Is patience malleable via educational intervention? Evidence from field experiments

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Motivation (1/2)

- **Patience** (i.e., individual discount factors) is important from both a micro- and a macroeconomic perspective

  - Patience is associated with more savings and better health and education at the micro-level (Sutter et al. 2018, *AER*; Falk et al. 2018, *QJE*)
  - Aggregate patience is positively correlated with country incomes (Hanushek et al. 2022 ,*Econ. J*; Sunde et al. 2022, *ReStud*)
  - Theory and evidence of intergenerational transmission of preferences and resulting socio-economic inequalities (e.g.,Dohmen et al, 2012, ReStud; Doepke and Zilibotti, 2017, *Econometrica*; Falk et al. 2021, JPE)

Motivation (2/2)

- **Neoclassical models** assume preferences to be stable “deep” parameters which are considered invariant to policy interventions (e.g., Stigler and Becker 1977, AER)
- In contrast, recent literature questions the stability of preferences across time and contexts (e.g., Malmendier and Nagel 2011, QJE; Callen et al. 2014, AER; Hanaoka et al. 2018, AEJ: Applied; Mata et al. 2018, JEP; Schildberg-Hörisch 2018, JEP)
- Emerging literature on causal effects of educational interventions on preferences for children and youth
  - Risk preferences (e.g., Sutter et al. 2020)
  - Time preferences (e.g., Alan and Ertac 2018, JPE; Lührmann et al. 2018, AEJ: Applied)
  - Social preferences (e.g., Cappelen et al. 2020, JPE; Kosse et al. 2020, JPE)

Are (time-)preferences generally malleable via educational intervention? If so, are treatment effects limited to early in the life cycle?

This paper

1) We conduct a **meta-analysis of 9 earlier field experiments** studying the causal effects of (financial-) education interventions on impatience measured in incentivized tasks.
   - study the role of student age (and contextual features of the intervention) in explaining the heterogeneity in treatment effects across studies

2) We conduct **an RCT studying the effects of a financial education intervention** on time-preferences of both youth and adults in Uganda using the CTB protocol (Andreoni and Sprenger 2012, AER).
   - Study heterogenous treatment effects by age of respondents

Preview of results

Meta-study:

- On average, the **effect of interventions on patience may be positive but uncertain** (0.08 sigma).
- The age of students and intensity of the interventions appear to explain a large share of between-study heterogeneity in treatment effects.

Field experiment:

- **Heterogenous effects** by age: adults' patience measured in incentivized tasks is unaffected by the intervention after 15 months follow-up, but we observe **large effects on patience and estimated discount factors for** youth in our setting

Study #1: Meta-anaylsis of earlier field experiments

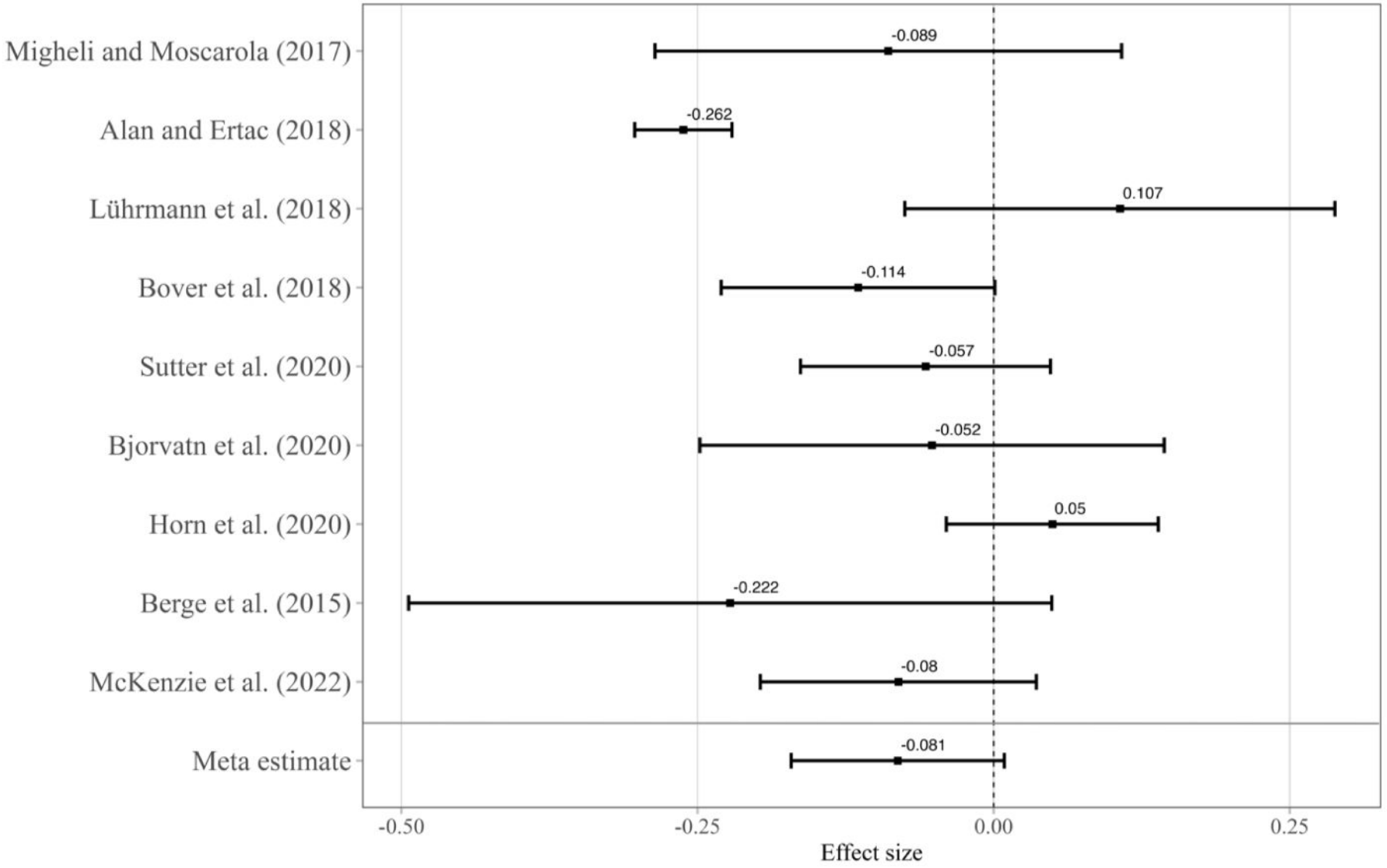
Inclusion criteria

- RCT studying the effect of an educational intervention on a measure of impatience elicitied via incentivized decision experiments

