

Online Appendix for  
“Why Don’t the Poor Save More? Evidence from Health Savings  
Experiments”  
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## A1. Who participates in ROSCAs?

To study the determinants of ROSCA participation, we use data from an ongoing savings project we are conducting with a random sample of households in Western Kenya (Dupas et al., 2012). Unlike the current study, participants in that study were sampled from a census of *all* households in three villages, and should therefore be representative of households in the area. We collected background characteristics and ROSCA participation from every respondent in that sample. In total, we have data on 2,580 adults in 1,693 households. We present this data in Appendix Table A8, in which we regress ROSCA participation on several background characteristics.

In Column 1, we include standard demographic variables including gender, marital status, age, and a measure of wealth (the value of animals owned).<sup>1</sup> Consistent with other studies, we find that women are much more likely to join ROSCAs than men (by close to 15 percentage points, on an average participation rate of 41 percent), but marital status does not appear to be a driver. We also find that more educated and richer individuals are more likely to join ROSCAs, and that older people are less likely.

In Column 2, we include other controls, including measures of risk aversion and time discounting identical to those presented in Table 1. We find that people who are more risk loving are more likely to join. We find no evidence that patience or time inconsistency affect participation. These results suggest that present-bias may not be the primary driver of ROSCA participation in our study context.

## A2. External Validity

To the extent that our sample is representative of 40% of the population, the impacts that we present in the paper are only applicable to these 40%. How would the four saving devices we introduced likely impact the rest of the population? We can only speculate on that point. The fundamental question is whether people who are not currently in ROSCAs have a lower or higher unmet demand for savings. If those people who do not participate in ROSCAs are simply less interested in saving, then the impact of any of our technologies would of course be lower. If, however, some people do not join ROSCAs for other reasons (for example, because they do not have the time for regular meetings), then the impact could be higher since those not in ROSCAs have no less interest in saving but fewer options to save securely.

Even aside from this issue, the impact of the two ROSCA-level treatments (the *Health pot* and the *Health Savings Account*) would also likely differ for non-ROSCA participants. Since both these schemes require some level of trust in others (either the co-contributors to the health pot or the treasurer of the HSA), non-ROSCA participants might be less likely to take them up since they might not be able to identify a group they trust enough to start either scheme. Potentially, these schemes could be run by a bank, but even banks are (often rightfully) viewed with suspicion in the area (Dupas et al. 2012).

## A3. Why Didn't ROSCAs Start These Programs on Their Own?

The last important question is why, if these savings technologies had such big effects, individuals did not come up with them on their own. After all, none of the technologies we introduced required anything new. In fact, the *Health Pot* was simply applying the concept of the ROSCA specifically to health products. The idea of earmarking was not novel either, since many ROSCAs use spending agreements for their main pot

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<sup>1</sup>We also include village fixed-effects in this regression.

(Gugerty, 2007). Our only innovation was the focus on health. Likewise, ROSCAs could easily implement the *HSA* scheme on their own. We provided those sampled for the *HSA* encouragement with a nice-looking ledger to record deposits and withdrawals, but a cheap exercise book available at the local store could have served the same purpose. Finally, the boxes we offered were made by hand by a local artisan. They cost about \$2 each, including the lock. People could make the box themselves and would only have to invest in a lock, at a cost of \$1. In fact, in other parts of Africa, people make lockboxes that do not actually require a lock – they just have a narrow slit that allows deposits but not withdrawals (Shipton 1990). Why didn't people in our study area do this on their own?

We asked people this question directly (in an open ended way) in our long-term follow-up, and coded their answers. Results are presented in Appendix Table A9. For the box, only 3% of respondents reported that they were using a savings box already (typically made out of wood). Almost all other respondents answered that they had “never thought of it” (88%). Only 8% reported the problem was the expense. For the *Health Pot*, 72% said they had never thought of it. The remainder said that they had not thought of ROSCAs as something that could be used for health-specific savings (rather than for savings for other purposes). For the *HSA*, the answers were similar: 77% reported that they had not thought of the idea and 23% reported that they had not thought of ROSCAs as a place to save for health.

While these answers are not really satisfactory in the sense that they do not really get at the bottom of *why* people did not think of it on their own, they suggest that once these ideas have been introduced, they should diffuse, which is exactly what we observe in section V.B.

