Leveraging the Lottery for Financial Inclusion: Lotto-Linked Savings Accounts in Haiti

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Abstract

Most Haitians are more familiar with lottery wagers than any other financial transaction and lack access to savings products. Using a lab-in-field experiment in Port-au-Prince, we asked 306 participants to allocate a fixed budget across consumption, a real-world lotto product, a real-time traditional savings product, and a lotto-linked savings (LLS) product that returned 60-100% of the principal with lotto credit in lieu of interest. We find that the introduction of an LLS product increased total upfront savings by 22%, an increase roughly equivalent to that induced by raising the traditional interest rate from 5 to 20%. This savings response increased to 30% when the LLS product returned more principal and less lotto credit. An LLS product with a lower expected return was equally effective at increasing savings as one that had the same expected return as the savings product, suggesting it is the presence, not the extent, of the lotto component that drives the savings response. The LLS-induced increase in savings was financed by large reductions in lotto spending, slightly smaller reductions in traditional savings, and yet smaller reductions in consumption, which increased subjects' overall expected returns in the experiment. Individuals who allocated more to the lottery pre-LLS and who overweight small probabilities increased savings most in response to the LLS.

JEL Classification: O12, D14, G21

Keywords: Savings, Lottery, Prize-linked savings, Financial inclusion, Haiti

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1 Introduction

About 80% of the Haitian population lacks access to formal financial services (Demirgüç-Kunt et al., 2014). But where banks are scarce, lotto stalls are abundant. Wagers on lotto numbers are the most familiar financial transaction for the working poor. We conducted a framed lab-in-field experiment among the working poor in Port-au-Prince to test whether lotto-linked savings (LLS) can leverage this familiarity with the lotto to increase savings. In contrast to a traditional savings account with a fixed and certain interest rate, an LLS account offers a lottery ticket or credit in lieu of interest payment. This experiment explores whether LLS may catalyze greater financial inclusion by providing the working poor a compelling and familiar gateway to formal savings and ultimately to broader financial services and products.

Savings products with similar features as LLS have existed in different forms since 18th and 19th Century Europe (Guillen and Tschoegl, 2002; Kearney et al., 2010).[1] and have been offered and piloted more widely in recent decades.[2] In Sweden, for example, an estimated 8% of the total government debt is in the form of bonds with lottery coupons (Green and Rydqvist, 1997). In Latin America, it is often raffles for in-kind prizes (e.g., gold, cars) rather than cash lotteries that provide the random incentive to save. In the US, legal and regulatory barriers have made it difficult to launch LLS products called Prize-Linked Savings Accounts, but recent pilots launched by credit unions in various states show promise. Whereas lottery play and gambling more generally were rarely considered serious topics for empirical economic research, the popularity of behavioral economics and finance in the past decade seems to have legitimized this vein work, including research on LLS products (Kearney et al., 2010; Tufano, De Neve and Maynard, 2011). In a pilot in Nebraska, 56% of individuals who saved

[1] For example, in the 17th and 18th centuries, England and France issued various securities which paid a premium to a subset holders instead of paying a set interest rate. At the close of the 19th Century, versions of LLS existed across much of Europe (Levy-Ullman, 1896). The UK Premium Savings Bonds still exist today. These bonds pay a certain interest and automatically enrolls the holder in a monthly lottery with prizes ranging from 50 to one million GBP.

[2] Guillen and Tschoegl (2002) detail the variants of LLS products that have been offered in Mexico, Colombia, Venezuela, Argentina, Sweden, Japan, Germany, Turkey, Kenya, Indonesia, Spain, and Pakistan.

in response to a "Save to Win" pilot had no formal savings at baseline, suggesting extensive margin expansion in access to and usage of savings in response to an LLS product (Cookson, 2016).[3] On the other hand, a large experiment in California with "individual development accounts" that included a lottery feature finds no effect on total savings on either intensive or extensive margins, ostensibly because of other binding constraints (Loibl et al., 2016).

Outside of North America and Europe, there is some evidence of LLS-induced savings effects among the emerging middle class. Commercial banks in upper-middle income countries such as Mexico, Argentina and South Africa have launched LLS pilots and programs. First National Bank in South Africa, for example, launched its "Million-a-Month" LLS product in 2005. Based on this 18 month pilot, an evaluation found that the LLS product increased savings by 38% and that this savings increase was financed primarily by a reduction in lottery play (Cole, Iverson and Tufano, 2014).[4] While encouraging for LLS products in general, the relevance of this South African experience for our analysis is limited by the fact that those included in the study were bank employees with average individual incomes more than double the average household income for South Africa. Moreover, the vast majority of this population had pre-existing access to financial services. In sharp contrast, our study population is poor, food insecure and has almost no access to financial services.

Among poor populations more comparable to our research setting in Haiti, two recent and relevant studies are worth highlighting. First, Brune (2015) conducts a randomized control trial (RCT) with 1,600 piece-rate workers at a large tea producing firm in Malawi to test the effect of bonuses on worker performance. He finds some (weak) evidence that lottery bonuses increased worker attendance more than fixed bonuses. Second, Herskowitz (2016) explores the motives behind gambling on professional soccer matches in Kampala, Uganda. This study of 1,700 men who bet regularly on soccer matches finds that such betting may be a rational response for people with binding liquidity constraints who are striving to purchase

[3]For details about this program see www.savetowin.org, which currently serves credit unions in 10 US states.

