THE ROLE OF REGRET IN PRIZE-LINKED SAVINGS: SUPPLEMENTARY MATERIALS*

Justin Abraham[†], Merve Akbas[‡], Dan Ariely[§], and Chaning Jang[¶]
August 2020

^{*}For online publication only. Files for replication are available at https://github.com/princetonbpl/akiba-lottery-pub.

 $^{^{\}dagger}$ University of California, San Diego. jabraham@ucsd.edu.

[‡]merveakbas@gmail.com.

 $[\]$ Duke University. dan@danariely.com.

 $[\]P$ The Busara Center for Behavioral Economics. chaning.jang@busaracenter.org.

Contents

\mathbf{A}	Exp	perimental Materials	5
	A.1	Consent form	5
	A.2	Savings account	5
		A.2.1 Account instructions (Control)	5
		A.2.2 Account instructions (PLS no feedback)	6
		A.2.3 Account instructions (PLS with feedback)	7
		A.2.4 SMS reminders (Control)	10
		A.2.5 SMS reminders (PLS no feedback)	10
		A.2.6 SMS reminders (PLS with feedback)	10
		A.2.7 Lottery administration (for treatment groups)	10
		A.2.8 Other	10
	A.3	Laboratory instructions	11
		A.3.1 Coin toss task	11
		A.3.2 Titration task	11
			11
			12
В	Sun	amary Statistics	13
	B.1	Balance checks	13
	B.2	Sample attrition	16
\mathbf{C}	Trea	atment Effects	18
	C.1	Average treatment effects with FWER adjustments	18
	C.2	Covariate-adjusted treatment effects	24
	C.3	Heterogeneous treatment effects	27
	C.4	Panel Regression	36
	C.5	Multinomial Logit	38
D	Bas	eline Correlates	40
${f E}$	Vist	ualization	42
	E.1	Main treatment effects by risk aversion	42
	E.2	Savings behavior over project period	43
	E 3		47

List of Tables

1	Baseline balance by treatment group	13
2	Baseline balance by treatment group for endline sample	14
3	Self-selection by treatment group	14
4	Observed and expected lottery results	15
5	Treatment group by participation at endline	16
6	Attrition by treatment group	16
7	Baseline balance by attrition status	17
8	Treatment effects – Mobile savings	18
9	Treatment effects – Mobile savings (before 30 days)	19
10	Treatment effects – Mobile savings (after 30 days)	19
11	Treatment effects – Savings outside the project	20
12	$\label{eq:Treatment} \mbox{Treatment effects} - \mbox{Gambling} \ \ldots \ $	20
13	Treatment effects – Akiba Smart	21
14	$\label{eq:Treatment} \mbox{Treatment effects} - \mbox{Expenditure} $	22
15	$\label{eq:continuous_self_self} Treatment\ effects-Self-perceptions \qquad \dots \qquad \dots \qquad \dots$	23
16	Covariate-adjusted treatment effects – Mobile savings	24
17	Covariate-adjusted treatment effects – Mobile savings (before 30	
	days)	24
18	Covariate-adjusted treatment effects – Mobile savings (after 30	
	days)	25
19	Covariate-adjusted treatment effects – Savings outside the project	25
20	$Covariate-adjusted\ treatment\ effects-Gambling\ \dots\dots\dots$	25
21	Covariate-adjusted treatment effects – Akiba Smart	26
22	$Covariate-adjusted\ treatment\ effects-Expenditure\ .\ .\ .\ .\ .$	26
23	Covariate-adjusted treatment effects – Self-perceptions	26
24	Heterogeneous effects – Primary outcomes by female	27
25	Heterogeneous effects – Primary outcomes by below 30 y.o	28
26	Heterogeneous effects – Primary outcomes by completed std. 8 .	28
27	Heterogeneous effects – Primary outcomes by completed formal 4	29
28	$Heterogeneous\ effects-Primary\ outcomes\ by\ married/co-habitating$	29
29	Heterogeneous effects – Primary outcomes by has children	30
30	Heterogeneous effects – Primary outcomes by currently saves . .	30
31	Heterogeneous effects – Primary outcomes by above median monthly	
	inc	31
32	Heterogeneous effects – Primary outcomes by employment status	31
33	Heterogeneous effects – Primary outcomes by self-employment	32
34	Heterogeneous effects – Primary outcomes by has dependant $$	32
35	$Heterogeneous\ effects-Primary\ outcomes\ by\ subject\ is\ a\ dependant$	33
36	Heterogeneous effects – Primary outcomes by risk averse	33
37	Heterogeneous effects – Primary outcomes by above median loc.	34

38	Heterogeneous effects – Primary outcomes by above median indiff.	
	point	34
39	Heterogeneous effects – Primary outcomes by above median CPGI	35
40	Regression of deposits on treatment and lottery results	36
41	Treatment effects on deposits with a linear time trend	37
42	Time-varying treatment effects on deposits	37
43	Multinomial treatment effects – Gambling behavior	38
44	Multinomial treatment effects – Temptation to gamble	39
45	${\bf Multinomial\ treatment\ effects-Hypothetical\ treatment\ selection}$	39
46	Baseline correlates of number of deposits made	40
47	Baseline correlates of amount deposited	41
1.		
	f Figures	
	f Figures	
		9
List of	f Figures	9 42
List of	f Figures Savings ID cards	
List of	Figures Savings ID cards	42
List of 1 2 3	Figures Savings ID cards	42 43
List of 1 2 3 4	Savings ID cards	42 43 44
List of 1 2 3 4 5	Savings ID cards	42 43 44 45

A. Experimental Materials

A.1 Consent form

You are asked to participate in research project conducted by researchers at Duke University, Dan Ariely (dan@danariely.com) and Seher Merve Akbas (merve.akbas@duke.edu). The purpose of this project is (1) to understand how people make decisions about money, (2) how people make risky decisions, (3) how people decide to save money.

During the study in the laboratory, you will be presented a number of decisions involving money. Your payment will depend on your decisions and specific rules about it will be explained to you before you start.

Your participation in this project is completely voluntary and you are free to withdraw from it at any time. During the project, all the information about you will be analyzed anonymously and reported by groups.

Do you have any questions that you would like to ask now?

For any future questions or concerns about the project, please contact the researcher Seher Merve Akbas via e-mail (merve.akbas@duke.edu) or phone (+1919-328-0080) or Dan Ariely via e-mail (dan@danariely.com) or the project associate, James Vancel (email: jvancel@poverty-action.org) (Phone: +254725066428), or the project manager, Joseph Njoroge (jmuiruri@poverty-action.org) (Phone: +254722900068).

I have read this information, and would like to participate

Name: Date:

A.2 Savings account

A.2.1 Account instructions (Control)

Here, we are introducing you AKIBA SMART, which will allow you to save money for a period of four weeks (28 days). Now I will explain how AKIBA SMART works. Using AKIBA SMART, you can save money by sending airtime (via Sambaza) to 0726-085246. The net worth of the airtime you send will be the amount you save. For example, if you send Airtime worth 20KSh it means you saved 20Ksh. This way, you won't pay any MPESA fees to save.

AKIBA SMART helps you save in two ways:

1. Every day, AKIBA SMART will add 5% of your daily savings to your account.

For example, if you saved 20KSH, you will receive 1 KSH extra. The more you save each day, the more money you will accumulate yourself. Furthermore, the more you save, the more you will receive extra from AKIBA SMART.

2. You will be able to keep your money in a safe place for 28 days, and at the end of 28 days, you will receive all your savings, with the extra money you received from AKIBA SMART back via MPESA (you won't receive Airtime).

As a promotion, you are automatically enrolled in AKIBA SMART today. You will receive your ID cards now and you can start saving immediately. [We will try out how it works here. As part of our promotion, we will give you some money to save today to learn how it works. This money is yours and you will receive it at the end of 28 days.]

Do you have any questions?

A.2.2 Account instructions (PLS no feedback)

Here, we are introducing you AKIBA SMART, which will allow you to save money for a period of four weeks (28 days). Now I will explain how AKIBA SMART works. Using AKIBA SMART, you can save money by sending airtime (via Sambaza) to 0726-085246. The net worth of the airtime you send will be the amount you save. For example, if you send Airtime worth 20KSh it means you saved 20Ksh. This way, you won't pay any MPESA fees to save.

AKIBA SMART helps you save in two ways:

- 1. Every day, if you save, you will receive your Lottery Ticket in an SMS and you will enter a lottery. The next day, you will be notified by SMS whether you won, and how much money you won. If you win, the prize will be added to your account. If you don't win, you will still keep your savings. This will continue every day for 28 days. The more you save each day, the more money you will accumulate yourself. Furthermore, the more you save, the bigger the prizes!!!
- 2. You will be able to keep your money in a safe place for 28 days, and at the end of 28 days you will receive all your savings, with the prizes you won back via MPESA (you won't receive Airtime).