## References

- [1] Dupas, Pascaline, Sarah Green, Anthony Keats, and Jonathan Robinson. 2012. “Challenges In Banking The Rural Poor: Evidence From Kenya’s Western Province.” In NBER Volume on African Economic Successes, Forthcoming, edited by S. Johnson S. Edwards and D. Weil. University of Chicago Press.
- [2] Gugerty, Mary Kay. 2007. “You Can’t Save Alone: Commitment in Rotating Savings and Credit Associations in Kenya.” *Economic Development and Cultural Change* 55 (2):251–282. URL <http://www.journals.uchicago.edu/doi/abs/10.1086/508716>.
- [3] Shipton, Parker. 1990. “How Gambians Save - and What Their Strategies Imply for International Aid.” WPS 395, Agriculture and Rural Development Department, The World Bank.

Appendix Table A1. Summary Statistics and Balance Check (ROSCA Level)

	Control Group	<i>Treatment Groups:</i>				P-Values for Test of:				
		Safe Box	Lockbox	Health		1=2=3 =4=5	2=1	3=1	4=1	5=1
				Pot	HSA					
1	2	3	4	5	6	7	8	9	10	
Number of Members in ROSCA	17.78 (7.00)	17.70 (10.41)	17.62 (9.83)	13.52 (6.07)	18.08 (6.75)	0.29	0.98	0.95	0.10	0.91
Female Only ROSCA	0.33 (0.49)	0.30 (0.47)	0.38 (0.50)	0.30 (0.47)	0.27 (0.45)	0.93	0.83	0.73	0.85	0.66
Share of Female Members	0.70 (0.31)	0.77 (0.25)	0.77 (0.25)	0.79 (0.23)	0.68 (0.32)	0.62	0.44	0.43	0.33	0.82
Number of meetings per month	2.33 (1.14)	1.95 (1.03)	2.38 (1.27)	2.26 (1.14)	2.15 (1.12)	0.75	0.31	0.88	0.84	0.61
Contribution Size, Monthly Equivalent (in Ksh)	522 (483)	353 (292)	344 (288)	380 (282)	397 (278)	0.44	0.11	0.08*	0.17	0.21
Pot Size (in Ksh)	4209 (4309)	3295 (3068)	3115 (3388)	3100 (3648)	3397 (2523)	0.84	0.41	0.29	0.30	0.43
ROSCA provides loans to members	0.61 (0.50)	0.60 (0.50)	0.58 (0.50)	0.61 (0.50)	0.77 (0.43)	0.63	0.94	0.82	0.99	0.29
ROSCA has an insurance pot	0.39 (0.50)	0.45 (0.51)	0.60 (0.50)	0.52 (0.51)	0.65 (0.49)	0.41	0.71	0.18	0.40	0.09*
Predetermined Order	1.00	1.00	0.96 (0.20)	1.00	0.96 (0.20)	0.67	1.00	0.34	1.00	0.35
"Health Script" happened during regular meeting	0.94 (0.24)	0.84 (0.37)	0.88 (0.34)	0.91 (0.29)	0.88 (0.33)	0.89	0.33	0.49	0.73	0.52
"Health Script" happened in the morning	0.17 (0.38)	0.35 (0.49)	0.15 (0.37)	0.13 (0.34)	0.19 (0.40)	0.41	0.16	0.92	0.77	0.83
Number of ROSCAs (Total = 113)	18	20	26	23	26					

Appendix Table A2. Baseline Health Savings Goal

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Money needed to reach Goal (self-assessed)	Months needed to reach Goal (self-assessed)	Specific Goal						Money in Case of Emergencies
			Chlorine to Treat Water	Water Filter	Water Container	Bednet	Latrine	Gum Boots	
Safe Box	-104.05 (97.23)	-0.64 (0.33)*	-0.07 (0.04)	-0.04 (0.03)	0.01 (0.04)	0.16 (0.08)*	0.00 (0.02)	0.01 (0.04)	-0.09 (0.04)**
Lockbox	49.84 (104.18)	-0.01 (0.32)	-0.13 (0.04)***	0.00 (0.04)	0.07 (0.04)*	0.10 (0.07)	0.00 (0.02)	0.04 (0.03)	-0.08 (0.04)**
Health Pot	68.90 (99.03)	-0.34 (0.34)	-0.01 (0.06)	0.03 (0.04)	0.04 (0.04)	-0.01 (0.08)	-0.02 (0.01)	-0.04 (0.04)	-0.01 (0.04)
Health Savings	0.17 (105.81)	-0.02 (0.38)	-0.08 (0.05)*	-0.03 (0.03)	0.05 (0.04)	0.06 (0.07)	-0.01 (0.01)	0.01 (0.04)	0.01 (0.04)
<i>p-value for F-test joint significance</i>	<i>0.36</i>	<i>0.05**</i>	<i>0.03**</i>	<i>0.09*</i>	<i>0.44</i>	<i>0.14</i>	<i>0.67</i>	<i>0.27</i>	<i>0.01***</i>
Control Mean	548.26	2.56	0.25	0.07	0.06	0.32	0.04	0.10	0.16
Control Std. Dev.	742.71	3.14	0.44	0.26	0.24	0.47	0.19	0.30	0.37
Observations	823	829	832	832	832	832	832	832	832