[4]By all reports this was a very successful pilot, but was ultimately shut down due to pressure from the official South African lottery system.

a lumpy good. Through a mix of RCT and lab-in-field evidence, the role of both lack of savings options and a target lumpy expenditure in observed gambling behavior is clear. Our analysis aims to contribute to this emerging area of research, which considers lottery play and gambling impulses among the poor to be legitimate research topics with important welfare and, potentially, policy implications.

Given that there is no evidence from poor countries of the potential of LLS products to increase savings and ultimately to expand financial inclusion, we could have - in principle - conducted this study in any of the 80 or so low and lower-middle income countries in the world. But there are few places seemingly as well-positioned to benefit from an LLS product as Haiti where poverty rates are high, access to formal savings and other financial services is limited, and lottery play is rampant. In addition to being 80% unbanked, Haitians spend as much as $1.5 billion per year at over 35,000 independently owned lottery stalls (Bahtia, 2010). This is equivalent to $220 per year for each individual over the age 15, a staggering figure in a country where the per capita GDI is $810. With well-known and consistent rules, the Haitian lottery, which uses numbers drawn in the New York Lottery, is transparent and offers known odds in a country where instability and corruption characterizes many institutions and uncertainty defines daily life (Wilson and Levin, 2010).

Following the design of Atalay et al. (2014), we conduct an experiment in which participants make a series of portfolio allocation decisions that include lottery and LLS options. To leverage familiarity with the lotto, the lottery options in the experiment consisted of the most basic and most familiar lotto product in Haiti. Specifically, participants in the experiment allocated 300 HTG ($4.8) across (i) consumption paid directly to the participant in two weeks, (ii) a real-world lotto credit available for participants to use in two weeks, (iii) a traditional savings product that pays the principal with interest in eight weeks, and (iv) the LLS product, which paid principal - either partially or entirely - along with lotto credit in eight weeks. This LLS product allows participants to "invest" their lotto credit based on numbers of their choosing since number selection is a critical aspect to the Haitian lotto

culture (Bahtia, 2010). We find that the introduction of LLS increased total savings by 22 percent, an increase in savings that is financed by reductions in the amount allocated to lotto, slightly smaller reductions in traditional savings and yet smaller reductions in consumption.[5]

In addition, our experiment allows us to test for the effects of different LLS features on total savings. First, we compare two LLS products that differed in the extent of the lotto component. One LLS had a higher savings-to-lotto ratio wherein more of the principal was secured. We find that such an LLS with a higher savings-to-lotto ratio resulted in a larger increase in total savings, suggesting that a reduction in the intensity of the lotto component did not reduce the amount allocated to LLS. In other words, the presence of a small lottery component appears to be sufficient to trigger a sizable increase in savings. Second, we compare two LLS products that differed in their expected return relative to the traditional savings product. One LLS had an expected return equal to the traditional savings product, while another offered a lower expected return. We find no difference in total savings between these two LLS products, again suggesting that individuals respond to the presence of a lotto component rather than the extent of this component

Using a risk experiment adapted from Tanaka, Camerer and Nguyen (2010), we explore which mechanisms might be driving the effect of LLS on total savings. On average, individuals in our sample were, by these experimental measures, risk-loving and tended to overweight small probabilities. We do not find any evidence that the effects of LLS on total savings differ by risk aversion. However, we find that the effect of LLS on total savings was higher for those who more heavily weighted small probabilities. This implies that such a behavioral bias may be driving the effectiveness of LLS we observe. This result is in line with a growing literature on the design of interventions that prove to be effective at increasing savings by acknowledging and leveraging behavioral biases such as self-control and inattention (Ashraf,

[5]The LLS induced increase in savings of 22 percent is the estimated difference in savings between decision rounds with LLS (rounds 3, 4, 5 and 6) and decisions rounds without LLS (rounds 1 and 2). An alternative estimate of the LLS effect would be to compare savings between rounds 1 and 3, which is a 13 percent increase in savings. This is comparable to the average difference in savings between decision rounds 1 and 2 which corresponds to a 15 percent increase in savings resulting from increasing the interest rate of the traditional savings product from 5 to 20 percent.

