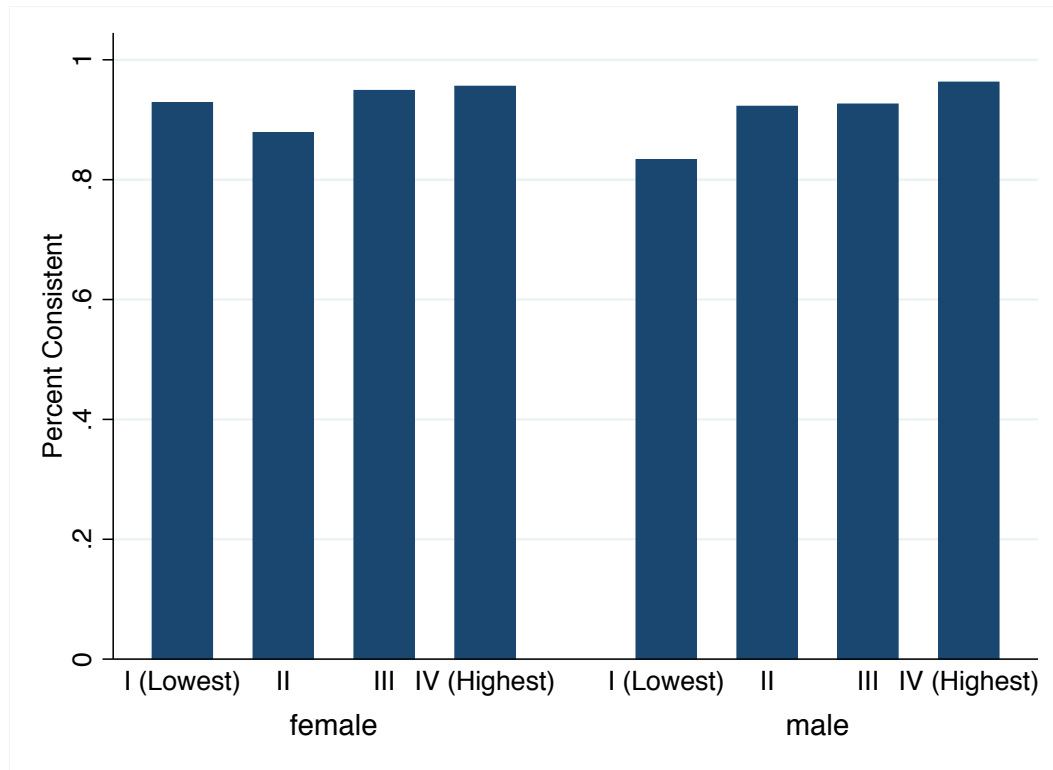

chi2(2) = 3..77
p = 0.152

chi2(2) = 1.35
p = 0.51

chi2(2) = 5.66
p = 0.059

Time Choice Consistency by Gender and Numeracy

chi2(3) =   8.49
p = 0.037

chi2(3) =   5.57
p = 0.135

chi2(3) =   10.5
p = 0.015

DO PREFERENCE MEASURES PREDICT BEHAVIOUR?

Predictors of Current Smoking,
Wave 5 (Probit Models)

	(1)	(2)	(3)
female	-0.000	-0.001	0.001
60-69	-0.040	-0.038	-0.038
over 70	**-0.106****	**-0.102****	**-0.102****
Medium education	-0.022	-0.030	-0.032
High education	**-0.078****	**-0.104*****	**-0.104*****
0 < horizon <1 yr	0.051		
horizon 1-10 yrs	0.027		
horizon > 10 yrs	-0.020		
Risk tolerant		-0.009	
Risk middle		-0.043	
patient		**-0.072***	**-0.074***
Patient middle		-0.031	-0.035
inconsistent		-0.001	-0.005
N	667.000	1054.000	1054.000

Marginal effects; t statistics in parentheses;* $p < 0.05$,** $p < 0.01$,***$p < 0.001$