Notes: Data collected at baseline. Individual controls include gender, age, time preferences, marital status, whether the respondent is a net provider of loans/gifts in the community, number of ROSCA memberships, and an indicator variable for having been sampled for multiple treatments. Rosca level controls include the monthly ROSCA contribution as well as the stratification dummies. The money needed to reach goal is trimmed of the top 1% of values.

Appendix Table A3. Attrition in 6- and 12-month follow-ups

	(1)	(2)
	Could not be interviewed at midline (after 6 months)	Could not be interviewed at endline (after 12 months)
Safe Box	0.049 (0.056)	0.000 (0.033)
Lock Box	0.026 (0.035)	-0.013 (0.031)
Health Pot	0.031 (0.042)	0.040 (0.030)
HSA	0.052 (0.046)	-0.020 (0.029)
Age	0.001 (0.001)	-0.001 (0.001)*
Female	-0.045 (0.041)	-0.038 (0.027)
Female * Married	-0.004 (0.036)	0.054 (0.019)***
Provider	0.024 (0.040)	-0.038 (0.021)*
More patient now than in the future	-0.015 (0.031)	-0.009 (0.031)
Present-Biased	0.066 (0.038)*	-0.022 (0.030)
Maximal Discount Rate in Present and in Future	0.039 (0.025)	-0.032 (0.024)
Observations	833	833
R-squared	0.34	0.05
Mean of Dep. Var. (Control Group)	0.054	0.081

Notes: see Table 1 notes for the definitions of the variables. All regressions include strata fixed effects and control for the monthly rosca contribution.

Standard errors in parentheses, clustered at the rosca-level. \*\*\*, \*\*, \* indicates significance at 1, 5 and 10%.

Appendix Table A4. Heterogeneity of Impacts (Preventative Health Investments), including interactions between treatments and wealth and number of children

	(1)	(2)	(3)	(4)
	Dependent variable: Amt spent on preventative health products (Ksh)			
	FULL SAMPLE		WOMEN ONLY	
	OLS	Total Effect if TRAIT <i>p-val</i>	OLS	Total Effect if TRAIT <i>p-val</i>
Safe Box	104.55 (96.50)		32.51 (175.06)	
X TRAIT = provider	-124.71 (179.16)	-20.16 <i>0.93</i>	-65.57 (208.69)	-33.06 <i>0.92</i>
X TRAIT = present-bias	-178.25 (134.11)	-73.7 <i>0.64</i>	-378.77 (179.23)**	-346.25 <i>0.21</i>
X TRAIT = married	- -	- -	290.38 (192.60)	322.89 <i>0.02**</i>
Lockbox	-27.74 (113.88)		-100.65 (173.01)	
X TRAIT = provider	201.70 (136.41)	173.96 <i>0.33</i>	221.19 (129.72)*	120.54 <i>0.56</i>
X TRAIT = present-bias	19.87 (110.30)	-7.88 <i>0.95</i>	-109.39 (145.25)	-210.03 <i>0.25</i>
X TRAIT = married	- -	- -	138.38 (126.05)	37.73 <i>0.85</i>
Health Pot	14.07 (176.40)		209.83 (189.56)	
X TRAIT = provider	315.83 (254.25)	329.9 <i>0.36</i>	635.82 (239.07)***	845.65 <i>0.01***</i>
X TRAIT = present-bias	69.44 (267.94)	83.51 <i>0.81</i>	-317.50 (224.99)	-107.67 <i>0.69</i>
X TRAIT = married	- -	- -	-215.67 (310.25)	-5.84 <i>0.99</i>
ROSCA Level Controls included	Yes		Yes	
Individual Level Controls included	Yes		Yes	
Observations	771		568	
R-Squared	0.20		0.22	

*This table replicates Table 4 in the main manuscript, but the regression specification used adds interactions between the treatments and the following characteristics: children and income in the week before the baseline. Note that inclusion of these control interactions is problematic since baseline income is likely endogenous to social networks and to time preferences.*

Appendix Table A5. Heterogeneity of Impacts (Ability to Cope with Emergencies), including interactions between treatments and wealth and number of children