The lottery works as follows:

Each day, if you save, you will receive a lottery ticket as SMS. The lottery ticket includes 4 numbers between 1 and 10. If the FIRST OR SECOND number in your lottery ticket match the first or second number in the winning ticket, you win Prize 1: 10% of what you saved that day! For example, if you saved 20KSH

that day, you win 2 KSH extra. If the FIRST AND SECOND numbers in your lottery ticket match the first and second numbers in the winning ticket, you win Prize 2: 100% of what you saved that day! For example, if you saved 20KSH that day, you win 20 KSH extra. If the ALL NUMBERS in your lottery ticket match all numbers in the winning ticket in the same order, you win Prize 3: 200 times what you saved that day! For example, if you saved 20KSH that day, you win 4000 KSH extra.

As a promotion, you are automatically enrolled in AKIBA SMART today. You will receive your ID cards now and you can start saving immediately. [We will try out how it works here. As part of our promotion, we will give you some money to save today to learn how it works. This money is yours and you will receive it at the end of 28 days.]

Do you have any questions?

A.2.3 Account instructions (PLS with feedback)

Here, we are introducing you AKIBA SMART, which will allow you to save money for a period of four weeks (28 days). Now I will explain how AKIBA SMART works. Using AKIBA SMART, you can save money by sending airtime (via Sambaza) to 0726-085246. The net worth of the airtime you send will be the amount you save. For example, if you send Airtime worth 20KSh it means you saved 20Ksh. This way, you won't pay any MPESA fees to save.

AKIBA SMART helps you save in two ways:

- 1. Every day, you will receive your Lottery Ticket in an SMS and you will enter a lottery. The next day, you will be notified by SMS whether you won, and how much money you won. If you win, your prize will be added to your account ONLY IF YOU SAVED that day, if you did not save, you will give up your prize. If you don't win, you will still keep your savings. This will continue every day for 28 days. The more you save each day, the more money you will accumulate yourself. Furthermore, the more you save, the bigger the prizes!!!
- 2. You will be able to keep your money in a safe place for 28 days, and at the end of 28 days you will receive all your savings, with the prizes you won back via MPESA (you won't receive Airtime).

The lottery works as follows:

Each day, you will receive a lottery ticket as SMS. The lottery ticket includes 4 numbers between 1 and 10. If the FIRST OR SECOND number in your lottery

ticket match the first or second number in the winning ticket, you win Prize 1: 10% of what you saved that day! For example, if you saved 20KSH that day, you win 2 KSH extra. If the FIRST AND SECOND numbers in your lottery ticket match the first and second numbers in the winning ticket, you win Prize 2: 100% of what you saved that day! For example, if you saved 20KSH that day, you win 20 KSH extra. If the ALL NUMBERS in your lottery ticket match all numbers in the winning ticket in the same order, you win Prize 3: 200times what you saved that day! For example, if you saved 20KSH that day, you win 4000 KSH extra.

REMEMBER: YOU CAN REDEEM YOUR PRIZE ONLY IF YOU SAVED THAT DAY.

As a promotion, you are automatically enrolled in AKIBA SMART today. You will receive your ID cards now and you can start saving immediately. [We will try out how it works here. As part of our promotion, we will give you some money to save today to learn how it works. This money is yours and you will receive it at the end of 28 days.]

Do you have any questions?

Figure 1: Savings ID cards

AKIBA SMART SAVINGS CARD BUSARA CENTER FOR BEHAVIORAL ECONOMICS	AKIBA SMART SAVINGS CARD BUSARA CENTER FOR BEHAVIORAL ECONOMICS
0224 2014 01	0224 2014 01
Name:	Name:
(a) Front	(b) Front
<u>Daily Earnings</u> 5% of your daily savings	Daily Prizes Prize 1: 10% of your daily savings Prize 2: 100% of your daily savings Prize 3: 200 times your daily savings
Signature:	Signature:
BUSARA CENTER FOR BEHANORAL ECONOMICS AKIBA SMART SAMBAZA 0726-085246 to save. For assistance SMS or call 0726-085246.	BUSARA ENERGY EN
(c) Back (Control)	(d) Back (Lottery)

A.2.4 SMS reminders (Control)

- Reminder: "Name, remember to save XX or more today to earn 5% daily interest. Sambaza *140*XX*Phone to save"
- Upon receipt of airtime: "You saved XX. You earned 5% interest! QQ was deposited into your account. Your balance is ZZ."

A.2.5 SMS reminders (PLS no feedback)

- Reminder: "Name, remember to buy your ticket today (this week) by saving XX. Sambaza *140*XX*Phone to save"
- <u>Upon receipt of airtime</u>: "You saved XX. You purchased your ticket. Your lucky numbers are AA-BB. Your balance is ZZ."

A.2.6 SMS reminders (PLS with feedback)

- Reminder: "Name, your lucky numbers today (this week) are AA-BB. Keep them by saving XX. Sambaza *140*XX*Phone to save"
- <u>Upon receipt of airtime</u>: "You saved XX. You purchased your ticket. Your lucky numbers are AA-BB. Your balance is ZZ."

A.2.7 Lottery administration (for treatment groups)

- Winning numbers: "Yesterday's (last week's) lucky numbers were CC-DD. Winners receive PPP Ksh. Save today (this week) to play again!"
- Winners: "Your lucky numbers were AA-BB. Congratulations! You won PPP Ksh! Win again today (this week) by saving."
- <u>Losers</u>: "Your lucky numbers were AA-BB. You did not win. Try again today (this week) by saving."
- Losers in regret group: "Your lucky numbers were AA-BB. You would have won, but you did not save enough to buy your ticket! Don't miss you again, save to play."

A.2.8 Other

- Upon receipt of an incoming SMS: "Your balance is ZZ. Save YY to buy your ticket (reach your match) OR You have reached your goal today (this week). Save more, Sambaza *140*XX*Phone."
- Upon receipt of airtime from unknown number: "This number is not known in the system. What is your standard phone number (10-digits)?"

• If reply is not understood (return airtime via Sambaza): "This is not a valid response. We are returning your airtime. Please save using your phone only. Call Phone for help."

A.3 Laboratory instructions

A.3.1 Coin toss task

For the next task your payoff will depend on a coin flip. You will win money if it is a heads or if it is a tails. You must decide which payoffs for heads and tails you prefer. The exact amount of money you will win will depend on which side the coin landed on. On the next screen you will see 6 different values for heads and tails. You make a SINGLE decision on which coin you prefer and remember that you can only flip one of the coins and only once. There are no right or wrong answers, only your preference.

A.3.2 Titration task

On the following screen you will find a series of questions. In each question, you are asked to choose between Option A and Option B. If you choose Option A, you will get a smaller amount but sooner. If you choose Option B, you will get a larger amount but later. Please choose the option you prefer. There are no right or wrong answers. After you make all your choices, the computer will randomly pick one of the questions and your payment will be determined by the option you chose in that question. Remember that the computer will pick only one question and any question could be picked. Therefore it is in your interest to answer each question as if it is the only question you are answering.

A.3.3 Lottery task

In this game, FIRST the computer will randomly chose 4 numbers, each between 0 and 9, to create a lottery ticket for you. For example, your lottery ticket could be: 5067 Then the computer will randomly choose 4 numbers again, each between 0 and 9, to create the winning lottery ticket. For example the winning ticket could be 5645 The lottery prizes are as follows:

PRIZE 1 (5KSH): If the FIRST OR SECOND number of your lottery ticket match the first OR second number of the winning ticket, your ticket will win prize 1.

PRIZE 2 (50KSH): If the FIRST AND SECOND number of your lottery ticket match the first AND second number of the winning ticket in the same order, your ticket will win prize 2.

PRIZE 3 (5000KSH): If ALL NUMBERS of your ticket match all numbers of the winning ticket in the same order, your ticket will win prize 3.

A.3.4 Canadian Problem Gambling Index

In the last 12 months how often have you [or have for item 7]? 0 = Never, 1 = Sometimes, 2 = Most of the time, 3 = Almost always

- 1. Bet more than you could really afford to lose?
- 2. Needed to gamble with larger amounts of money to get the same feeling of excitement?
- 3. Gone back another day to try and win back the money you lost?
- 4. Borrowed money or sold anything to get money to gamble?
- 5. Felt that you might have a problem with gambling?
- 6. Felt that gambling has caused you health problems, including stress and anxiety?
- 7. People criticized your betting or told you that you have a gambling problem, whether or not you thought it was true?
- 8. Felt your gambling has caused financial problems for you or your household?