Karlan and Yin, 2006; Dizon, Gong and Jones, 2016; Dupas and Robinson, 2013; Karlan et al., 2016). Those who allocated more to lottery than savings pre-LLS also increased savings more aggresively when exposed to LLS.[6]

Our paper is one of three studies that experimentally evaluate the impact of a savings product with a lottery component. All three studies find that a lottery component increased total savings. Filiz-Ozbay et al. (2015) conducted lab experiments with students at a US university. They find that a 0.01% probability of receiving a large prize causes subjects to increase their savings by about 4% relative to a traditional savings device with the same expected return. Moreover, they - like we - find that non-linear probability weighting is likely driving the result. Atalay et al. (2014) conducted lab experiments with a sample representative of the US population and with another sample that had lower income and less savings. They find that introducing a lottery-linked savings product increased total savings by 25 percent, quite similar in magnitude to our own finding. Our portfolio allocation game closely followed the experimental design of Atalay et al. (2014), but we used fewer decision rounds and additionally elicited risk preferences to further understand the underlying mechanism for the result. Our research setting - one of the poorest and most food insecure countries in the world - stands in stark contrast to these other studies. Unlike Atalay et al. (2014) and Filiz-Ozbay et al. (2015) we introduce a real-world lotto product, instead of experimentally designed lottery payoffs, among the Haitian poor who exhibit low savings and an extraordinary lotto culture.

2 Experiment and data

In July 2016, we conducted lab-in-field games with 306 participants in four different locations in Port-au-Prince. In each location, we conducted four sessions, one in the morning and

[6]The correlation between overweighting small probabilities and initial allocation to lottery pre-LLS is low, indicating that these two measures are not one and the same. Both the overweighting of small probabilities and the initial allocation to the lottery may be operating in different ways to increase the effectiveness of the LLS in increasing savings.

another in the afternoon across two days. Each of the 16 sessions had 16-20 participants, with an average of 19 participants per session. Local mobilizers recruited participants prior to each session. The mobilizers were instructed to recruit lottery players who had a mobile phone and a Digicel SIM card. Digicel is the largest mobile service provider in Haiti with a 72% market share.[7]

2.1 Registration and survey

As the participant arrived in the session, she went through the registration process, where an enumerator took down her details. Our experiment leveraged Mon Cash, a mobile money platform operated by Digicel in partnership with Scotiabank. The Mon Cash platform allows for deposits, withdrawals, transfers, airtime purchase, payment of goods and services, and receipt of international transfers via mobile phone transactions. The enumerator first transferred a 158 Haitian Gourdes (HTG) show-up fee to the participant's Mon Cash account.[8,9] This was done to build trust in the payment system we would use in the experiments, and to verify that the participant's Mon Cash account was functional.

The enumerator also activated the participant's SMS-lotto account, if it was not already activated. This account is used to wager on a lotto conducted via SMS that is operated by a licensed Haitian company. Using a mobile phone and a Digicel SIM card, individuals can play various lottery games on the SMS-lotto platform. SMS-lotto offers five different lottery games, three of which are well-known *borlette* games traditionally played in lottery stalls across Haiti, namely bolet (and maryaj), three chiffres, and five chiffres. We explain the bolet game in more detail below.[10] After the registration process, which verified that the participant had active Mon Cash and SMS-lotto accounts, the participant was then assigned

[7] Digicel has operations in 31 markets in Central America and the Caribbean, and in the Asia-Pacific region.

[8] Throughout this paper, we use Gourdes as the currency. At the time of the study, the exchange rate was 1 USD= 63 HTG (Haitian Gourdes).

[9] The show-up fee was 150 Gourdes, and an additional 8 Gourdes was paid to the participant to cover the cost of withdrawing the funds from a Mon Cash agent.

[10] See Bernstein (2015) for a more extensive discussion on the Haitian lottery and these different game types.

to another enumerator who conducted a brief survey with her. On average, this survey took about 10 minutes to complete and included questions on demographic characteristics, income, food security, assets, lottery play, savings, credit, and time preferences.[11]

2.2 Portfolio allocation decisions

After all of the participants in a session had completed the survey, a group session was conducted where the facilitator explained the portfolio allocation game. Each participant would be asked to individually make a series of six decisions. In each decision, she would allocate 300 HTG in 10-HTG denominations across three to four of the following financial products, which varied in the rate of return, risk, and timing of payments:

- *Consumption*: Participant receives the full principal in two weeks via Mon Cash.
- *Lotto*: Participant receives the full principal as SMS-lotto credit in two weeks.
- *Savings*: Participant receives the full principal plus interest in eight weeks via Mon Cash.
- *Lotto-Linked Savings (LLS)*: Participant receives the principal - either partially or entirely - in eight weeks via Mon Cash plus SMS-lotto credit cum-interest in eight weeks.

The amount allocated to consumption was paid back in two weeks, instead of immediately. This was done to ensure that individuals did not allocate to consumption simply because they did not trust that any delayed payments would be made. Our experiment thereby eliminates trust that future payments will be made as a possible explanation for differences in allocations between consumption and savings.