CONCLUSIONS

Conclusions

- Respondents able and willing to complete the module

- Incentivized choice tasks provide different information from self-assessments

- For economists, incentivized choices are easier to interpret

- The incentivized choices appear to predict real world behavior
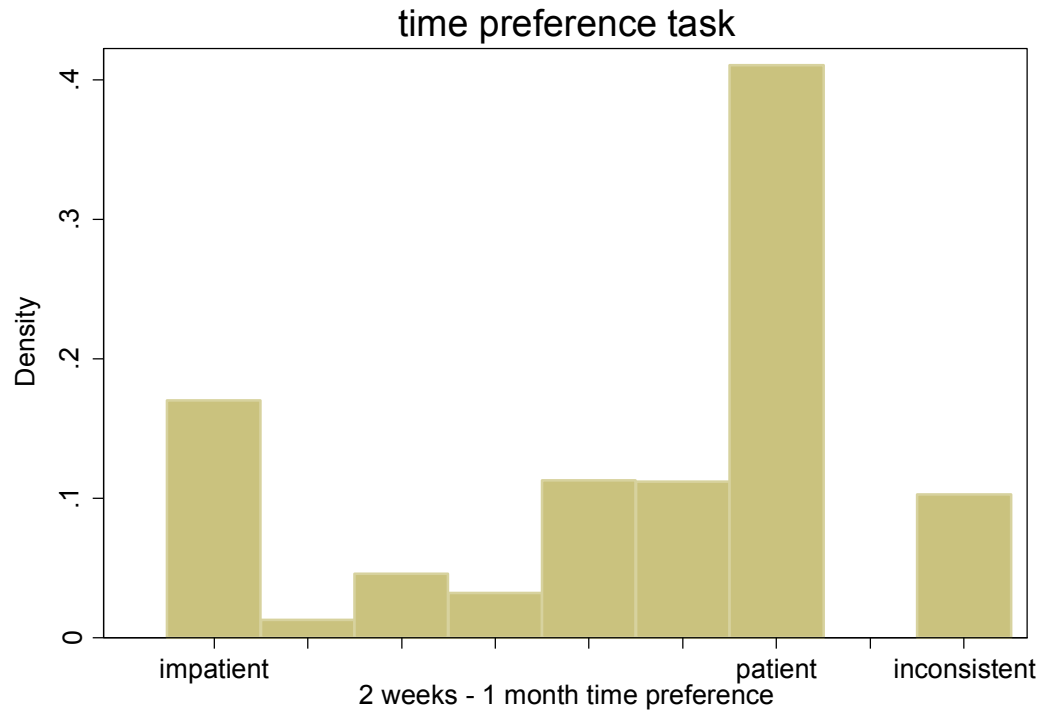
EXTRA SLIDES

Time Preference Task:
Implied Weekly Discount Rates

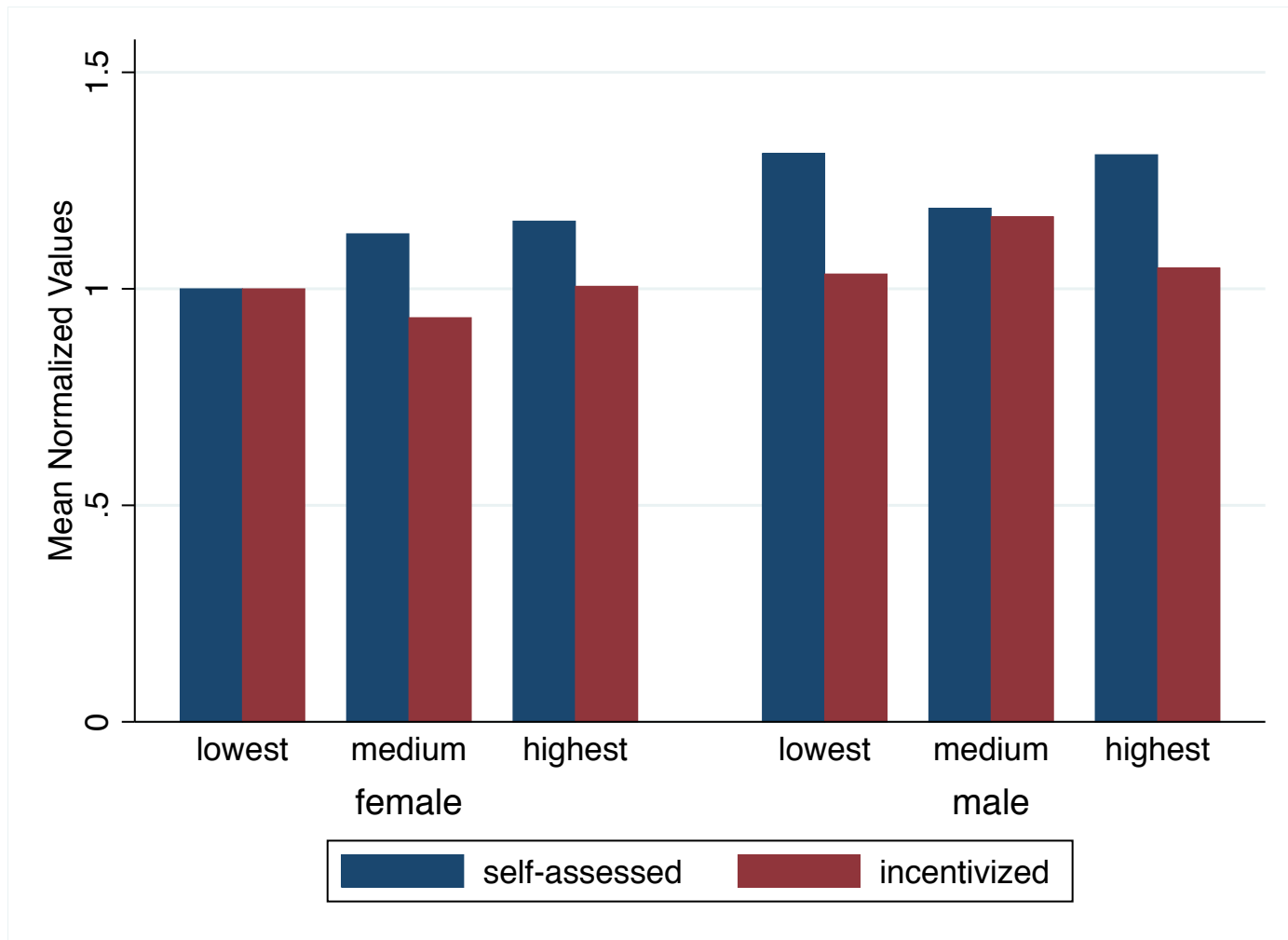| Number of Times Choosing Delay	First List (2 weeks or 1 month)	Second List 2. weeks or 2 months)
0	> 18.8 %	> 9.1 %
1	14.9 – 18.8 %	7.3 – 9.1 %
2	10.7 – 14.9 %	6.0 – 7.3 %
3	7.8 – 10.7 %	5.1 – 6.0 %
4	4.8 – 7.8 %	2.8 – 5.1 %
5	1.6 – 4.8 %	0.6% – 2.8 %
All 6	< 1.6 %	< 0.6 %