In the past month, how often have you done the following? 0 = Never, 1 = 1-4 times, 2 = Daily, 3 = multiple times per day

- 1. Bet money on a sporting event
- 2. Played the lottery (Charity Sweepstakes)
- 3. Played cards or another game for money (billards, checkers, etc)
- 4. In the past month, how often have you gambled in all activities?
- 5. Participated in an SMS promotion (Safaricom "Bonyeza Ushinde" "Tetemesha" or other)

B. Summary Statistics

B.1 Balance checks

Table 1: Baseline balance by treatment group

	(1)	(2)	(3)	(4)	(5)
	No Feedback -	PLS -	No Feedback -	Control mean	Obs.
	Control	Control	PLS	(SD)	
Female	0.07	0.10	0.03	0.52	311
	(0.07)	(0.07)	(0.07)	(0.50)	
Age	0.78	0.72	-0.05	30.75	311
	(1.39)	(1.34)	(1.35)	(9.83)	
Completed std. 8	-0.02	-0.02	0.00	0.99	311
	(0.02)	(0.02)	(0.02)	(0.10)	
Married/co-habitating	0.10	0.09	-0.01	0.42	311
	(0.07)	(0.07)	(0.07)	(0.50)	
No. of children	0.23	0.24	0.01	1.75	311
	(0.24)	(0.25)	(0.25)	(1.70)	
Currently saves	0.05	-0.10	-0.15	0.56	311
	(0.07)	(0.07)	(0.07)	(0.50)	
Total savings last month	-17.81	-7.04	10.77	58.82	311
	(11.88)	(12.55)	(9.23)	(106.26)	
Monthly income	-3.68	-0.59	3.09	112.05	311
	(17.63)	(16.85)	(15.46)	(137.13)	
Employment status	0.05	-0.03	-0.08	0.50	311
	(0.07)	(0.07)	(0.07)	(0.50)	
Coefficient of relative risk aversion	0.08	-0.03	-0.12	1.16	311
	(0.18)	(0.17)	(0.18)	(1.27)	
Locus of control	0.48	-0.83	-1.31	69.81	311
	(1.40)	(1.46)	(1.37)	(10.78)	
Standardized CPGI	-0.11	-0.22	-0.11	-0.00	311
	(0.13)	(0.12)	(0.12)	(1.00)	
Exp. discount factor	-0.05	-0.01	0.04	0.33	311
	(0.03)	(0.03)	(0.03)	(0.20)	
Joint test p-value	0.44	0.72	0.42		
-					

Notes: The first three columns report the difference of means across treatment groups with standard errors in parentheses. Column 4 reports the mean of the control group with SD in parentheses. The bottom row reports the p-value of a joint test of significance for each hypothesis.

Table 2: Baseline balance by treatment group for endline sample

	(1)	(2)	(3)	(4)	(5)
	No Feedback -	PLS -	No Feedback -	Control mean	Obs.
	Control	Control	PLS	(SD)	Obs.
Female	0.05	0.09	0.04	0.53	284
	(0.07)	(0.07)	(0.07)	(0.50)	
Age	-0.18	0.24	0.42	31.37	284
	(1.48)	(1.43)	(1.42)	(10.11)	
Completed std. 8	-0.02	0.00	0.02	0.99	284
	(0.02)	(0.01)	(0.02)	(0.10)	
Married/co-habitating	0.08	0.07	-0.01	0.44	284
	(0.07)	(0.07)	(0.07)	(0.50)	
No. of children	-0.01	0.10	0.11	1.88	284
	(0.25)	(0.26)	(0.25)	(1.73)	
Currently saves	0.05	-0.05	-0.09	0.54	284
	(0.07)	(0.07)	(0.07)	(0.50)	
Total savings last month	-18.63	-4.82	13.81	58.75	284
	(12.01)	(12.88)	(9.78)	(100.77)	
Monthly income	-9.42	-5.24	4.18	117.77	284
	(18.93)	(17.87)	(16.18)	(140.31)	
Employment status	0.05	-0.05	-0.09	0.51	284
	(0.07)	(0.07)	(0.07)	(0.50)	
Coefficient of relative risk aversion	0.16	-0.01	-0.17	1.13	284
	(0.19)	(0.18)	(0.19)	(1.25)	
Locus of control	0.69	-0.95	-1.63	69.79	284
	(1.50)	(1.56)	(1.45)	(11.05)	
Standardized CPGI	-0.12	-0.20	-0.09	-0.02	284
	(0.13)	(0.13)	(0.12)	(0.97)	
Exp. discount factor	-0.06	-0.02	0.04	0.33	284
	(0.03)	(0.03)	(0.03)	(0.20)	
Joint test p-value	0.52	0.94	0.64		

Notes: These results are restricted to the sample of participants who completed the endline survey. The first three columns report the difference of means across treatment groups with SEs in parentheses. Column 4 reports the mean of the control group with SD in parentheses. The bottom row reports the p-value of a joint test of significance for each hypothesis.

Table 3: Self-selection by treatment group

	Self-selection into treatment groups						
	Interest Lottery Regret Total						
Interest	39	52	3	94			
Lottery	27	54	14	95			
Regret	32	42	21	95			
Total	98	148	38	284			

Notes: This table reports the number of participants self-selecting into the treatment conditions after completing the study, disaggregated by original treatment assignment.

Table 4: Observed and expected lottery results

	Freq.	Pct. observed	Pct. expected
No match	7065	81.49	62.43
One match	1518	17.51	22.22
Two matches	86	0.99	1.23
Complete match	1	0.01	0.00

Notes: The first column tabulates the frequency of observed lottery ticket matches. The second and third columns report the observed and expected probabilities, respectively, of each type of lottery match. A lottery ticket was a random sequence of four numbers between 1 and 9, inclusive. Prizes were awarded according to how well a participant's lottery numbers matched the winning numbers. If the first or second numbers matched, a 10% match of savings was awarded. If both the first and second numbers matched, a 100% match of savings was awarded. If all numbers matched, a prize of 200 times the daily savings was awarded.

B.2 Sample attrition

Table 5: Treatment group by participation at endline

	Partici	Participation at endline					
	Attrited Completed Total						
Control	11	94	105				
Lottery	8	95	103				
Regret	8	95	103				
Total	27	284	311				

Notes: This table reports the number of observations in the endline survey by treatment group. Columns 1 and 2 reports the number of participants who completed the baseline survey but not endline and those who completed both surveys, repsectively.

Table 6: Attrition by treatment group

	Completed endline
No Feedback	0.03
	(0.04)
PLS	0.03
	(0.04)
Constant	0.90
	(0.03)
Adjusted R^2	-0.004
Difference p-value	1.00
Joint p-value	0.75
Observations	311

Notes: This table reports a regression of selection on each of the treatment arms. Standard errors are in parentheses.

Table 7: Baseline balance by attrition status

	(1)	(2)	(3)
	${\bf Completed} \ {\bf -}$	Mean (SD)	Obs.
	attrited	of completed	Obs.
Female	-0.02	0.58	311
	(0.10)	(0.49)	
Age	1.62	31.39	303
	(1.69)	(9.79)	
Completed std. 8	0.06	0.98	311
	(0.05)	(0.13)	
Married/co-habitating	0.04	0.49	307
	(0.10)	(0.50)	
No. of children	0.06	1.91	311
	(0.36)	(1.75)	
Currently saves	-0.05	0.54	311
	(0.10)	(0.50)	
Total savings last month	3.68	50.91	311
	(19.87)	(80.23)	
Monthly income	25.66	112.86	311
	(20.91)	(121.67)	
Employment status	0.10	0.51	311
	(0.10)	(0.50)	
Coefficient of relative risk aversion	-0.01	1.18	311
	(0.26)	(1.30)	
Locus of control	0.07	69.70	311
	(1.59)	(10.38)	
Standardized CPGI	-0.19	-0.13	311
	(0.23)	(0.89)	
Exp. discount factor	-0.06	0.30	311
	(0.04)	(0.20)	

Notes: Column 1 reports the difference of means between participants who completed endline and those who attrited. Standard errors are in parentheses. Column 2 reports the mean among participants at endline with SD in parentheses.

C. Treatment Effects

C.1 Average treatment effects with FWER adjustments

Table 8: Treatment effects – Mobile savings

	Effe	ect estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total no. of deposits	4.59	5.71	1.13	13.66	311
	(2.52)	(2.45)	(2.84)	(15.08)	
	[0.19]	[0.06]	[0.89]		
No. of days saved	3.93	4.94	1.01	11.78	311
	(2.05)	(2.08)	(2.32)	(12.93)	
	[0.17]	[0.06]	[0.89]		
Total deposit amount	-0.79	-1.60	-0.81	14.87	311
	(3.34)	(2.91)	(2.88)	(24.48)	
	[0.83]	[0.59]	[0.89]		
Total withdrawal amount	0.53	1.63	1.10	1.07	311
	(0.94)	(0.74)	(1.02)	(4.53)	
	[0.83]	[0.06]	[0.61]		

Table 9: Treatment effects – Mobile savings (before 30 days)

	Effe	ct estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total no. of deposits (before 30 days)	2.56	3.08	0.51	8.48	311
	(1.40)	(1.35)	(1.53)	(8.74)	
	[0.14]	[0.05]	[0.92]		
No. of days saved (before 30 days)	1.94	2.56	0.62	7.42	311
	(1.16)	(1.15)	(1.26)	(7.61)	
	[0.18]	[0.05]	[0.86]		
Daily avg. no. of deposits (before 30 days)	0.09	0.10	0.02	0.28	311
	(0.05)	(0.05)	(0.05)	(0.29)	
	[0.14]	[0.05]	[0.92]		
Total deposit amount (before 30 days)	-1.17	-1.65	-0.48	8.99	311
	(2.07)	(1.85)	(1.46)	(17.18)	
	[0.60]	[0.40]	[0.92]		

Table 10: Treatment effects – Mobile savings (after 30 days)