Since the lotto product used in the experiment was the familiar bolet game, it needed little explanation to participants. In the bolet game, an individual chooses a two digit number

[11] For very few participants, the survey was conducted after the portfolio allocation game. This was done as a time management strategy in order to ensure that a session was completed.

from 00-99 and a bet amount on that chosen number. The winning numbers are based on the New York lottery, which draws three winning numbers, where the 1st is a three-digit number and the 2nd and 3rd are two-digit numbers. If the chosen number matches the last two-digits of the winning number in the 1st position then you win 50 times your bet; if it matches the winning two-digit number in the 2nd position then you win 20 times your bet; and if it matches the two-digit winning number in the 3rd position then you win 10 times your bet. There are two drawings everyday, one at 12:30 PM and another at 7:00 PM. The expected return on this simple bolet game is -20%. With the aid of SMS-lotto promotional flyers, the facilitator explained to each group how to play this familiar bolet game on a mobile phone. In practice, individuals could later play any game in the SMS-lotto platform with the SMS-lotto credit they receive. Using administrative data generated from each participant's SMS-lotto account, we find that 91 percent of those who used the SMS-lotto credit they received used it to play the bolet game, validating the use of the bolet game as the basis for our calibration of the return of the prototype LLS product. This provides support for our benchmarking of the LLS product to traditional savings.

In the group session, the facilitator only explained the basic form of each financial product. After which, individuals were assigned to an enumerator who asked the participant to make three practice decisions to familiarize participants with the game and then six actual decisions with real payouts. All decisions were made in private and recorded by enumerators on tablets. Across each decision round, we varied which products were offered and we varied the features of the savings and LLS products. The features of the financial products across each decision round are summarized in Table 1.

The LLS offered a combination of some security of the principal plus receiving some percentage of the principal as lottery coupons. For example, for "same return" LLS in decision round 3, the amount allocated to LLS would pay back 65% of the principal in eight weeks and provide the participant with SMS-lotto credit worth 50% of the amount allocated to LLS. This particular LLS configuration yields an expected return of 5%. In each decision

round where the LLS was offered, the enumerator explained to the participant the proportion of principal that would be secured and the proportion of the principal that will be paid out as lotto credit, but the enumerator did not mention the expected return for the LLS.

We rely on variation in product design to test the effect of specific features of the traditional savings and LLS product on total savings. First, the LLS in decision rounds 5 and 6 had less of a lottery component and more of a savings component than the LLS in decision rounds 3 and 4. That is, the LLS in decision rounds 5 and 6 secured more of the principal and provided less lotto credit. This allows us to test for the effectiveness of an LLS by the degree of its lotto component. Additionally, the order of decisions rounds were randomized within session. Some individuals made decisions following order A (series 1-2-3-4-5-6), while others made decisions following order B (series 1-2-5-6-3-4). This allows us to control for ordering effects when testing for the effectiveness of an LLS by the degree of its lotto component. Second, for morning sessions the "same return" LLS was used, so that in each round, the expected return of the LLS product was equal to the return on the savings product. For afternoon sessions, the "lower return" LLS was used, so that in each round, the expected return of the LLS product was less than the return on the savings product. This allows us to test for the effectiveness of an LLS that would cost a financial service provider less than a traditional savings account. Lastly, we varied the interest rate of the savings product across rounds. This allows us to test the effectiveness of an LLS depending on the return on traditional savings.

During the one-on-one exercise to elicit allocation decisions, the enumerator briefly highlighted what was changing across each decision round. Before each allocation decision, the enumerator showed the participant a token with a token number indicating what number the decision was. The participant was reminded each time that one of the six allocation decisions would randomly be selected to be paid out for real. To improve understanding and increase salience, individuals were given real 10-HTG notes worth 300 HTG to allocate into cups which represented a financial product. Moreover, placed in front of each cup were small

Table 1: Financial products across decision rounds

	Round	*Consumption*	*Lotto*	*Savings*	*LLS* *same return*	*LLS* *lower return*
					Between session variation	
		2 weeks	***2 weeks***	***8 weeks***	***8 weeks***	***8 weeks***
Practice	**A**	0% return	-20% E(return)	–	–	–
	B	0% return	–	5% return	–	–
	C	0% return	–	20% return	–	–
Pre-LLS	**1**	0% return	-20% E(return)	5% return	–	–
	2	0% return	-20% E(return)	20% return	–	–
LLS, high risk	**3**	0% return	-20% E(return)	5% return	5% E(return)= 65% principal, 50% lotto	0% E(return)= 60% principal, 50% lotto
	4	0% return	-20% E(return)	20% return	20% E(return)= 80% principal, 50% lotto	15% E(return)= 75% principal, 50% lotto
LLS, low risk	**5**	0% return	-20% E(return)	5% return	5% E(return)= 85% principal, 25% lotto	0% E(return)= 80% principal, 25% lotto
	6	0% return	-20% E(return)	20% return	20% E(return)= 100% principal, 25% lotto	15% E(return)= 95% principal, 25% lotto

cards that illustrated the features of the particular financial product. After each decision was made, the enumerator then verbalized the payoffs depending on the participant's allocation, and the participant was allowed to revise her allocation if she wanted to.[12] This ensured that the participant comprehended the payoffs correctly.

After all of the participants completed their individual decisions, they convened as a group and one of six tokens was drawn from a bag to decide which decision round was to be paid. Then each participant met with her assigned enumerator who gave her a card that summarized the amounts and dates of her payouts.