Dataset:

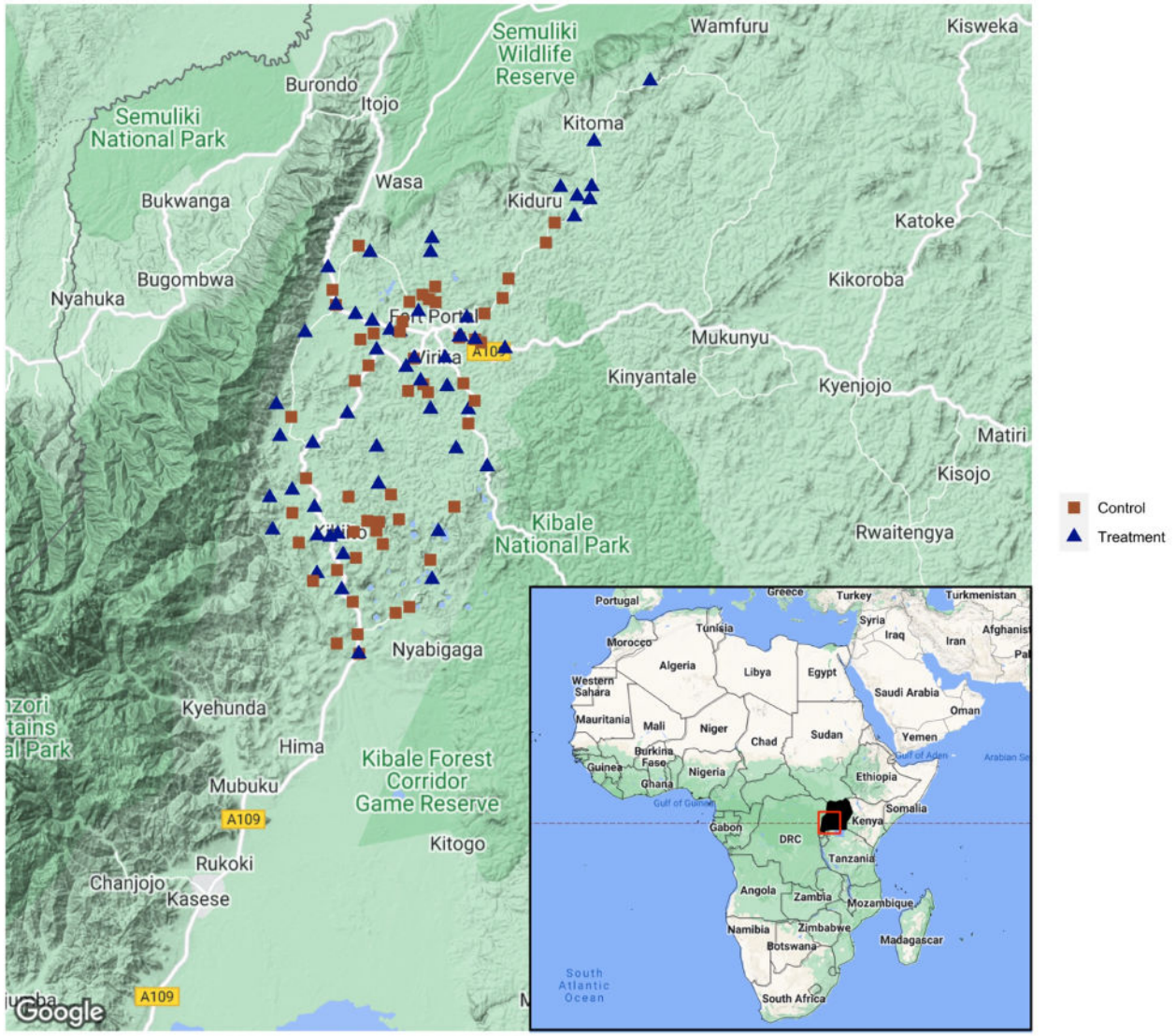
- 9 RCTs and 34 treatment effect estimates
- Intensity ranges from 1 hour to 16 hours
- Within-study average age ranges from 8 to 49
- Countries: Germany, Italy, Philippines, Spain, Tanzania, Turkey, Uganda
- Sample sizes from 165 to 4100
- Delay between treatment and measurement of time preferences from immediately after to about five years after

Study #1: Results (1/2)



Study #2: Field experiment on time-preferences in Uganda

- RCT with 1,217 individuals in 108 villages
- Randomized half of the villages to a full-day financial education intervention with the following topics:
  - (i) budgeting and personal financial management,
  - (ii) saving and future consumption
  - (iii) credit and borrowing decisions
  - (iv) business investing
  - (v) mobile payments
- Measured time-preferences of individuals after 15 months using incentivized tasks



Study #2: Baseline balance

Variable	Control (*N=629*)	Treatment (*N=588*)	Diff. (p-value)
Female	0.622	0.599	0.657
Age	33.781 (11.162)	34.766 (12.49)	0.365
Tertiary education	0.108	0.134	0.406
Household size	4.024 (2.508)	4.146 (2.643)	0.651
Monthly consumption (UGX)	493,871 (341,309)	503,600 (335,361)	0.797
Monthly savings (UGX)	701,549 (1620,014)	709,717 (1487,041)	0.756
Monthly investments (UGX)	1413,484 (2874,804)	1626,736 (3181,338)	0.585
Patience (self-reported)	5.901 (2.637)	5.997 (2.645)	0.47
Financial numeracy	0.898 (0.783)	0.92 (0.806)	0.775

Study #2: Time preference elicitation design (adapted CTB: Carvalho et al. 2016, JDE)