	Effe	ect estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total no. of deposits (after 30 days)	2.02	2.63	0.61	5.18	311
	(1.26)	(1.25)	(1.44)	(7.56)	
	[0.20]	[0.07]	[0.91]		
No. of days saved (after 30 days)	1.99	2.38	0.39	4.36	311
	(1.02)	(1.05)	(1.18)	(6.36)	
	[0.11]	[0.05]	[0.92]		
Daily avg. no. of deposits (after 30 days)	0.07	0.09	0.02	0.17	311
	(0.04)	(0.04)	(0.05)	(0.25)	
	[0.20]	[0.07]	[0.91]		
Total deposit amount (after 30 days)	0.38	0.05	-0.33	5.88	311
	(1.68)	(1.47)	(1.58)	(11.43)	
	[0.83]	[0.98]	[0.92]		

Table 11: Treatment effects – Savings outside the project

	Eff	ect estima	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total savings last month	18.45	-17.87	-36.32	80.31	284
	(25.16)	(14.64)	(24.06)	(112.74)	
	[0.86]	[0.53]	[0.35]		
M-Pesa savings last month	-5.42	-6.71	-1.29	20.42	284
	(6.34)	(5.49)	(5.30)	(44.67)	
	[0.86]	[0.53]	[0.81]		
ROSCA savings last month	1.48	7.37	5.89	22.24	283
	(6.76)	(6.79)	(7.33)	(42.18)	
	[0.97]	[0.53]	[0.69]		
Saves with a ROSCA	-0.02	0.14	0.16	0.54	284
	(0.07)	(0.07)	(0.07)	(0.50)	
	[0.97]	[0.17]	[0.10]		

Table 12: Treatment effects – Gambling

	Effe	ct estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Gamble more	0.06	0.15	0.08	0.12	284
	(0.05)	(0.06)	(0.06)	(0.32)	
	[0.62]	[0.05]	[0.48]		
Gamble less	-0.02	0.04	0.06	0.16	284
	(0.05)	(0.06)	(0.05)	(0.37)	
	[0.88]	[0.80]	[0.55]		
More tempted to gamble	0.09	0.05	-0.04	0.47	284
	(0.07)	(0.07)	(0.07)	(0.50)	
	[0.62]	[0.80]	[0.55]		
Less tempted to gamble	-0.01	0.03	0.04	0.06	284
	(0.03)	(0.04)	(0.04)	(0.25)	
	[0.88]	[0.80]	[0.55]		

Table 13: Treatment effects – Akiba Smart

	Effe	ect estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
How much do you trust Akiba Smart?	0.03	-0.07	-0.10	0.00	284
	(0.14)	(0.18)	(0.18)	(1.00)	
	[0.86]	[0.94]	[0.84]		
What is your confidence in Akiba Smart?	0.11	0.07	-0.04	0.00	284
	(0.13)	(0.14)	(0.13)	(1.00)	
	[0.63]	[0.94]	[0.84]		
Did you tell friends and famiy about AKIBA?	-0.08	-0.04	0.04	0.83	284
	(0.06)	(0.06)	(0.06)	(0.38)	
	[0.51]	[0.93]	[0.84]		
Continue saving with AKIBA	-0.05	-0.01	0.04	0.91	283
	(0.05)	(0.04)	(0.05)	(0.28)	
	[0.61]	[0.94]	[0.81]		

Table 14: Treatment effects – Expenditure

	Effe	ect estim	ates	Sample	
	(1) No Feedback	(2) PLS	(3) PLS- No Feedback	(4) Control Mean (SD)	(5) Obs.
Airtime	-0.33 (0.15) [0.36]	-0.13 (0.19) [0.99]	0.20 (0.12) $[0.74]$	0.35 (1.47)	284
Business-related	0.08 (0.04) [0.67]	0.10 (0.05) [0.37]	0.02 (0.05) [1.00]	0.06 (0.25)	284
Durable goods	-0.06 (0.04) [0.85]	-0.01 (0.05) [1.00]	0.05 (0.04) [0.90]	0.13 (0.34)	284
Loan repayment	-0.01 (0.04) [0.98]	-0.02 (0.04) [1.00]	-0.01 (0.04) [1.00]	0.09 (0.28)	284
Food	0.04 (0.07) [0.98]	-0.08 (0.06) [0.91]	-0.12 (0.06) [0.66]	0.28 (0.45)	284
Rent and housing payments	-0.03 (0.04) [0.98]	-0.00 (0.04) [1.00]	0.03 (0.04) [0.99]	0.11 (0.31)	284
Health-related	-0.02 (0.02) [0.97]	-0.03 (0.02) [0.75]	-0.01 (0.01) [0.97]	0.03 (0.18)	284
Other non-durables	0.01 (0.02) [0.98]	0.03 (0.02) [0.89]	0.02 (0.03) [0.99]	0.01 (0.10)	284
Saved balance	0.04 (0.04) [0.97]	0.06 (0.04) [0.89]	0.02 (0.05) $[1.00]$	0.07 (0.26)	284
School-related	0.08 (0.05) [0.85]	0.02 (0.05) [1.00]	-0.06 (0.05) [0.92]	0.12 (0.32)	284
Transfers	0.02 (0.03) [0.98]	-0.00 (0.02) [1.00]	-0.02 (0.03) [0.99]	0.02 (0.15)	284
Travel	-0.00 (0.02) [1.00]	-0.00 (0.02) [1.00]	0.00 (0.02) $[1.00]$	0.02 (0.15)	284
Did not save	-0.02 (0.04) [0.98]	-0.01 (0.04) [1.00]	0.01 (0.04) $[1.00]$	0.10 (0.30)	284

Table 15: Treatment effects - Self-perceptions

	Effe	ect estim	ates	Sample	
	(1)	(2)	(3)	(4)	(5)
	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Do you see yourself as a saver?	-0.20	-0.09	0.11	-0.00	284
	(0.15)	(0.14)	(0.15)	(1.00)	
	[0.48]	[0.90]	[0.77]		
Are you in general a lucky person?	4.77	4.97	0.20	-0.00	284
	(0.20)	(0.18)	(0.23)	(1.00)	
	[0.00]	[0.00]	[0.77]		
Do you feel you saved enough?	0.19	-0.09	-0.28	0.00	284
	(0.15)	(0.15)	(0.15)	(1.00)	
	[0.48]	[0.90]	[0.23]		
How did you feel not saving?	-0.02	0.06	0.08	-0.00	284
	(0.16)	(0.15)	(0.16)	(1.00)	
	[0.88]	[0.90]	[0.77]		

C.2 Covariate-adjusted treatment effects

Table 16: Covariate-adjusted treatment effects – Mobile savings

	N	o contro	ols	W	ith contr	rols	Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Feedback	PLS	PLS- No Feedback	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total no. of deposits	4.59	5.71	1.13	4.53	4.76	0.23	13.66	311
_	(2.52)	(2.45)	(2.84)	(2.64)	(2.42)	(2.86)	(15.08)	
No. of days saved	3.93	4.94	1.01	3.56	4.19	0.63	11.78	311
	(2.05)	(2.08)	(2.32)	(2.06)	(2.05)	(2.26)	(12.93)	
Total deposit amount	-0.79	-1.60	-0.81	-0.32	-1.46	-1.14	14.87	311
	(3.34)	(2.91)	(2.88)	(3.15)	(2.73)	(2.86)	(24.48)	
Total withdrawal amount	0.53	1.63	1.10	0.31	1.62	1.31	1.07	311
	(0.94)	(0.74)	(1.02)	(0.85)	(0.77)	(0.94)	(4.53)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 17: Covariate-adjusted treatment effects – Mobile savings (before 30 days)

	No controls			W	ith cont	rols	Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Feedback	PLS	PLS- No Feedback	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total no. of deposits (before 30 days)	2.56	3.08	0.51	2.46	2.56	0.10	8.48	311
	(1.40)	(1.35)	(1.53)	(1.43)	(1.34)	(1.53)	(8.74)	
No. of days saved (before 30 days)	1.94	2.56	0.62	1.67	2.18	0.51	7.42	311
	(1.16)	(1.15)	(1.26)	(1.15)	(1.15)	(1.24)	(7.61)	
Daily avg. no. of deposits (before 30 days)	0.09	0.10	0.02	0.08	0.09	0.00	0.28	311
	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.29)	
Total deposit amount (before 30 days)	-1.17	-1.65	-0.48	-1.02	-1.52	-0.50	8.99	311
	(2.07)	(1.85)	(1.46)	(1.84)	(1.69)	(1.36)	(17.18)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 18: Covariate-adjusted treatment effects – Mobile savings (after 30 days)

	No controls			W	ith conti	rols	Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Feedback PLS	LS PLS- No Feedback	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.	
Total no. of deposits (after 30 days)	2.02	2.63	0.61	2.07	2.20	0.13	5.18	311
	(1.26)	(1.25)	(1.44)	(1.34)	(1.23)	(1.47)	(7.56)	
No. of days saved (after 30 days)	1.99	2.38	0.39	1.88	2.01	0.12	4.36	311
	(1.02)	(1.05)	(1.18)	(1.03)	(1.02)	(1.14)	(6.36)	
Daily avg. no. of deposits (after 30 days)	0.07	0.09	0.02	0.07	0.07	0.00	0.17	311
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.25)	
Total deposit amount (after 30 days)	0.38	0.05	-0.33	0.70	0.06	-0.64	5.88	311
	(1.68)	(1.47)	(1.58)	(1.70)	(1.40)	(1.67)	(11.43)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 19: Covariate-adjusted treatment effects – Savings outside the project