2.3 Risk preference elicitation

After the portfolio allocation game, we reconvened the participants as a group and conducted an incentive-compatible risk experiment to elicit risk preferences. We use the method in Tanaka, Camerer and Nguyen (2010) with both gains and losses, which allows for prospect theoretic preferences as well as conventional expected utility preferences. In this exercise, participants were asked to make two sets of a series of choices between option A and option B. Each of the two sets had 14 choices, see Appendix Table A1. One of the 28 total choices would randomly be selected and would be played and paid out for real.

In a bag with 10 tokens, the higher payout would be paid if a red token was drawn and the lower payout if a blue token was drawn. After all choices were made, say for example that set 1 and choice 1 were randomly selected to be played for real. Then for a participant that chose option A the bag would contain three red tokens and seven blue tokens, whereas for a participant that chose option B the bag would contain one red token and nine blue tokens.

The facilitator explained the basic form of the risk exercise, then the participants made choices in few practice rounds using tablets. After which, the participants then made the full set of choices individually on tablets, by tapping on images shown on the tablet screen

[12] To operationalize this, enumerators were given payout matrixes that allowed her to easily mention the payoffs depending on the participant's allocation.

and then swiping on the screen to proceed to the next round in the series (see Appendix Figure A1). Note that in the first set, when the participant switched to Option B, then the series skipped to the first choice of the second set. The risk exercise ended when the participant chooses Option B in the second set. After all the participants had completed the exercise, one number was drawn to decide which set and choice number would be played for real. Then, each participant met individually with an enumerator to draw from the bag of ten tokens and receive her payment immediately via Mon Cash.

Following Tanaka, Camerer and Nguyen (2010), we use the switch points in the first and second set of choices to calculate a participant's risk aversion parameter (σ) and her probability weighting parameter (α). The parameter σ falls within the range (0.05, 1.50), while α falls within the range (0.05, 1.45), where both of which are calculated at intervals of 0.05.[13] When $\sigma < 1$ the value function is concave indicating risk-aversion; smaller values of σ indicate a greater risk-aversion. When $\alpha < 1$ the weighting function is inverted S-shaped, indicating that individuals overweight small probabilities and underweight large probabilities. The model reduces to the expected utility framework when $\sigma = 1$ and $\alpha = 1$.

3 Descriptive statistics

The participants in this study consisted of poor and vulnerable individuals who were frequent lotto players and had little savings. Table 2 presents sample descriptive statistics. The sample was 74% male and 93% single. The average age in the sample was 26.7 years and the average household size was 5.4. Monthly household food expenses were roughly 8,259 HTG (or 131 USD). The sample consisted of food insecure individuals. In a 4-week period, 79% of households worried that their household would not have enough food, and 39% of households experienced at least one whole day where at least one household member went without eating because there was not enough food.

[13] The exact calculation of these parameters can be found in the web appendix of Tanaka, Camerer and Nguyen (2010), available here.

Table 2: Sample descriptive statistics

	Mean	Std Dev	Obs
Survey measures			
Age	26.7	15.4	287
Male	0.74	0.44	288
Household size	5.39	2.30	288
Single	0.93	0.25	288
Student	0.30	0.46	287
Unemployed	0.21	0.41	287
Income, one week	1669	3251	288
Food expenses, one month	8260	12352	288
Food security (1): anxiety about HH food	0.79	0.41	287
Food security (2): no food in HH	0.54	0.50	283
Food security (3): slept at night hungry	0.49	0.50	287
Food security (4): whole day without eating	0.39	0.49	285
Has refrigerator	0.32	0.47	288
Has flush toilet	0.35	0.48	288
Days per week play lotto	4.68	2.13	271
Bet amount on a usual day	173	268	274
Ever played lotto on mobile phone	0.20	0.40	288
Plays lotto to achieve a goal	0.81	0.39	274
Plays lotto for an investment	0.33	0.47	274
Save in sol	0.12	0.33	288
Save in bank	0.090	0.29	288
Save: balance in bank	52714	194464	26
Save informally (at home or with neighbor or friend)	0.29	0.45	288
Save: balance in informal	5094.1	10171.2	83
Borrowed money from family	0.31	0.46	285
Outstanding credit balance from family	2329	3894	89
Risk elicitation			
Risk aversion parameter	1.20	0.44	301
Prelec probability weighting parameter	0.63	0.20	301
Portfolio allocation			
Round 1: allocation to consumption	0.40	0.18	306
Round 1: allocation to lotto	0.22	0.13	306
Round 1: allocation to savings	0.38	0.17	306