Panel A: Time preference elicitation design

Budget	Sooner endowment (UGX)	Interior choice (split endowments) (UGX)	Later endowment (UGX)	t	$t+k$	$1+r$
1	5,400 | 0	2,700 | 3,000	0 | 6,000	0	1	1.11
2	5,400 | 0	2,700 | 3,000	0 | 6,000	1	2	1.11
3	5,000 | 0	2,500 | 3,000	0 | 6,000	1	2	1.20
4	5,000 | 0	2,500 | 3,000	0 | 6,000	1	6	1.20

- Conducted via phone and using mobile money
- Adding "thank-you payments" in two installments (500 UGX sooner and 500 UGX later) regardless of the experimental choices to equalize transaction costs

- Outcome variables:
  i. Share of the budget allocated to the sooner payment date
  ii. Binary indicator of choosing the early option (at the-choice-level)
  iii. Estimated individual discount factor $\hat{\delta}$ (and present bias $\hat{\beta}$) from a standard beta-delta utility function (Laibson 1997, QJE)

Study #2: External validity of elicited patience measures (1/2)

Panel A: Impatience and field behavior

VARIABLES	(1) ln(Savings)	(2) Tertiary education (1/0)	(3) Self-reported patience	(4) ln(Savings)	(5) Tertiary education (1/0)	(6) Self-reported patience
Allocation to sooner payment (share)	-0.784*	-0.006	-0.212**			
	(0.448)	(0.031)	(0.080)			
Impatient choice (binary)				-0.732**	-0.005	-0.176***
				(0.352)	(0.024)	(0.063)
Constant	10.174***	0.087**	-0.339	10.139***	0.087**	-0.363
	(1.043)	(0.035)	(0.236)	(1.041)	(0.034)	(0.237)
R^2	0.043	0.027	0.037	0.045	0.027	0.038
N (budget choices)	2,516	2,516	2,516	2,516	2,516	2,516
N (individuals)	629	629	629	629	629	629
Clusters (villages)	54	54	54	54	54	54

Study #2: Results (1/2) – Treatment effects on allocation behaviors

	Average treatment effects (full sample)		Heterogeneous treatment effects (≤ 24 years of age)	
Panel A: Treatment effects on allcation behaviors				
	(1) Allocation to sooner payment (share)	(2) Impatient Choice (binary)	(3) Allocation to sooner payment (share)	(4) Impatient Choice (binary)
Treatment	-0.016 (0.024) [0.329]	-0.023 (0.032) [0.329]	-0.146*** (0.045) [0.017]	-0.172*** (0.058) [0.017]
R^2	0.042	0.039	0.102	0.104
N (budget choices)	4,868	4,868	836	836
N (individuals)	1,217	1,217	209	209
Clusters (villages)	108	108	81	81

Study #2: Results (2/2) - Treatment effects on utility parameters (Andersen 2008)

Panel B: Treatment effects on individual utility parameters

	Discount factor $\widehat{\delta}_i$	Present bias $\widehat{\beta}_i$	Discount factor $\widehat{\delta}_i$	Present bias $\widehat{\beta}_i$
Treatment	0.016	-0.007	0.077***	-0.022
	(0.014)	(0.004)	(0.028)	(0.021)
	[0.313]	[0.175]	[0.017]	[0.313]
Constant	1.090***	1.000***	0.987***	1.014***
	(0.058)	(0.003)	(0.060)	(0.017)
R^2	0.013	0.020	0.091	0.109
N (individuals)	1,055	1,055	186	186
Clusters (villages)	108	108	78	78

Conclusion

- (Financial-) education interventions appear to be successful in fostering non-cognitive outcomes (i.e., time-preferences of children, youth and young adults)
  - We find causal effects on measures of impatience and estimated discount factors
  - In contrast to Lührmann et al. 2018: No effect on dynamic time-inconisency (i.e., present bias) in our study
  - No effect on choice consistency
- This could be an important mechanism explaining part of the treatment effects of financial education on saving behavior documented in previous literature (Lusardi and Mitchell 2014, JEL; Kaiser et al. 2022, JFE)
- Future work should look at long-term treatment effects and extend analyses to other preferences (i.e., risk preferences)

Thank you

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Additional slides

Meta-study

Table 1: Meta-regression analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Age		0.034**				0.034**
		(0.014)				(0.009)
Age × Age		-0.001*				-0.0005**
		(0.0002)				(0.0001)
Intensity			-0.009			-0.013*
			(0.008)			(0.055)
Delay				0.0004		
				(0.0008)		
Developing country					-0.031	
					(0.083)	
$\widehat{\theta}$	-0.081	-0.480**	-0.105**	-0.099	-0.067	-0.511***
	(0.039)	(0.149)	(0.043)	(0.056)	(0.059)	(0.085)
$\hat{\tau}^2$	0.01200	0.0003	0.0083	0.01231	0.0101	0.000
$\tau^2 = 0$ (p-value)	<0.001	0.018	<0.001	<0.001	<0.001	0.183
I^2	80.84%	25.57%	71.12%	79.88%	74.72%	0.00%
n (studies)	9	9	9	9	9	9

Notes: This table shows results from meta-regression analyses relying on the random-effects model defined in Eq. 2. *** p<0.01, ** p<0.05, * p<0.1.

Robustness Meta-Study (1/6)

Table D1: Leave-one-out meta-analysis

Omitted study	Meta-estimate ($\widehat{\theta}$)	CI 95% lower	CI 95% upper	p-value
Migheli and Moscarola 2017	-0.081	-0.171	0.009	0.079
Alan and Ertac 2018	-0.043	-0.103	0.018	0.168
Lührmann et al. 2018	-0.102	-0.184	-0.019	0.016
Bover et al. 2018	-0.077	-0.17	0.017	0.107
Sutter et al. 2018	-0.085	-0.179	0.009	0.075
Bjorvatn et al. 2020	-0.084	-0.174	0.005	0.066
Horn et al. 2020	-0.105	-0.189	-0.021	0.014
Berge et a. 2015	-0.073	-0.159	0.013	0.098
McKenzie et al. 2022	-0.081	-0.175	0.012	0.088

Notes: This table shows estimates of the model defined in Section 2.2 of the main text when removing studies from the sample on a case-by-case basis.