	ľ	No contro	ls	W	ith contr	ols	Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Feedback	PLS	PLS- No Feedback	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Total savings last month	18.45 (25.16)	-17.87 (14.64)	-36.32 (24.06)	16.75 (23.25)	-12.44 (14.86)	-29.19 (22.10)	80.31 (112.74)	284
M-Pesa savings last month	-5.42 (6.34)	-6.71 (5.49)	-1.29 (5.30)	-5.47 (6.06)	-6.19 (5.38)	-0.73 (5.27)	20.42 (44.67)	284
ROSCA savings last month	1.48 (6.76)	7.37 (6.79)	5.89 (7.33)	2.84 (6.26)	7.85 (6.35)	5.01 (6.85)	22.24 (42.18)	283
Saves with a ROSCA	-0.02 (0.07)	0.14 (0.07)	0.16 (0.07)	-0.01 (0.07)	0.14 (0.06)	0.15 (0.07)	0.54 (0.50)	284

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 20: Covariate-adjusted treatment effects – Gambling

	N	lo contro	ols	W	ith contr	rols	Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Feedback	PLS	PLS- No Feedback	No Feedback	PLS	PLS- No Feedback	Control Mean (SD)	Obs.
Gamble more	0.06	0.15	0.08	0.06	0.16	0.10	0.12	284
	(0.05)	(0.06)	(0.06)	(0.05)	(0.05)	(0.06)	(0.32)	
Gamble less	-0.02	0.04	0.06	-0.02	0.03	0.05	0.16	284
	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)	(0.06)	(0.37)	
More tempted to gamble	0.09	0.05	-0.04	0.05	0.03	-0.02	0.47	284
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.50)	
Less tempted to gamble	-0.01	0.03	0.04	-0.00	0.04	0.04	0.06	284
-	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.25)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 21: Covariate-adjusted treatment effects – Akiba Smart

	No controls			With controls			Sample	
	(1) No Feedback	(2) PLS	(3) PLS-	(4) No Feedback	(5) PLS	(6) PLS-	(7) Control Mean	(8) Obs.
How much do you trust Akiba Smart?	0.03	-0.07	No Feedback -0.10	0.08	0.05	No Feedback -0.03	(SD) 0.00	284
	(0.14)	(0.18)	(0.18)	(0.14)	(0.16)	(0.15)	(1.00)	
What is your confidence in Akiba Smart?	0.11 (0.13)	0.07 (0.14)	-0.04 (0.13)	0.16 (0.13)	0.18 (0.12)	0.02 (0.12)	0.00 (1.00)	284
Did you tell friends and famiy about AKIBA?	-0.08 (0.06)	-0.04 (0.06)	0.04 (0.06)	-0.05 (0.06)	-0.04 (0.06)	0.01 (0.06)	0.83 (0.38)	284
Continue saving with AKIBA	-0.05 (0.05)	-0.01 (0.04)	0.04 (0.05)	-0.04 (0.05)	-0.01 (0.04)	0.03 (0.05)	0.91 (0.28)	283

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

 ${\bf Table~22:~Covariate\text{-}adjusted~treatment~effects-Expenditure}$

	N	o contro	ols	W	ith contr	rols	Sample	
	(1) No Feedback	(2) PLS	(3) PLS- No Feedback	(4) No Feedback	(5) PLS	(6) PLS- No Feedback	(7) Control Mean (SD)	(8) Obs.
Airtime	-0.33	-0.13	0.20	-0.24	-0.02	0.22	0.35	284
	(0.15)	(0.19)	(0.12)	(0.12)	(0.18)	(0.13)	(1.47)	
Business-related	0.08	0.10	0.02	0.10	0.12	0.02	0.06	284
	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.25)	
Durable goods	-0.06	-0.01	0.05	-0.07	-0.01	0.07	0.13	284
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.34)	
Loan repayment	-0.01	-0.02	-0.01	-0.03	-0.04	-0.01	0.09	284
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.28)	
Food	0.04	-0.08	-0.12	0.05	-0.06	-0.11	0.28	284
	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.45)	
Rent and housing payments	-0.03	-0.00	0.03	-0.03	0.01	0.04	0.11	284
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.31)	
Health-related	-0.02	-0.03	-0.01	-0.02	-0.03	-0.01	0.03	284
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.18)	
Other non-durables	0.01	0.03	0.02	0.00	0.04	0.03	0.01	284
	(0.02)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.10)	
Saved balance	0.04	0.06	0.02	0.04	0.05	0.01	0.07	284
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.26)	
School-related	0.08	0.02	-0.06	0.09	-0.01	-0.09	0.12	284
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.32)	
Transfers	0.02	-0.00	-0.02	0.02	-0.00	-0.03	0.02	284
	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.15)	
Travel	-0.00	-0.00	0.00	0.01	0.01	0.00	0.02	284
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.15)	
Did not save	-0.02	-0.01	0.01	-0.03	0.00	0.03	0.10	284
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.30)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

Table 23: Covariate-adjusted treatment effects – Self-perceptions

	No controls		With controls			Sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Feedback PLS PLS-No Feedback	No Feedback PLS	PLS	PLS- No Feedback	Control Mean (SD)	Obs.	
Do you see yourself as a saver?	-0.20 (0.15)	-0.09 (0.14)	0.11 (0.15)	-0.23 (0.15)	-0.06 (0.14)	0.17 (0.15)	-0.00 (1.00)	284
Are you in general a lucky person? $$	4.77 (0.20)	4.97 (0.18)	0.20 (0.23)	4.86	4.95	0.08	-0.00 (1.00)	284
Do you feel you saved enough?	0.19	-0.09	-0.28	0.20	-0.11	-0.31	0.00	284
How did you feel not saving?	(0.15) -0.02	(0.15) 0.06	(0.15) 0.08	(0.15) -0.06	(0.15) 0.06	(0.15) 0.12	(1.00) -0.00	284
	(0.16)	(0.15)	(0.16)	(0.16)	(0.16)	(0.17)	(1.00)	

Notes: Columns 1–3 report OLS estimates of the treatment effect. Columns 4–6 report estimates with covariate adjustment. Standard errors are in parentheses. Columns 7–8 report the mean and SD of the control group and the number observations, respectively. Observations are at the individual level.

C.3 Heterogeneous treatment effects

Table 24: Heterogeneous effects – Primary outcomes by female

	(1) Total no. of deposits	(2) Total deposit amount	(3) Saves with a ROSCA	(4) Gamble more
No Feedback	4.62	3.20	0.05	0.16
No reedback	(3.71)	(6.67)	(0.11)	(0.08)
No Feedback ×	(0.11)	(0.01)	(0.11)	(0.00)
Female	0.07	-6.28	-0.12	-0.17
	(5.06)	(7.28)	(0.15)	(0.11)
PLS	0.33	-4.94	0.05	0.19
	(3.57)	(5.29)	(0.11)	(0.09)
PLS \times				
Female	8.84	5.99	0.13	-0.07
	(4.84)	(6.13)	(0.14)	(0.12)
Female	-1.15	-3.99	0.12	0.05
	(2.98)	(4.90)	(0.10)	(0.07)
Constant	14.26	16.96	0.48	0.09
	(2.26)	(4.28)	(0.08)	(0.04)
Adjusted R^2	0.015	0.006	0.029	0.016
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.17	0.29	0.46	0.85
PLS p -value	0.01	0.73	0.04	0.13
Observations	311	311	284	284

Table 25: Heterogeneous effects – Primary outcomes by below 30 y.o.

	(1)	(0)	(2)	(4)
	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	6.20	3.15	-0.15	0.03
	(4.09)	(4.15)	(0.10)	(0.09)
No Feedback \times				
Below 30 y.o.	-3.80	-7.47	0.24	0.06
	(5.14)	(6.62)	(0.14)	(0.10)
PLS	5.52	0.20	0.09	0.13
	(3.79)	(3.00)	(0.09)	(0.09)
PLS ×				
Below 30 y.o.	-0.64	-3.22	0.07	0.03
	(4.99)	(5.73)	(0.14)	(0.11)
Below 30 y.o.	-2.91	3.32	-0.35	-0.14
	(3.08)	(4.57)	(0.10)	(0.07)
Constant	15.07	12.91	0.72	0.19
	(2.50)	(2.08)	(0.07)	(0.06)
Adjusted R^2	0.015	-0.011	0.075	0.029
Control mean	13.66	14.87	0.54	0.12
No Feedback <i>p</i> -value	0.44	0.40	0.38	0.12
PLS p-value	0.13	0.54	0.13	0.02
Observations	303	303	276	276