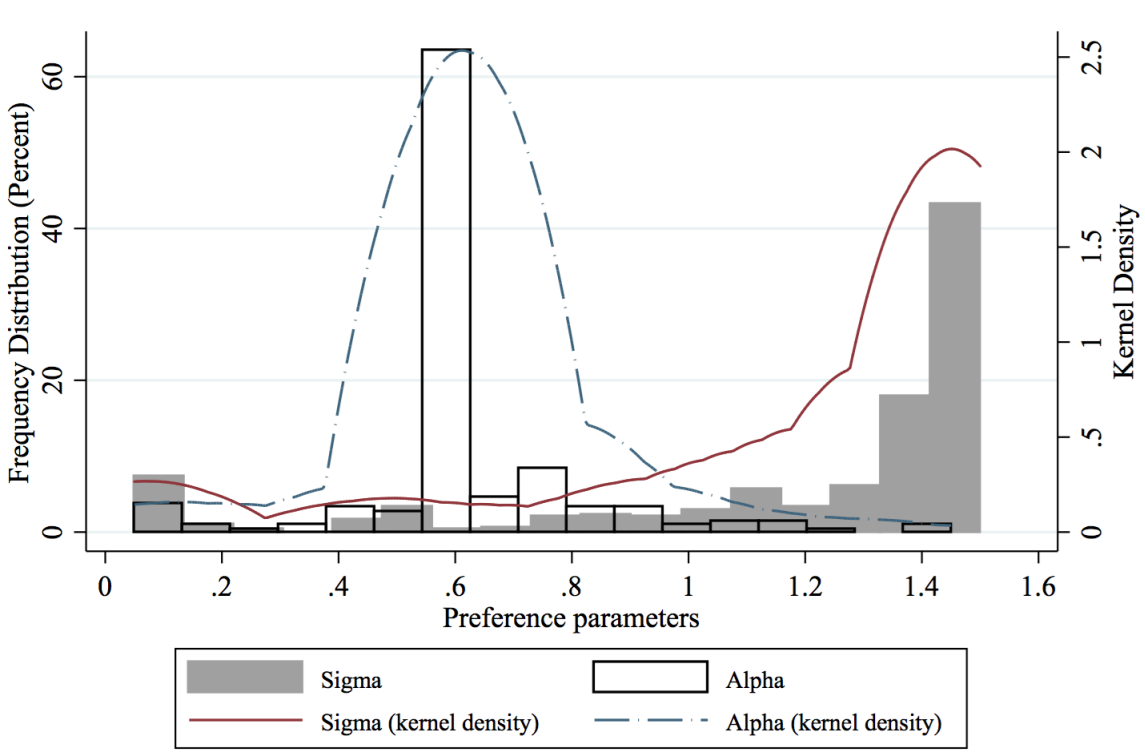
Notes: All currency amounts are in HTG. The food security measures are yes and no responses to the following questions, (1) In the past 4 weeks, did you worry that your household would not have enough food?, (2) In the past 4 weeks, was there ever no food at all in your household because there were no resources to get more? (3) In the past 4 weeks, did you or any household member go to sleep at night hungry because there was not enough food? (4) In the past 4 weeks, did you or any household member go a whole day without eating anything because there was not enough food?

In the sample, lotto play was high and savings was low. On average, participants played the lotto 4.7 days a week and spent 173 HTG on a usual day on the lotto. However, only 20% of the individuals in the sample had played the lotto on their mobile phone. Pre-empting this unfamiliarity with mobile phone lottery, we explained the SMS-lotto platform more extensively in the lab games. About 81% mention that they play the lotto to achieve a goal, and about 31% mentioned that they play the lotto for an investment purpose. This is consistent with the observation that lotto stalls serve as the prime financial service provider in Haiti. Only 9% of participants saved in a bank or formal financial institution, but among those who saved in a bank the average balance was 52,713 HTG. About 29% of participants saved at home or with their neighbor or friend, and among these participants who reported informal savings the average balance was 5,094 HTG.

The mean risk-aversion parameter σ was 1.2 and the mean probability weighting parameter α was 0.63. This suggests that, on average, the participants were risk-loving and tended to overweight small probabilities. In Tanaka, Camerer and Nguyen (2010), the mean σ in their Vietnamese sample was 0.59 and 0.63, and the mean α was 0.74. Thus, our sample was uniquely risk-loving, but comparable in its probability weighting to a sample of individuals from Vietnamese villages. The sample distribution of both σ and α are further presented in Figure 1. Again, we see that the distribution of α is skewed to the left, indicating a more risk-loving sample. Recall that our mobilizers were asked to recruit lottery players into the study which may explain the risk-loving character of our sample. And although lottery play is rampant among the working poor in Haiti, our analysis may not necessarily extrapolate to those, say, in rural areas who do not play the lotto.