Robustness Meta-Study (2/6)

Table D2: Sensitivity of $\widehat{\theta}$ to the choice of τ^2

	(1) $\tau^2 = 0$	(2) $\tau^2 = 0.001$	(3) $\tau^2 = 0.01$	(4) $\tau^2 = 0.1$
$\widehat{\theta}$	-0.165***	-0.116***	-0.082**	-0.080
	(0.016)	(0.023)	(0.041)	(0.109)
I^2	0.00%	24.78%	76.71%	97.05%
n (studies)	9	9	9	9

Notes: This table shows estimates of the model defined in Section 2.2 of the main text when manually setting τ^2 to the respective values and then estimating the model via weighted least squares.

Robustness Meta-Study (3/6)

Table D3: Sensitivity of $\hat{\tau}^2$ and $\hat{\theta}$ to the choice of estimation algorithm

	(1) ML	(2) REML	(3) Empirical bayes	(4) DerSimonian–Laird	(5) Hunter-Schmidt	(6) Sidik-Jonkman	(7) RVE
$\hat{\theta}$	-0.083**	-0.082*	-0.083**	-0.080*	-0.081*	-0.083*	-0.063
	(0.040)	(0.042)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
$\hat{\tau}^2$	0.0093	0.0107	0.0088	0.020	0.0128	0.0095	0.006
I^2	75.42%	77.88%	74.48%	86.99%	80.84	75.82%	-
n (estimates)	9	9	9	9	9	9	34
n (studies)	9	9	9	9	9	9	9

Notes: Column 1 presents results from "random-effects" meta-analysis using (unrestricted) maximum likelihood for estimation whereas column (2) repeats the result restricted maximum likelihood estimator. Column (3) uses Empirical base as the estimator and columns (4) to (6) present results relying on three alternative non-iterative estimators to estimate τ^2.

Robustness Meta-Study (4/6)

Table D4: Using multiple estimates per study

	(1) RVE ($\tau^2=\hat{\tau}^2$)	(2) RVE ($\tau^2=\hat{\tau}^2$)	(3) RVE ($\tau^2=0$)	(4) RVE ($\tau^2=0$)	(5) WLS ($\tau^2=0$)	(6) WLS ($\tau^2=0$)
Age		0.0371*		0.0377*		0.034***
		(0.0125)		(0.0123)		(0.007)
Age × Age		-0.0005*		-0.0006*		-0.0005***
		(0.0002)		(0.0002)		(0.0001)
Intensity		-0.0165		-0.0160		-0.0126**
		(0.0068)		(0.0066)		(0.0038)
$\widehat{\theta}$	-0.063	-0.5563*	-0.059	-0.5602*	-0.165**	-0.5110
	(0.039)	(0.1527)	(0.040)	(0.1477)	(0.066)	(0.0619)
$\hat{\tau}^2$	0.0060	0.0013	-	-	-	-
n (estimates)	34	34	34	34	34	34
n (studies)	9	9	9	9	9	9

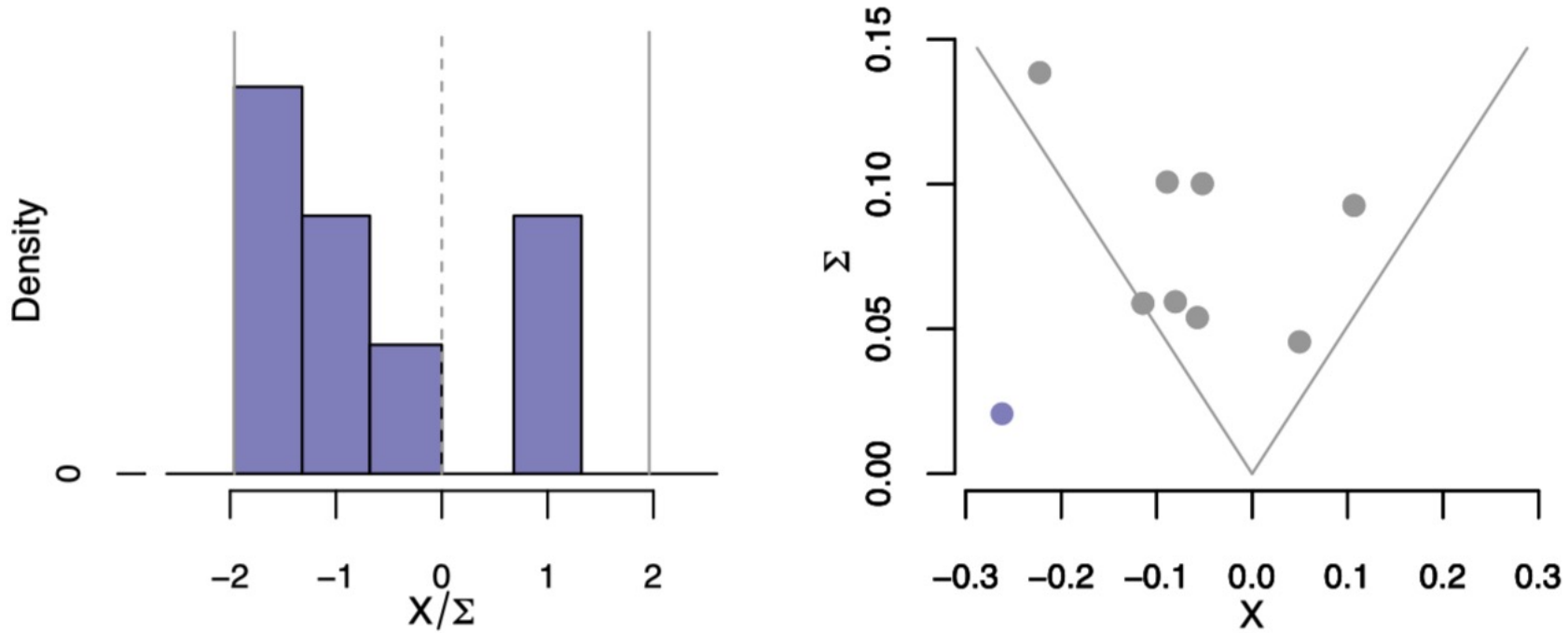
Robustness Meta-Study (5/6)