Table 26: Heterogeneous effects – Primary outcomes by completed std. 8

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	14.33	4.63	0.33	-0.00
	(14.29)	(4.82)	(0.28)	(.)
No Feedback \times				
Completed std. 8	-9.84	-5.31	-0.35	0.07
	(14.52)	(5.91)	(0.28)	(0.05)
PLS	4.67	5.84	-0.00	-0.00
	(7.15)	(6.09)	(.)	(.)
$PLS \times $				
Completed std. 8	1.27	-7.39	0.14	0.15
	(7.57)	(6.77)	(0.07)	(0.06)
Completed std. 8	9.75	13.45	0.55	0.12
	(1.49)	(2.42)	(0.05)	(0.03)
Constant	4.00	1.54	0.00	0.00
	(.)	(0.00)	(.)	(.)
Adjusted \mathbb{R}^2	0.005	-0.012	0.016	0.010
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.08	0.84	0.83	0.21
PLS p -value	0.02	0.60	0.04	0.01
Observations	311	311	284	284

Table 27: Heterogeneous effects – Primary outcomes by completed formal 4

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	2.73	-0.58	-0.06	0.02
	(3.41)	(4.97)	(0.10)	(0.08)
No Feedback \times				
Completed formal 4	3.64	-0.50	0.11	0.08
	(5.09)	(6.86)	(0.15)	(0.10)
PLS	8.30	1.06	0.16	0.15
	(3.78)	(3.92)	(0.10)	(0.09)
$PLS \times $				
Completed formal 4	-4.20	-4.76	-0.00	0.01
	(5.05)	(5.94)	(0.14)	(0.11)
Completed formal 4	-1.23	0.96	-0.14	-0.09
	(2.99)	(4.88)	(0.10)	(0.06)
Constant	14.23	14.42	0.61	0.16
	(1.87)	(2.96)	(0.07)	(0.05)
Adjusted \mathbb{R}^2	0.010	-0.013	0.018	0.013
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.09	0.82	0.67	0.11
PLS p -value	0.22	0.41	0.11	0.02
Observations	311	311	284	284

Table 28: Heterogeneous effects – Primary outcomes by married/co-habitating

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	5.19	-2.32	-0.09	0.05
	(3.58)	(4.80)	(0.10)	(0.08)
No Feedback \times				
Married/co-habitating	-1.60	3.30	0.14	0.05
	(5.24)	(6.69)	(0.15)	(0.10)
PLS	7.78	-3.61	0.09	0.06
	(3.40)	(4.16)	(0.10)	(0.08)
PLS ×				
Married/co-habitating	-4.60	4.20	0.10	0.18
	(5.06)	(5.78)	(0.14)	(0.11)
Married/co-habitating	3.57	-2.09	-0.02	-0.08
	(3.10)	(4.67)	(0.11)	(0.07)
Constant	12.18	15.89	0.56	0.15
	(1.76)	(3.55)	(0.07)	(0.05)
Adjusted \mathbb{R}^2	0.005	-0.014	0.011	0.015
Control mean	13.66	14.87	0.54	0.12
No Feedback p-value	0.35	0.83	0.66	0.17
PLS p-value	0.40	0.88	0.06	0.00
Observations	307	307	280	280

Table 29: Heterogeneous effects – Primary outcomes by has children

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	0.24	-12.87	0.31	0.20
	(3.72)	(7.16)	(0.13)	(0.08)
No Feedback \times				
Has children	5.67	16.33	-0.44	-0.19
	(4.86)	(8.01)	(0.16)	(0.10)
PLS	3.85	-8.70	0.19	0.12
	(4.49)	(7.76)	(0.13)	(0.07)
PLS ×				
Has children	2.49	9.78	-0.06	0.04
	(5.37)	(8.22)	(0.15)	(0.10)
Has children	1.57	-8.46	0.45	0.16
	(3.28)	(7.18)	(0.10)	(0.04)
Constant	12.52	20.99	0.21	0.00
	(2.78)	(6.91)	(0.08)	(.)
Adjusted R^2	0.014	0.003	0.097	0.033
Control mean	13.66	14.87	0.54	0.12
No Feedback <i>p</i> -value	0.06	0.34	0.12	0.82
PLS p-value	0.03	0.69	0.09	0.03
Observations	311	311	284	284

Table 30: Heterogeneous effects – Primary outcomes by currently saves

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	8.07	2.05	-0.00	0.06
	(4.07)	(4.49)	(0.11)	(0.07)
No Feedback \times				
Currently saves	-6.16	-5.25	-0.03	-0.00
	(5.23)	(6.57)	(0.15)	(0.10)
PLS	8.26	3.42	0.24	0.18
	(3.23)	(3.77)	(0.10)	(0.07)
PLS \times				
Currently saves	-4.32	-9.25	-0.19	-0.06
	(4.87)	(5.64)	(0.14)	(0.11)
Currently saves	5.62	7.44	0.14	0.09
	(2.82)	(4.56)	(0.10)	(0.06)
Constant	10.50	10.69	0.47	0.07
	(1.79)	(2.73)	(0.08)	(0.04)
Adjusted \mathbb{R}^2	0.009	-0.004	0.015	0.015
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.56	0.51	0.71	0.45
PLS p -value	0.28	0.17	0.60	0.15
Observations	311	311	284	284

Table 31: Heterogeneous effects – Primary outcomes by above median monthly inc

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	4.17	-0.81	0.09	0.10
	(3.22)	(2.76)	(0.10)	(0.07)
No Feedback ×				
Above median monthly inc.	0.59	-0.85	-0.23	-0.09
	(5.11)	(6.86)	(0.14)	(0.10)
PLS	5.99	-0.12	0.24	0.09
	(3.43)	(3.05)	(0.10)	(0.07)
PLS ×				
Above median monthly inc.	-0.97	-4.36	-0.23	0.09
	(4.97)	(5.99)	(0.14)	(0.11)
Above median monthly inc.	2.62	9.22	0.30	0.08
	(3.01)	(5.01)	(0.10)	(0.07)
Constant	12.48	10.74	0.40	0.08
	(1.85)	(2.25)	(0.07)	(0.04)
Adjusted R^2	0.006	0.016	0.039	0.026
Control mean	13.66	14.87	0.54	0.12
No Feedback p-value	0.23	0.79	0.17	0.85
PLS p-value	0.16	0.39	0.89	0.04
Observations	311	311	284	284

Table 32: Heterogeneous effects – Primary outcomes by employment status

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	4.67	-1.66	-0.03	0.17
	(3.69)	(3.74)	(0.10)	(0.07)
No Feedback \times				
Employment status	-0.56	1.04	0.01	-0.21
	(5.11)	(6.51)	(0.14)	(0.10)
PLS	9.02	1.18	0.31	0.17
	(3.28)	(3.69)	(0.10)	(0.07)
PLS \times				
Employment status	-6.82	-5.57	-0.34	-0.04
	(4.91)	(5.89)	(0.14)	(0.11)
Employment status	4.53	6.42	0.30	0.14
	(2.93)	(4.77)	(0.10)	(0.06)
Constant	11.42	11.69	0.39	0.04
	(1.76)	(3.10)	(0.07)	(0.03)
Adjusted \mathbb{R}^2	0.011	0.002	0.066	0.026
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.25	0.91	0.77	0.63
PLS p -value	0.55	0.34	0.77	0.15
Observations	311	311	284	284

Table 33: Heterogeneous effects – Primary outcomes by self-employment

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	4.59	-3.04	0.03	0.11
	(3.42)	(3.93)	(0.10)	(0.07)
No Feedback \times				
Self-employment	5.74	6.12	-0.22	0.08
	(7.02)	(6.14)	(0.18)	(0.17)
PLS	6.95	-1.40	0.27	0.14
	(3.07)	(3.88)	(0.09)	(0.07)
$PLS \times $				
Self-employment	8.24	8.32	-0.41	0.06
	(7.03)	(6.38)	(0.16)	(0.16)
Self-employment	-0.41	-2.75	0.49	0.04
	(3.48)	(4.25)	(0.11)	(0.09)
Constant	12.41	13.92	0.39	0.08
	(1.85)	(3.36)	(0.07)	(0.04)
Adjusted \mathbb{R}^2	0.029	-0.012	0.088	0.014
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.09	0.51	0.21	0.21
PLS p -value	0.02	0.17	0.33	0.17
Observations	231	231	209	209

Table 34: Heterogeneous effects – Primary outcomes by has dependant

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	0.80	-0.31	0.09	0.14
	(4.02)	(6.32)	(0.14)	(0.09)
No Feedback \times				
Has dependent	4.27	-0.85	-0.14	-0.10
	(4.96)	(7.37)	(0.16)	(0.11)
PLS	1.21	-3.07	0.35	0.06
	(4.65)	(6.40)	(0.15)	(0.06)
$PLS \times $				
Has dependent	5.30	1.60	-0.24	0.11
	(5.42)	(7.18)	(0.17)	(0.09)
Has dependent	3.04	5.43	0.50	0.14
	(3.16)	(6.20)	(0.10)	(0.04)
Constant	11.20	10.48	0.12	0.00
	(2.66)	(5.61)	(0.08)	(.)
Adjusted \mathbb{R}^2	0.018	-0.006	0.090	0.033
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.08	0.76	0.54	0.46
PLS p -value	0.02	0.65	0.17	0.01
Observations	311	311	284	284