	(1)	(2)	(3)	(4)
	Dependent variable: Could not Afford Full Medical Treatment for an Illness in Past 3 Months			
	FULL SAMPLE		WOMEN ONLY	
	Coefficient	Total Effect if TRAIT <i>p-val</i>	Coefficient	Total Effect if TRAIT <i>p-val</i>
Safe Box	-0.03 (0.14)		0.09 (0.19)	
X TRAIT = provider	-0.27 (0.19)	-0.31 <i>0.15</i>	-0.11 (0.26)	-0.01 <i>0.97</i>
X TRAIT = present-bias	0.31 (0.15)**	0.28 <i>0.11</i>	0.15 (0.20)	0.24 <i>0.29</i>
X TRAIT = married	- -	- -	-0.02 (0.22)	0.07 <i>0.70</i>
Health Savings	0.00 (0.13)		0.28 (0.16)*	
X TRAIT = provider	-0.39 (0.19)**	-0.39 <i>0.05**</i>	-0.28 (0.27)	0.00 <i>0.99</i>
X TRAIT = present-bias	0.12 (0.12)	0.12 <i>0.39</i>	-0.13 (0.20)	0.15 <i>0.46</i>
X TRAIT = married	- -	- -	-0.10 (0.20)	0.18 <i>0.32</i>
ROSCA Level Controls included	Yes		Yes	
Individual Level Controls included	Yes		Yes	
Observations	771		568	
R-Squared	0.14		0.19	

*This table replicates Table 5 in the main manuscript, but the regression specification used adds interactions between the treatments and the following characteristics: children and income in the week before the baseline. Note that inclusion of these control interactions is problematic since baseline income is likely endogenous to social networks and to time preferences.*

Appendix Table A6. Determinants of Take-up of Savings Technologies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Safe Box		Lock Box				Health Savings Account		Health Pot	
	Amount in Box		Amount in Box		Had called to have box opened		Total Deposits		Took up Health Pot	
	6 months	1 year	6 months	1 year	6 months	1 year	6 months	1 year	6 months	1 year
Provider	-43.516 (474.306)	-76.257 (123.094)	294.632 (186.661)	317.363 (247.554)	0.111 (0.078)	0.185 (0.071)**	0.957 (38.554)	-43.859 (87.467)	0.304 (0.101)***	0.089 (0.126)
Present-Bias	-964.198 (483.635)*	-308.460 (171.297)*	95.973 (126.635)	-107.175 (372.878)	-0.073 (0.087)	-0.114 (0.122)	14.085 (40.645)	-49.448 (55.082)	-0.125 (0.149)	-0.164 (0.142)
Married female	87.408 (330.657)	72.482 (108.580)	-50.099 (107.479)	102.199 (234.312)	-0.145 (0.078)*	0.134 (0.068)*	-88.871 (64.034)	-71.521 (57.268)	-0.106 (0.144)	0.002 (0.109)
Age	-7.283 (10.410)	8.148 (5.668)	4.242 (4.876)	-8.400 (10.238)	-0.001 (0.002)	-0.003 (0.002)	0.537 (0.964)	-0.218 (1.358)	-0.004 (0.004)	0.006 (0.004)
Female	-371.892 (618.841)	139.325 (135.169)	-88.922 (112.284)	-296.907 (210.620)	0.050 (0.112)	0.058 (0.093)	65.974 (59.908)	76.536 (70.966)	0.174 (0.166)	0.005 (0.147)
Patient now, impatient later	-587.651 (465.730)	24.668 (90.187)	242.304 (131.965)*	9.912 (242.410)	0.056 (0.076)	0.021 (0.101)	-0.658 (33.968)	-21.677 (39.619)	-0.022 (0.126)	-0.107 (0.116)
Maximal Discount Rate in Present and in Future	-298.460 (550.361)	87.178 (89.406)	-21.907 (76.398)	-312.825 (212.855)	-0.019 (0.057)	-0.114 (0.106)	-6.341 (29.598)	-15.390 (39.918)	0.012 (0.085)	-0.090 (0.084)
ROSCA controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	75	72	129	118	188	180	213	213	137	113
R-squared	0.29	0.38	0.28	0.19	0.34	0.38	0.46	0.47	0.25	0.23
Mean of dependent variable	633.56	310.88	321.08	572.81	0.18	0.31	148.43	222.34	0.65	0.72
SD of dependent variable	1248.50	423.45	446.06	866.42	0.38	0.46	226.96	383.75	0.48	0.45

Notes: The data comes from unannounced home visits as well as ROSCA visits conducted after 6 months and 12 months. Data on balances in the boxes are based on direct observation by enumerators. Data on balances and withdrawals for the HSA group come from the HSA record book kept by treasurers for ROSCAs sampled for HSA.