Table D5: RVE with different assumptions

	(1) RVE ($\tau^2=\hat{\tau}^2$ and $\rho=0.8$)	(2) RVE ($\tau^2=0$ and $\rho=0.8$)	(3) RVE ($\tau^2=\hat{\tau}^2$ and $\rho=0$)	(4) RVE ($\tau^2=0$ and $\rho=0$)
$\widehat{\theta}$	-0.0626	-0.0586	-0.0625	-0.1646
	(0.0385)	(0.0400)	(0.0384)	(0.0934)
$\hat{\tau}^2$	0.0060	-	0.0058	-
n (estimates)	34	34	34	34
n (studies)	9	9	9	9

Robustness Meta-Study (6/6)

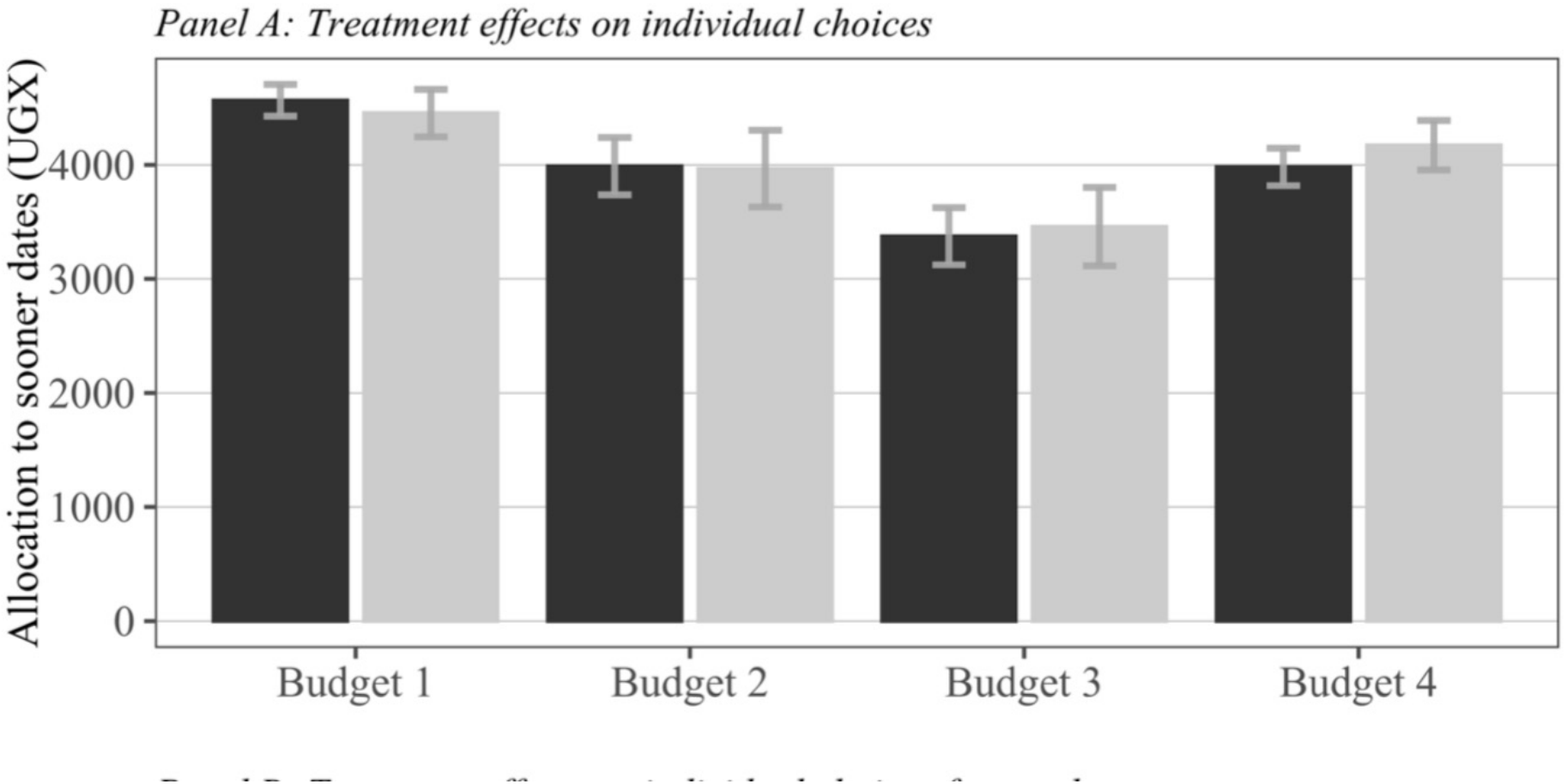
Figure D1: Funnel plot of treatment effects and histogram of z-statistics