Table 35: Heterogeneous effects – Primary outcomes by subject is a dependant

	(1) Total no. of deposits	(2) Total deposit amount	(3) Saves with a ROSCA	(4) Gamble more
No Feedback	6.01	-0.07	-0.04	0.03
	(3.12)	(4.36)	(0.08)	(0.06)
No Feedback \times				
Subject is a dependant	-4.80	-1.01	0.15	0.15
	(5.19)	(5.22)	(0.16)	(0.10)
PLS	3.84	-4.20	0.03	0.12
	(2.83)	(3.60)	(0.08)	(0.07)
$PLS \times$				
Subject is a dependant	7.54	11.08	0.45	0.09
	(5.67)	(5.32)	(0.15)	(0.11)
Subject is a dependant	-1.45	-8.23	-0.32	-0.15
	(3.39)	(3.77)	(0.11)	(0.04)
Constant	13.99	16.75	0.62	0.15
	(1.71)	(3.01)	(0.06)	(0.04)
Adjusted R^2	0.016	0.006	0.041	0.017
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.77	0.71	0.41	0.02
PLS p-value	0.02	0.08	0.00	0.01
Observations	311	311	284	284

Table 36: Heterogeneous effects – Primary outcomes by risk averse

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	7.87	-0.13	-0.10	0.08
	(3.63)	(4.91)	(0.10)	(0.08)
No Feedback \times				
Risk averse	-7.63	-1.99	0.18	-0.05
	(4.92)	(6.58)	(0.15)	(0.10)
PLS	7.83	-3.09	0.13	0.15
	(3.50)	(4.14)	(0.10)	(0.08)
PLS \times				
Risk averse	-4.62	3.09	0.02	-0.01
	(4.89)	(5.87)	(0.14)	(0.11)
Risk averse	0.50	-3.87	0.01	-0.05
	(2.97)	(4.76)	(0.10)	(0.07)
Constant	13.42	16.71	0.54	0.14
	(1.99)	(3.50)	(0.07)	(0.05)
Adjusted \mathbb{R}^2	0.017	-0.007	0.016	0.015
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.94	0.63	0.41	0.65
PLS p -value	0.35	1.00	0.14	0.07
Observations	311	311	284	284

Table 37: Heterogeneous effects – Primary outcomes by above median loc

	(1) Total no. of deposits	(2) Total deposit amount	(3) Saves with a ROSCA	(4) Gamble more
No Feedback	4.19	-1.59	-0.08	0.01
	(3.10)	(4.42)	(0.09)	(0.07)
No Feedback ×				
Above median LOC	1.03	2.07	0.16	0.12
	(5.37)	(6.79)	(0.15)	(0.11)
PLS	6.14	-1.86	0.20	0.12
	(3.15)	(3.74)	(0.09)	(0.07)
PLS ×				
Above median LOC	-1.11	0.65	-0.14	0.07
	(5.07)	(6.05)	(0.15)	(0.11)
Above median LOC	-0.72	-0.96	0.04	-0.06
	(3.03)	(4.85)	(0.11)	(0.06)
Constant	13.94	15.25	0.53	0.14
	(1.89)	(3.15)	(0.07)	(0.05)
Adjusted R^2	0.002	-0.015	0.021	0.010
Control mean	13.66	14.87	0.54	0.12
No Feedback p-value	0.24	0.92	0.48	0.10
PLS p-value	0.21	0.80	0.64	0.03
Observations	311	311	284	284

Table 38: Heterogeneous effects – Primary outcomes by above median indiff. point

	(1) Total no. of deposits	(2) Total deposit amount	(3) Saves with a ROSCA	(4) Gamble more
No Feedback	3.06	-8.41	0.02	0.08
	(3.10)	(5.14)	(0.10)	(0.07)
No Feedback \times				
Above median indiff. point	3.71	16.03	-0.07	-0.03
	(5.23)	(6.95)	(0.15)	(0.10)
PLS	9.75	-4.02	0.24	0.19
	(3.47)	(5.07)	(0.10)	(0.08)
$PLS \times$				
Above median indiff. point	-7.98	4.62	-0.20	-0.09
	(4.88)	(5.88)	(0.14)	(0.11)
Above median indiff. point	0.63	-8.85	0.08	0.02
	(2.95)	(4.82)	(0.10)	(0.07)
Constant	13.33	19.42	0.50	0.11
	(1.97)	(4.51)	(0.07)	(0.05)
Adjusted R^2	0.018	0.010	0.011	0.010
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.11	0.10	0.66	0.55
PLS p -value	0.61	0.84	0.70	0.22
Observations	311	311	284	284

Table 39: Heterogeneous effects – Primary outcomes by above median CPGI

	(1)	(2)	(3)	(4)
	Total no. of deposits	Total deposit amount	Saves with a ROSCA	Gamble more
No Feedback	2.53	-1.40	-0.09	-0.01
	(3.29)	(3.45)	(0.10)	(0.07)
No Feedback \times				
Above median CPGI	4.38	1.69	0.16	0.16
	(5.22)	(7.00)	(0.15)	(0.11)
PLS	6.17	0.79	0.13	0.11
	(3.59)	(3.44)	(0.10)	(0.08)
$\mathrm{PLS}\times$				
Above median CPGI	-1.79	-5.46	0.03	0.07
	(4.79)	(5.89)	(0.14)	(0.12)
Above median CPGI	-2.88	2.49	0.00	-0.06
	(2.93)	(4.86)	(0.10)	(0.07)
Constant	15.06	13.66	0.54	0.15
	(2.27)	(2.55)	(0.07)	(0.05)
Adjusted R^2	0.009	-0.010	0.013	0.014
Control mean	13.66	14.87	0.54	0.12
No Feedback p -value	0.09	0.96	0.48	0.06
PLS p -value	0.17	0.33	0.13	0.03
Observations	311	311	284	284

C.4 Panel Regression

Table 40: Regression of deposits on treatment and lottery results

	Made a deposit
Winning ticket	0.02
	(0.01)
Adjusted R^2	0.081
Control mean	0.20
PLS effect	0.82
Observations	4473

Notes: This table reports estimates of a regression of having saved at period t on winning the lottery at t conditional on being in the PLS group and not having saved at t-1. The unit of observation is individual-by-period. Standard errors are in parentheses and clustered at the individual level.

Table 41: Treatment effects on deposits with a linear time trend

	Made a deposit
Lottery	0.07
	(0.04)
Regret	0.09
	(0.04)
Period	-0.00
	(0.00)
Lottery \times Period	-0.00
	(0.00)
Regret \times Period	-0.00
	(0.00)
Constant	0.31
	(0.03)
Adjusted R^2	0.031
Observations	18660

Notes: This table reports a regression of having saved at period t on treatment indicators and a linear time trend. The unit of observation is individual-by-period. Standard errors are in parentheses and clustered at the individual level.

Table 42: Time-varying treatment effects on deposits

	Made a deposit
Lottery	0.10
	(0.07)
Regret	0.12
	(0.07)
Constant	0.60
	(0.05)
Adjusted R^2	0.049
No Feedback joint p -value	0.02
PLS joint p -value	0.01
Observations	18660

Notes: This table reports a regression of having saved at period t on treatment indicators interacted with period indicator variables. The unit of observation is individual-by-period. Standard errors are in parentheses and clustered at the individual level.

C.5 Multinomial Logit

Table 43: Multinomial treatment effects – Gambling behavior

		Relative risk ratio				
	$(1) \qquad (2)$		(3)	(4)	$\overline{(5)}$	
	Constant	No Feedback	PLS	PLS- No Feedback	Obs.	
Gambled less	0.22	0.91	1.69	1.86	284	
	(0.06)	(0.38)	(0.66)	(0.76)		
Gambled more	0.16	1.62	3.03	1.87	284	
	(0.05)	(0.69)	(1.23)	(0.69)		

Notes: This table reports estimates from a multinomial logit regression of the categorial response on treatment assignment. Each row corresponds to a response category with the baseline value as . Column 1 reports the constant term corresponding to the mean of the control group. Columns 2–3 reports the treatment effect in relative risk ratios compared to the control group. Column 4 reports the difference between the two PLS treatments. Standard errors are in parentheses. Column 5 reports the number of observations in the analytic sample. Observations are at the individual level.

Table 44: Multinomial treatment effects – Temptation to gamble

		Sample				
	$(1) \qquad (2)$		(3)	(4)	$\overline{\qquad \qquad }$	
	Constant	No Feedback	PLS	PLS- No Feedback	Obs.	
Less tempted	0.14	0.99	1.78	1.80	284	
More tempted	(0.06) 1.00 (0.21)	(0.64) 1.43 (0.43)	(1.02) 1.32 (0.40)	(1.09) 0.92 (0.28)	284	

Notes: This table reports estimates from a multinomial logit regression of the categorial response on treatment assignment. Each row corresponds to a response category with the baseline value as . Column 1 reports the constant term corresponding to the mean of the control group. Columns 2–3 reports the treatment effect in relative risk ratios compared to the control group. Column 4 reports the difference between the two PLS treatments. Standard errors are in parentheses. Column 5 reports the number of observations in the analytic sample. Observations are at the individual level.