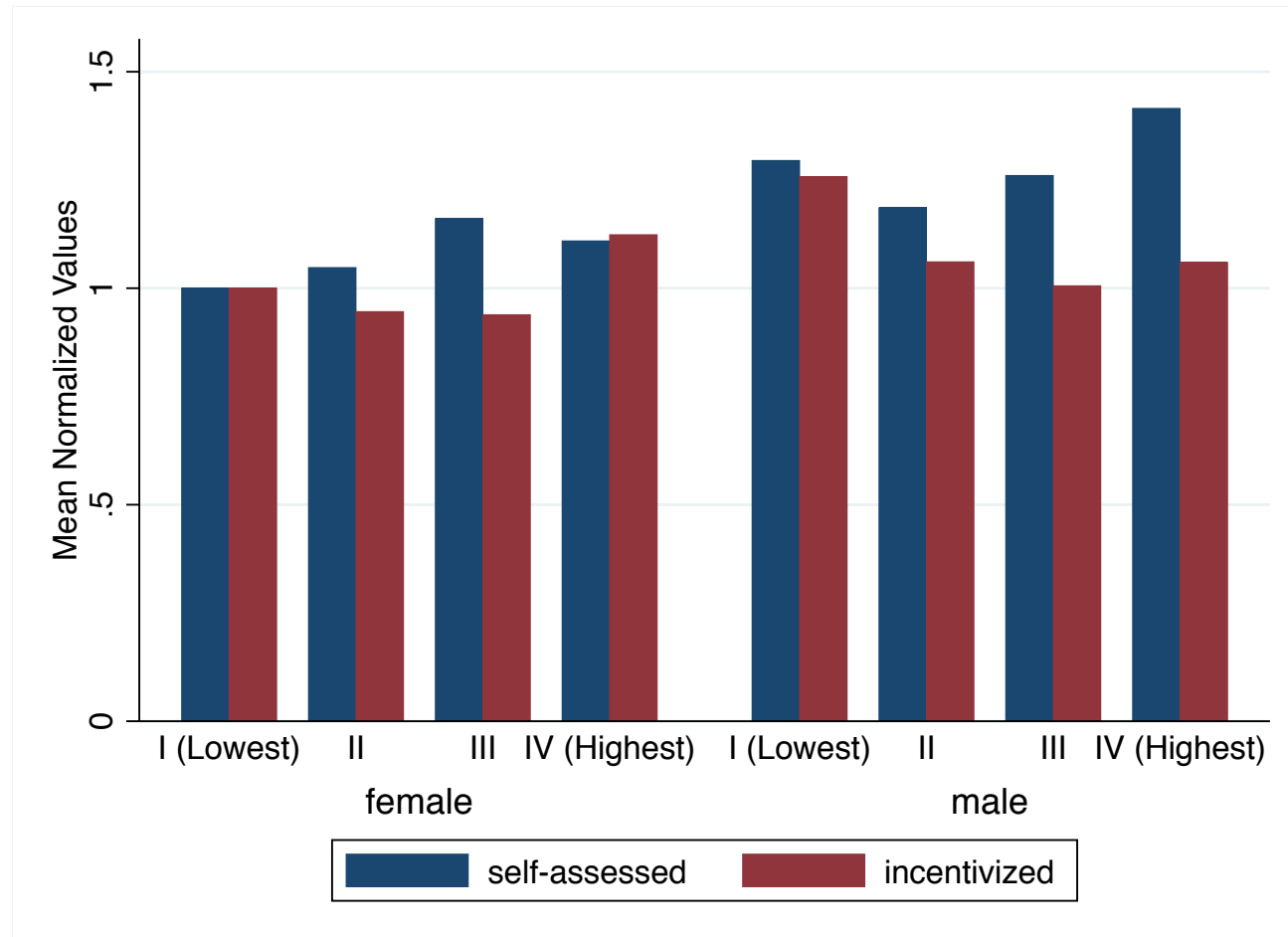# Relationship Between Risk Tasks
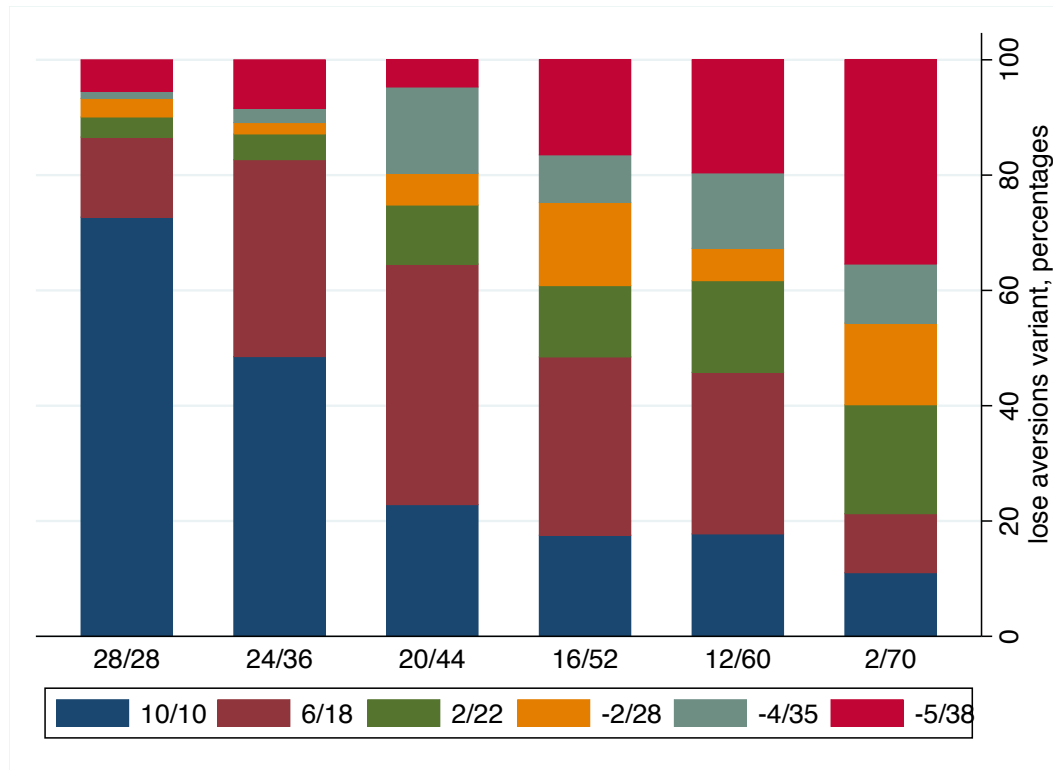
Extra Figure: Alternative Time Preference Measure

Risk Tolerance by Gender and Education

Risk Tolerance by Gender and Numeracy

Patience by Gender and Age