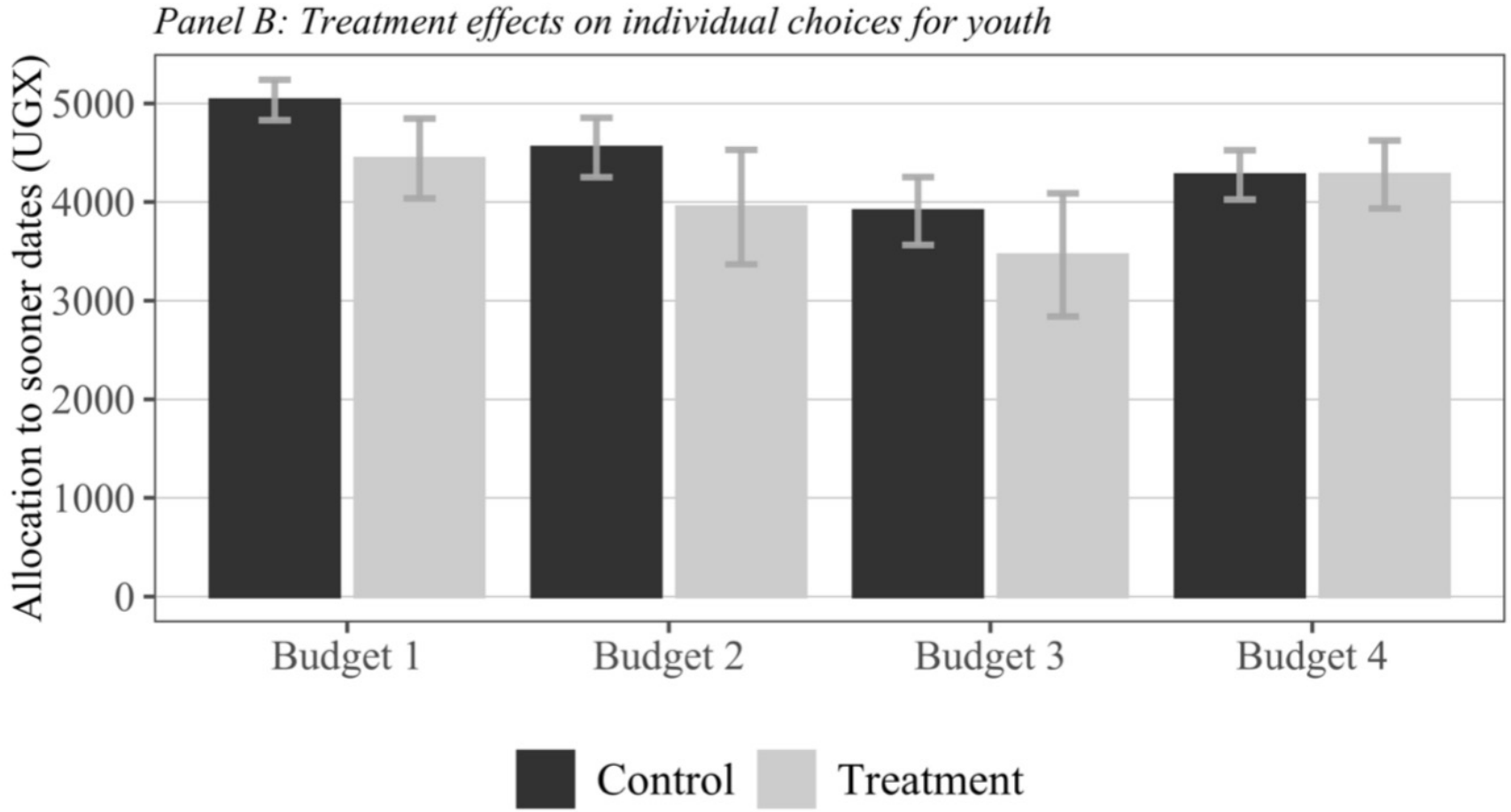
Notes: The left panel shows a binned density plot for the z-statistics (Z= X/ Σ). The solid grey lines indicate the critical values at $|Z| = 1.96$ while the dash-dotted gray line marks $Z = 0$. The right panel plots the extracted estimate (X) against its standard error (Σ). The gray lines mark $|Z| = 1.96$.

Field experiment

Additional result: Field experiment



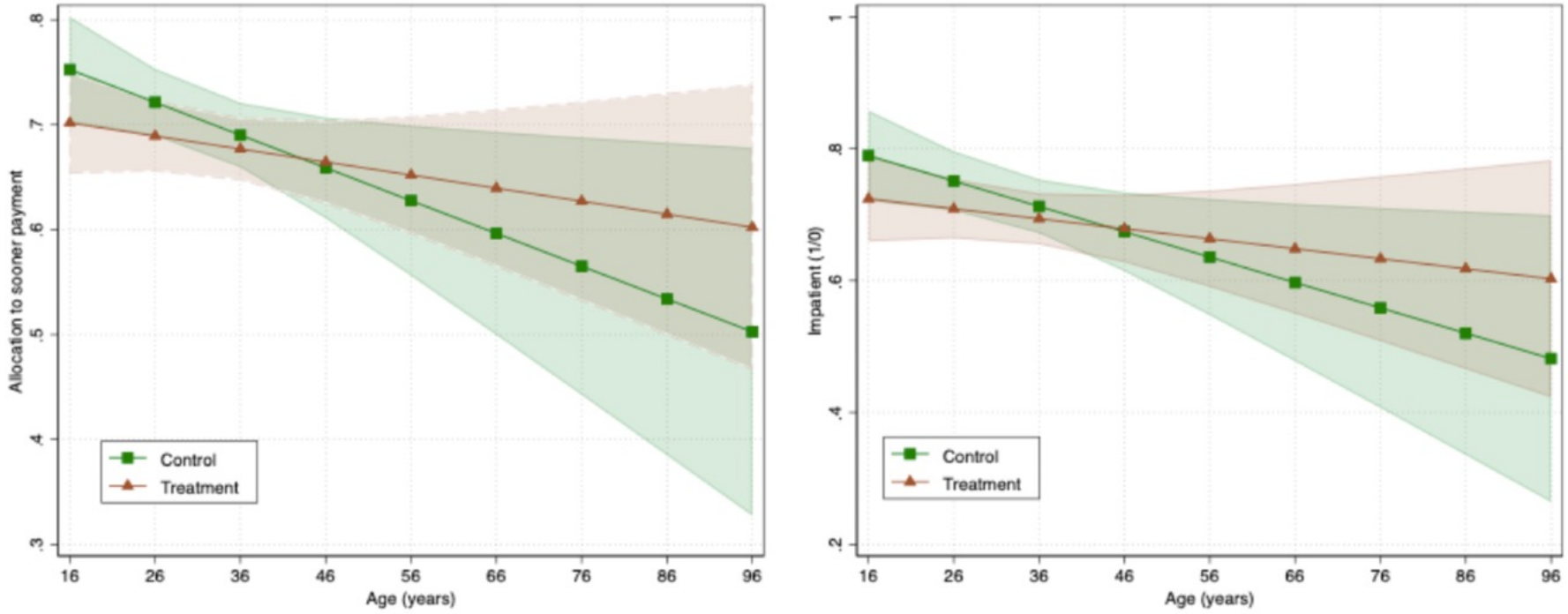
Additional result: Field experiment



Note: This figure shows the average allocation to sooner payment dates across all four CTB budgets with 95%-Cis by the treatment and control group for the full sample (Panel A) and for respondents with age equal to 24 years or below (Panel B).

Additional result: Field experiment

Figure E2: Treatment effects on impatience depending on age



Notes: This figure shows linear effects of age and treatment and their interaction with 95% Cis. Dependent variables are the proportion of allocations to sooner payment dates and a dummy for whether the sooner payment is chosen.