Exchange rate was roughly 75 Ksh to US \$1 during the study period.

Appendix Table A7. Representativeness of 3-year Follow-up Sample

	(1)	(2)	(3)	(4)
<b>Panel A. Unlocked Box</b>				
	Uses Box		Amount in Box	
	6 months	1 Year	6 months	1 Year
Completed long-term follow-up survey	0.05 (0.10)	-0.06 (0.11)	119.93 (225.79)	120.82 (101.16)
Mean for those not completing survey	0.69	0.72	536.22	208.22
S.D. for those not completing survey	0.47	0.46	950.85	167.02
Observations	102	101	75	72
<b>Panel B. Locked Box</b>				
	Uses Box		Amount in Box	
	6 months	1 Year	6 months	1 Year
Completed long-term follow-up survey	-0.03 (0.07)	-0.09 (0.08)	142.52 (79.32)*	38.87 (151.21)
Mean for those not completing survey	0.69	0.75	232.47	539.88
S.D. for those not completing survey	0.47	0.44	250.96	773.62
Observations	197	180	129	118
<b>Panel C. Health Pot</b>				
	Contributes to Pot		Reports "Health Pot Helped Save More"	
	6 months	1 Year	6 months	1 Year
Completed long-term follow-up survey	0.04 (0.08)	0.01 (0.08)	0.01 (0.04)	-0.03 (0.03)
Mean for those not completing survey	0.64	0.75	0.98	1.00
S.D. for those not completing survey	0.48	0.44	0.16	0.00
Observations	137	113	89	75
<b>Panel D. Health Savings Account</b>				
	Uses Account		Balance	
	6 months	1 Year	6 months	1 Year
Completed long-term follow-up survey	0.04 (0.03)	-0.03 (0.02)	-19.33 (22.70)	-2.75 (21.14)
Mean for those not completing survey	0.92	0.99	128.63	146.42
S.D. for those not completing survey	0.28	0.11	185.78	204.44
Observations	161	155	202	209

Notes: To check the representativeness of the long-term follow-up sample, this table compares the 6-month and 12-month take-up figures among those interviewed for the long-term follow-up (after 33 months) and the full sample. All regressions include strata fixed effects. Standard errors in parentheses, clustered at the rosca-level. \*\*\*, \*\*, \* indicates significance at 1, 5 and 10%.

Appendix Table A8. Determinants of ROSCA Participation

	(1)	(2)
Female	0.145 (0.051)***	0.146 (0.051)***
Years education	0.019 (0.003)***	0.018 (0.003)***
Age	-0.002 (0.001)**	-0.001 (0.001)**
Married	0.018 (0.048)	0.018 (0.048)
Female * Married	-0.020 (0.055)	-0.024 (0.055)
Value of animals (1000 Ksh)	0.003 (0.001)***	0.003 (0.001)***
Percentage Invested (out of 100 Ksh) in Risky Asset <sup>a</sup>		0.121 (0.043)***
Somewhat Patient		-0.002 (0.036)
Present-Biased		-0.027 (0.036)
Patient Now, Impatient Later		-0.032 (0.037)
Maximal Discount Rate in Present and Future		-0.042 (0.033)
Observations	2580	2580
# of households	1693	1693
R-squared	0.047	0.051
Mean of the dependant variable	0.412	0.412

Notes: Data taken from a random sample of households in Western Kenya. Standard errors, clustered at the household level, in parentheses. \*\*\*, \*\*, \* indicates significance at 1, 5 and 10%.

See Table 1 for definition of time preference measures.

<sup>a</sup>The risky asset paid off 4 times the amount invested with probability 0.5 and 0 otherwise.

**Appendix Table A9. Answers to semi-qualitative surveys administered at Long-Term Follow-up**

	(1)	(2)	(3)
	Box <sup>1</sup>	Health Pot	HSA
<b>Why didn't you adopt this saving technology on your own?</b>			
N/A, was already using this technology	0.03	0.00	0.00
Never thought of it	0.88	0.72	0.79
Expensive	0.08	-	-
ROSCAs are not for health	-	0.28	0.21
Afraid money would be stolen	0.01	-	-

*Notes: Data is from follow-up conducted 33 months after project started.*

<sup>1</sup> *We pool the two box groups because the Lock Box group was given the key after 1 year.*