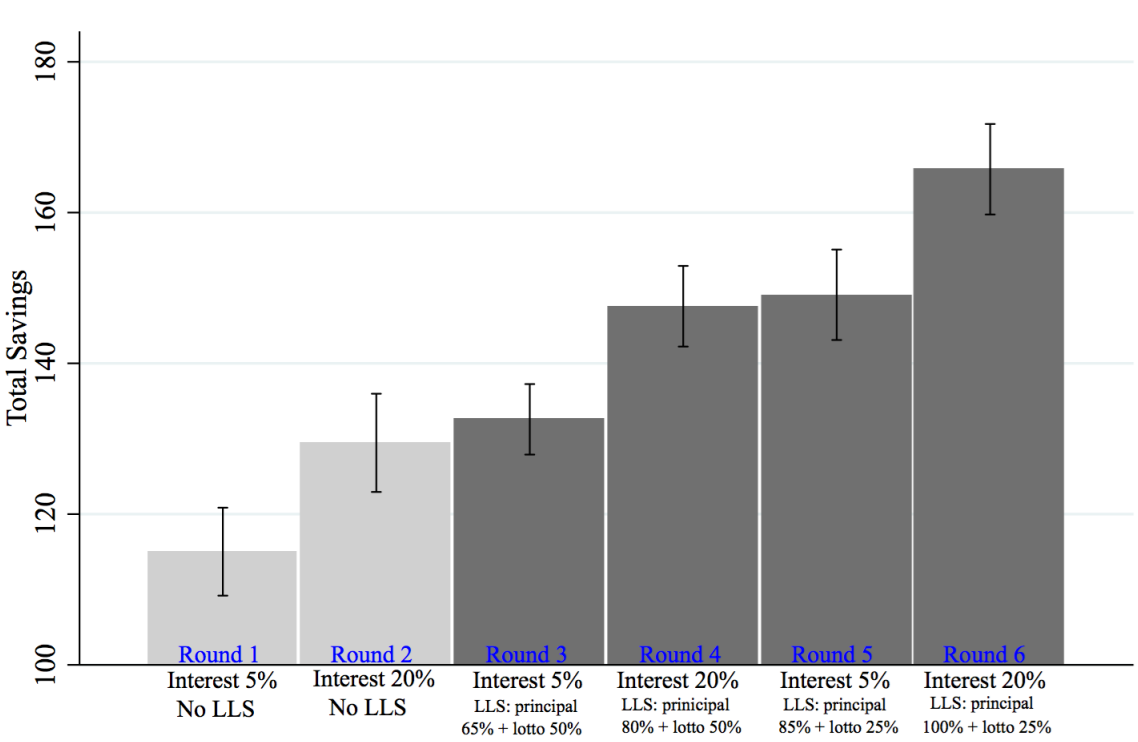
In the bottom of Table 2, we show that in the first round of decisions where the return to savings was 5%, participants on average allocated 40% of the 300 HTG to consumption, 22% to lotto, and 38% to savings. Allocation to savings was high which likely stemmed from the high in-game savings return of 5% over a 6-week period and the fact that allocation decisions were being made on endowments provided in the experiment.

Figure 1: Distribution of preference parameters



Notes: Sigma is the risk-aversion parameter and alpha is the Prelec probability weighting parameter.
See Tanaka, Camerer, and Nguyen (2010) for details on the calculation of these parameters.
The kernel densities are estimated usinhg an epanechnikov kernel with a 0.10 bandwidth.

Figure 2: Mean of total savings in each decision round



Notes: Each bar represents the mean of total savings in each decision round. Total savings is defined as the total secured principal received in eight weeks, which equals the sum of the amount allocated to savings (excluding interest) and the amount allocated to LLS which will be paid back with certainty (excluding lotto winnings). The darker bars represent rounds where LLS was offered (rounds 3-6). The bands indicate a 95% confidence interval for the calculated mean.

4 Effect of LLS on total savings

Our main goal is to estimate the effect of introducing LLS on total savings. Our primary and default definition of total savings is the total secured principal that will be paid in eight weeks. For comparison, we also show regression results for alternative definitions of savings that also include delayed payments in the form of interest and expected lottery winnings. In Figure 2, we present the mean across participants of total savings for each decision round. The darker bars represent decisions rounds where LLS was offered (see Table 1 for a summary of financial product features).

Comparing round 1 to round 3 (5% return, with and without LLS) and round 2 to round 4 (20% return, with and without LLS), we find a statistically significant increase in mean total savings when LLS was offered. Interestingly, the difference between mean total savings in round 1 and 2 is equal to the difference in round 1 and 3. This suggests that the increase in mean total savings when LLS is offered is roughly equivalent to raising the interest rate on a traditional savings product from 5% to 20%. Furthermore, we find that reducing the lotto component in an LLS product increases mean total savings even more (comparing round 3 to round 5, and round 4 to round 6). This suggests that even higher increases in total savings can be achieved with an LLS product that has less of a lotto component and instead secures more of the principal.

To more accurately quantify the effect of the LLS on total savings, we estimate the following equation using panel fixed effects

$$TS_{ir} = \alpha_i + \beta_1 LLS_{ir} + \beta_{\mathbf{2}}(\mathbf{F_{ir}}) + \epsilon_{ir} \tag{1}$$

where TS_{ir} is total savings of individual i in decision round r, α_i is an individual fixed effect which controls for any round-invariant individual characteristics, LLS_{ir} is a dummy variable equal to 1 in a round where LLS was offered, and F_{ir} is a vector of dummy variables equal to 1 in a round where a given feature of the LLS or savings product was present. Specifically,

we test for the effects of two features of the LLS, the degree of its lotto component (which was lower in rounds 5 and 6 than in rounds 3 and 4) and the return of the LLS relative to the savings product (which was lower in afternoon than in morning sessions). Additionally, we test for the effect of the interest rate on total savings and heterogenous impacts of the LLS by the savings interest rate (which was lower in rounds 1, 3, and 4). We use robust standard errors clustered at the individual level in all specifications. We do not cluster at the session level as we have only 18 sessions, which would result in too few clusters for adjusting standard errors (Cameron and Miller, 2015). However, clustering at the session level does not affect the statistical significance of the main results which use within-individual variation.