Additional result: Field experiment

	Allocation to sooner payments		Impatience		Present bias $\hat{\beta}$		Discount factor $\hat{\delta}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	age ≤24	age >24	age ≤24	age >24	age ≤24	age >24	age ≤24	age >24
Treatment	-0.146***	0.013	-0.172***	0.009	-0.022	-0.005	0.077***	0.004
	(0.045)	(0.027)	(0.058)	(0.035)	(0.021)	(0.005)	(0.028)	(0.015)
Today	0.068***	0.104***	0.089***	0.133***				
	(0.018)	(0.016)	(0.025)	(0.020)				
Delay=5 months	0.064**	0.119***	0.063*	0.143***				
	(0.029)	(0.013)	(0.035)	(0.017)				
(1+r) = 1.2	-0.052***	-0.057***	-0.054***	-0.064***				
	(0.016)	(0.008)	(0.020)	(0.011)				
Treatment * Today	0.006	-0.020	-0.007	-0.015				
	(0.027)	(0.019)	(0.038)	(0.025)				
Treatment * Delay=6 months	0.089*	0.006	0.092	0.020				
	(0.047)	(0.020)	(0.058)	(0.028)				
Treatment * (1+r) = 1.2	0.029	0.012	0.033	0.011				
	(0.021)	(0.011)	(0.025)	(0.014)				
Constant	0.722***	0.640***	0.723***	0.650***	1.014***	0.999***	0.987***	1.101***
	(0.128)	(0.037)	(0.168)	(0.050)	(0.0s17)	(0.005)	(0.060)	(0.069)
Observations	836	4,032	836	4,032	186	869	186	869
R-squared	0.102	0.048	0.104	0.045	0.109	0.026	0.091	0.023
District FEs	YES	YES	YES	YES	YES	YES	YES	YES
Clusters	81	107	81	107	78	106	78	106

Notes: Heterogeneous treatment effects by age on the proportion of allocations to sooner payments, a dummy whether the respondent chose the sooner payment option, as well as estimated individual preference parameters $\hat{\beta}$ and $\hat{\delta}$. Regression estimates in columns (3) and (4) are based on a linear probability model. Standard errors are clustered at the individual and district level. *** p<0.01, ** p<0.05, * p<0.1.

Additional result: Field experiment

Table B3: Response rates

	N (Control)	N (Treatment)	N (All)
Full sample	991	879	1,870
Endline sample	862	793	1,655
Sample without inconsistent choices	748	711	1,459
Sample without future-biased and inconsistent respondents	629	588	1,217

Notes: Respondents at endline without dropouts. Inconsistent choices occur when respondents violate the law of demand in the time preference elicitation task, i.e., choosing the sooner payment when the interest rate is 1.2 while choosing the later payment when the interest rate is 1.11.

Additional result: Field experiment

Table B4: Determinants of attrition and CTB participation/comprehension

	(1) Attrition (1/0)	(2) Inconsistent or future biased Choice (1/0)	(3) Take-up (1/0)
Treatment	-0.030	0.001	0.667***
	(0.019)	(0.021)	(0.020)
Female	0.014	0.053***	-0.010
	(0.014)	(0.020)	(0.021)
Age	-0.002***	0.002*	0.001
	(0.001)	(0.001)	(0.001)
Married	-0.036**	0.003	-0.009
	(0.014)	(0.022)	(0.018)
Primary education	-0.015	0.057**	-0.023
	(0.017)	(0.022)	(0.025)
Catholic	-0.013	-0.015	0.040**
	(0.015)	(0.021)	(0.018)
Number of children	-0.016*	0.021*	0.008
	(0.009)	(0.011)	(0.010)
Household size	0.008	-0.019***	-0.004
	(0.007)	(0.006)	(0.009)
Constant	0.202***	0.197*	0.059
	(0.045)	(0.103)	(0.067)
Observations	1,863	1,863	1,863
R^2	0.030	0.019	0.461
Clusters	108	108	108

Notes: Column 1 runs a test for differential attrition. The dependent variable is 1 if a participant is lost in the endline survey, 0 otherwise. Column 2 checks whether inconsistent choices are associated with treatment assignment. The dependent variable is 1 if a participant made an inconsistent choice in the Convex Time Budgeting Task (i.e., violating the law demand), 0 otherwise. Results are based on a linear probability model (LPM). Standard errors are clustered at the village level *** p<0.01, ** p<0.05, * p<0.1

Additional result: Field experiment

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	(1) Attrition (1/0)	(2) Inconsistent or future biased Choice (1/0)	(3) Take-up (1/0)
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	(0.019)	(0.021)	(0.020)
Female	0.014	0.053***	-0.010
	(0.014)	(0.020)	(0.021)
Age	-0.002***	0.002*	0.001
	(0.001)	(0.001)	(0.001)
Married	-0.036**	0.003	-0.009
	(0.014)	(0.022)	(0.018)
Primary education	-0.015	0.057**	-0.023
	(0.017)	(0.022)	(0.025)
Catholic	-0.013	-0.015	0.040**
	(0.015)	(0.021)	(0.018)
Number of children	-0.016*	0.021*	0.008
	(0.009)	(0.011)	(0.010)
Household size	0.008	-0.019***	-0.004
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Constant	0.202***	0.197*	0.059
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Additional result: Field experiment

Table B1: Additional descriptive statistics and randomization balance at baseline

	Control *(N=629)*	Treatment *(N=588)*	p-value
Panel A: Respondent characteristics at baseline			
Female (1/0)	0.622	0.599	0,657
Age	33.781 (11.162)	34.766 (12.49)	0,365
Married (1/0)	0.494	0.527	0,438
Catholic (1/0)	0.485	0.459	0,38
No. of children	1.892 (1.757)	1.927 (1.802)	0,87
Tertiary education (1/0)	0.108	0.134	0,406
Illiterate (1/0)	0.124	0.131	0,859
Financial literacy (no. of correct items)	3.642 (1.637)	3.694 (1.658)	0,592
Self-reported patience	5.901 (2.637)	5.997 (2.645)	0,47
Numeracy	0.898 (0.783)	0.92 (0.806)	0,775
Sum of individual savings (UGX)	701,548.7 (1,620,014.4)	709,717 (1,487,040.6)	0,756
Business investments in past year (UGX)	1,413,483.7 (2,874,803.8)	1,626,735.9 (3,181,338.1)	0,585
Trust in delayed payments (1/0)	0.965	0.976	0,299
Work experience (years)	6.904 (7.537)	7.529 (8.308)	0,346
Risk aversion	5.413 (2.671)	5.25 (2.655)	0,494
Panel B: Houshould characteristics at baseline			
Household size	4.024 (2.508)	4.146 (2.643)	0,651
No. of rooms	2.374 (1.454)	2.493 (1.548)	0,485
No. of plots owned	1.143 (1.232)	1.31 (1.313)	0,133
Owns own plot (1/0)	0.525	0.548	0,651
Number of assets	36.614 (16.993)	38.752 (18.364)	0,222
Tap water (1/0)	0.583	0.645	0,265
Monthly HH consumption (UGX)	493,870.8 (341,309.3)	503,600.1 (335,361.4)	0,797