Table 45: Multinomial treatment effects – Hypothetical treatment selection

		Relative risk ratio				
	(1)	(2)	(3)	(4)	$\overline{(5)}$	
	Constant	No Feedback	PLS	PLS- No Feedback	Obs.	
Select No Feedback group	1.33	1.50	0.98	0.66	284	
	(0.28)	(0.48)	(0.31)	(0.22)		
Select PLS group	0.08	6.74	8.53	1.27	284	
	(0.05)	(4.62)	(5.66)	(0.55)		

Notes: This table reports estimates from a multinomial logit regression of the categorial response on treatment assignment. Each row corresponds to a response category with the baseline value as . Column 1 reports the constant term corresponding to the mean of the control group. Columns 2–3 reports the treatment effect in relative risk ratios compared to the control group. Column 4 reports the difference between the two PLS treatments. Standard errors are in parentheses. Column 5 reports the number of observations in the analytic sample. Observations are at the individual level.

D. Baseline Correlates

Table 46: Baseline correlates of number of deposits made

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Avg. indiff. point	0.00 (0.00)							
Geo. discount factor		0.00 (0.00)						
Exp. discount factor		, ,	2.13 (6.83)					
Hyp. discount factor			` ′	0.50 (1.62)				
Dept. from stationarity				, ,	-1.60 (3.09)			
Decreasing impatience					, ,	-2.03 (6.10)		
Coefficient of relative risk aversion						,	-0.14 (1.04)	
Locus of control							()	-0.28 (1.43)
Constant	11.14 (2.44)	11.30 (1.39)	11.08 (2.40)	11.26 (1.96)	11.31 (1.51)	11.33 (1.73)	11.94 (1.68)	11.78 (1.27)
Adjusted R2	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
F-statistic	0.08		0.10	0.10	0.27	0.11	0.02	0.04
Observations	105	105	105	105	105	105	105	105

Notes: This table reports estimates of 8 univariate regressions of number of deposits made on preference parameters estimated in the lab. Standard errors are clustered at the participant level and reported in parentheses.

Table 47: Baseline correlates of amount deposited

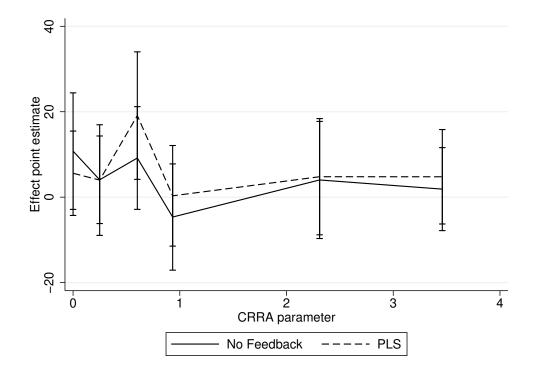
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Avg. indiff. point	-0.02 (0.01)							
Geo. discount factor	(0.01)	-0.00						
Exp. discount factor		(0.00)	-18.98 (10.66)					
Hyp. discount factor			(10.00)	-4.85 (2.55)				
Dept. from stationarity				(2.00)	2.31			
Decreasing impatience					(5.56)	9.42		
Coefficient of relative risk aversion						(9.92)	-0.47	
Locus of control							(2.04)	-1.19
Constant	22.85 (5.85)	16.03 (3.06)	21.11 (5.26)	19.96 (4.59)	15.56 (3.11)	16.96 (3.66)	15.41 (3.22)	(2.73) 14.87 (2.40)
Adjusted R2	0.03	-0.00	0.01	0.02	-0.01	-0.00	-0.01	-0.01
F-statistic	4.07		3.17	3.61	0.17	0.90	0.05	0.19
Observations	105	105	105	105	105	105	105	105

Notes: This table reports estimates of 8 univariate regressions of amount deposited on preference parameters estimated in the lab. Standard errors are clustered at the participant level and reported in parentheses.

E. Visualization

E.1 Main treatment effects by risk aversion

Figure 2: Treatment effect by risk aversion – Total deposits made



E.2 Savings behavior over project period

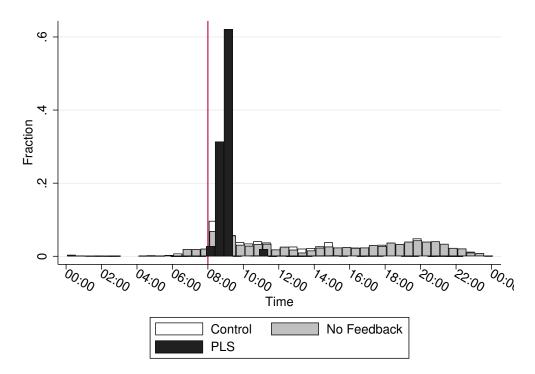
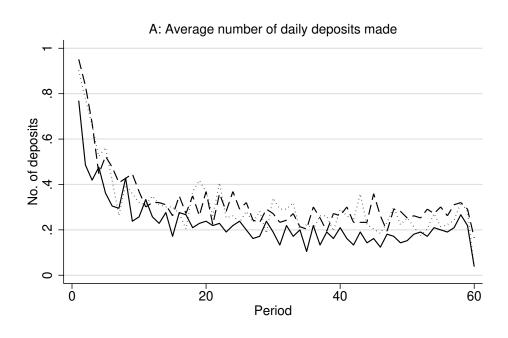


Figure 3: Timing of deposits

Notes: This figure plots the empirical distribution of timing of all deposits over the project period. Each bin spans 30 minutes with a height equal to the fraction of all deposits within each treatment group. Participants received the first SMS at 8:00 that summarized how much the participant saved the previous day, how much the participant earned through a matching contribution or winnings, and their total balance. An hour later, participants received a second SMS encouraging them to save that day. Participants in REGRET received a new lottery ticket with the second message.

Figure 4: Number of daily deposits



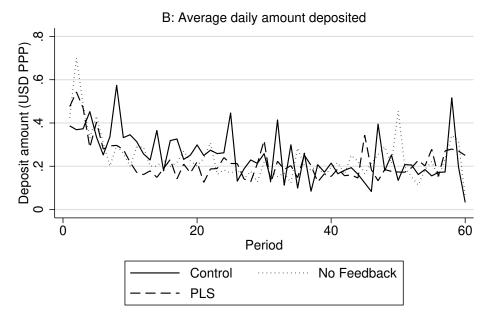


Figure 5: Cumulative number of deposits

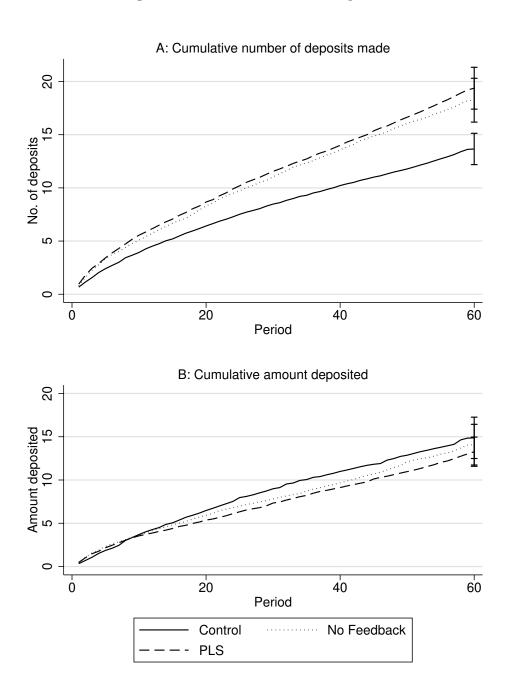
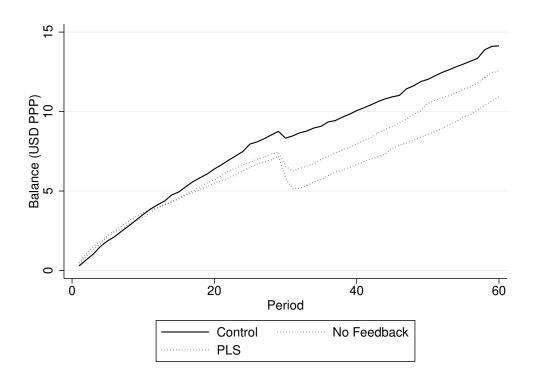
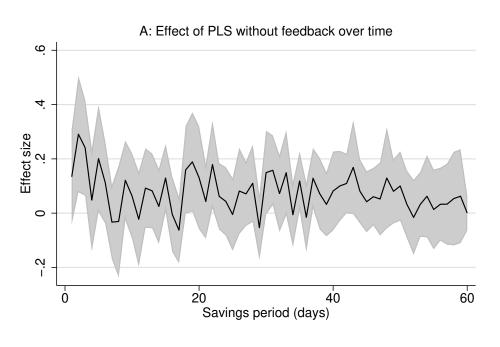


Figure 6: Daily balance averaged over all participants



E.3 Panel treatment effects

Figure 7: Effects over time – Number of deposits



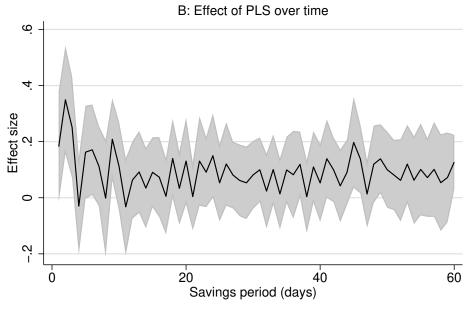


Figure 8: Effects over time – Amount deposited