Notes: Means and standard deviations (in parenthesis) of additional individual characteristics (Panel A) and household characteristics (Panel B) at baseline by treatment and control. Financial literacy is measured using adapted versions of five commonly used questions on interest compounding, inflation, risk diversification, mortgages, and bonds. Risk aversion is assessed by asking respondents to report their risk aversion on a scale from 1 (very low) to 10 (very high). P-values are based on a linear regression with the treatment status as single predictor and standard errors clustered at the district level. P-values are unadjusted for multiple hypothesis testing. Sum of savings, investments and monthly household consumption are winsorized at the 99th percentile. F-statistic of test for joint orthogonality is 1.12 (p=0.322).

Additional result: Field experiment

Table B2: Additional descriptive statistics for the full baseline sample (*N=1,870*)

Variable	Control *(N=991)*	Treatment *(N=879)*	p-value
Panel A: Respondent characteristics at baseline			
Female (1/0)	0.642	0.622	0,746
Age	33.319 (11.368)	34.339 (12.003)	0,194
Married (1/0)	0.486	0.497	0,872
Catholic (1/0)	0.49	0.447	0,115
No. of children	1.817 (1.692)	1.903 (1.783)	0,539
Tertiary education (1/0)	0.115	0.132	0,462
Illiterate (1/0)	0.122	0.115	0,61
Financial literacy (no. of correct items)	3.657 (1.633)	3.667 (1.65)	0,979
Self-reported patience	5.81 (2.678)	5.983 (2.682)	0,149
Numeracy	0.916 (0.789)	0.901 (0.806)	0,602
Sum of savings	655,090 (1,517,493)	712,203 (1,500,488)	0,832
Investments	1,371,897 (2,748,671)	1,499,072 (2,924,460)	0,751
Trust in delayed payments (1/0)	0.968	0.974	0,408
Work experience (years)	6.632 (7.291)	7.402 (8.37)	0,076
Panel B: Houshould characteristics at baseline			
Risk aversion	5.229 (2.748)	5.235 (2.707)	0,525
Household size	3.919 (2.405)	4.046 (2.578)	0,543
No. of rooms	2.335 (1.481)	2.414 (1.528)	0,4
No. of plots owned	1.139 (1.386)	1.281 (1.303)	0,213
Owns own plot (1/0)	0.495	0.510	0,569
Number of assets	36.429 (17.67)	37.679 (17.932)	0,466
Tap water (1/0)	0.591	0.635	0,389
Monthly HH consumption	479,047(334,673)	498,813 (332,416)	0,558

Notes: Means and standard deviations (in parenthesis) of additional individual characteristics (Panel A) and household characteristics (Panel B) at baseline by treatment and control for the full sample at baseline. Variables and p-values are reported as in Table B1 and are unadjusted for multiple hypothesis testing.

Quasi-hyperbolic utility function (Laibson, 1997)

$$U(c_t, c_{t+k}) = (c_t - \omega_t)^{\alpha} + \beta_{t=0}\delta^k (c_t - \omega_{t+k})^{\alpha}$$

δ^k denotes the daily discount factor
β is the present bias parameter when payments are immediate (i. e. , $t = 0$)
k represents the delay
α represents the risk parameter under CRRA
ω_t and ω_{t+k} denote Stone-Geary consumption minima (Andersen et al. 2008)

Time preference task

(1) Now imagine you have a choice between the following three options:

Option A: You can receive 5,400 UGX today and 0 UGX in one month.

Option B: You can receive 2,700 UGX today and 3,000 UGX in one month.

Option C: You can receive 0 UGX today and 6,000 UGX in one month.

Verbatim instructions (1/3)

(2) Now imagine you have a choice between the following three options:

Option A: You can receive 5,400 UGX in one month and 0 UGX in two months.

Option B: You can receive 2,700 UGX in one month and 3,000 UGX in two months.

Option C: You can receive 0 UGX in one month and 6,000 UGX in two months.

(3) Now imagine you have a choice between the following three options:

Option A: You can receive 5,000 UGX in one month and 0 UGX in two months.

Option B: You can receive 2,500 UGX in one month and 3,000 UGX in two months.

Option C: You can receive 0 UGX in one month and 6,000 UGX in two months.

Verbatim instructions (2/3)

(2) Now imagine you have a choice between the following three options:

Option A: You can receive 5,400 UGX in one month and 0 UGX in two months.

Option B: You can receive 2,700 UGX in one month and 3,000 UGX in two months.

Option C: You can receive 0 UGX in one month and 6,000 UGX in two months.

(3) Now imagine you have a choice between the following three options:

Option A: You can receive 5,000 UGX in one month and 0 UGX in two months.

Option B: You can receive 2,500 UGX in one month and 3,000 UGX in two months.

Option C: You can receive 0 UGX in one month and 6,000 UGX in two months.

Verbatim instructions (3/3)

(4) Now imagine you have a choice between the following three options:

Option A: You can receive 5,000 UGX in one month and 0 UGX in six months.

Option B: You can receive 2,500 UGX in one month and 3,000 UGX in six months.

Option C: You can receive 0 UGX in one month and 6,000 UGX in six months.

The computer has now randomly chosen one question [question number]. You chose option [A, B or C]. Therefore, the payment amounts are:

You will receive in one month on [automatically include date]:

You will receive in two months on [automatically include date]:

You will receive in six months on [automatically include date]:

Do you trust that you will receive your delayed payment? [yes/no]