Estimation results are presented in Table 3. We find that the introduction of LLS increases total savings by 26.5 HTG (Column 1), equal to a 22% increase relative to when LLS was not offered. An alternative measure of total savings might include the certain interest that would be received in the traditional savings product. Using this measure, we show that the introduction of the LLS increases total savings by 21.1 HTG (Column 2), equal to a 15% increase relative to when LLS was not offered. And yet another measure of total savings might include both the certain interest and the expected winnings on the delayed lotto embedded in the LLS. Using this measure, we find that the introduction of the LLS increases total savings by 46.3 HTG (Column 3), equal to a 34% increase relative to when LLS was not offered.

Testing for the effects of LLS features (Column 4), first, we find that a lower risk LLS product with a smaller lotto:principal ratio resulted in a larger increase in total savings. An LLS product which had a higher lotto component increased savings by 16%, whereas one which had a lower lotto component increased savings by 30%, relative to when LLS was not offered. Mechanically, a product with a lower lotto component would have a higher savings component in the sense that a larger percentage of the principal would be secured. As such, the lesson we learn here is that the *contributions* into an LLS are unaffected by the degree of the lotto component. So that similarly, when including both secured interest and expected

Table 3: Effect of LLS on total savings

	(1)	(2)	(3)	(4)	(5)	(6)
			Individual fixed effects			
	Total savings	Total savings + interest	Total savings + interest + expected winnings	Total savings	Total savings + interest	Total savings + interest + expected winnings
(a) LLS offered	26.5***	21.1***	46.3***	19.3***	16.9***	52.7***
	(2.2)	(2.1)	(2.2)	(3.3)	(3.6)	(3.9)
(b) Low Risk LLS				17.4***	17.7***	0.8
				(1.9)	(2.0)	(2.2)
(c) Low Return LLS				-4.5	-3.6	-6.9
				(4.5)	(5.0)	(5.3)
(d) High Interest Savings				14.4***	34.6***	34.6***
				(2.9)	(3.3)	(3.3)
(e) LLS × High Interest Savings				1.4	-5.6	-6.8*
				(3.1)	(3.5)	(3.7)
Constant	122.2***	138.1***	138.1***	115.0***	120.8***	120.8***
	(1.5)	(1.7)	(1.8)	(2.0)	(2.1)	(2.2)
Effect size in percent, relative to no LLS offered						
(a) LLS	21.7	15.3	33.6	15.8	12.2	38.2
	[1.9]	[1.9]	[2.2]	[2.9]	[2.8]	[3.2]
(a+b) LLS- low risk				30.0	25.0	38.7
				[3.3]	[3.0]	[3.4]
(a+c) LLS- low return				12.1	9.6	33.2
				[2.6]	[2.5]	[2.7]
(a+e) LLS- high interest				17.0	8.2	33.3
				[3.2]	[3.2]	[3.7]
Observations	1835	1835	1835	1835	1835	1835
Participants	306	306	306	306	306	306

Notes: Total savings is defined as the total secured principal received in eight weeks, which equals the sum of the amount allocated to savings (excluding interest) and the amount allocated to LLS which will be paid back with certainty (excluding lotto winnings). Robust standard errors clustered by individuals are shown in parentheses below the point estimates. Level of significance: *** p<0.01, ** p<0.05, * p<0.10. Bootstrapped standard errors, using 500 replications, are shown in brackets below the effect sizes in percent.

delayed lottery winnings into the savings measure (Column 6), we find that a lower risk LLS has no differential effect on the total delayed amount to be received.[14]

Second, we find that the introduction of an LLS product that had a lower expected return than the traditional savings product had a similar impact on total savings as one which had an expected return equal to the traditional savings product (Column 4). We find no evidence of differential LLS impacts by its return relative to the traditional savings product. Lastly, we show that a higher interest savings on the traditional savings product increased total savings by 14.4 HTG, equal to a 13% increase (Column 4). Mechanically including interest payments into the savings definition increases the effect of the interest (Column 5 and 6). Moreover, the effectiveness of an LLS in increasing total savings is unaffected by the interest rate on the traditional savings product. Note that, by experimental design, a decision round with a higher interest on the savings product also meant a higher return on the LLS product. In Appendix Table A2, we show that the same results hold when we remove individual fixed effects and run a random effects model while controlling for the randomly assigned order, specifically game order 1-2-3-4-5-6 vs game order 1-2-5-6-3-4.

Given that our motivation for testing an LLS product is to understand whether it might offer a promising gateway to financial inclusion, it is important to analyze how subjects in the experiment financed the estimated LLS-induced increases in total savings. To this end, we assess how the availability of LLS changed allocations to the other financial products. We estimate equation (1), but as dependent variables, we instead use the amounts allocated to consumption, lotto, and traditional savings.

Estimation results are presented in Table 4. The introduction of LLS decreased the amount allocated to all the other financial products. Particularly, dividing $\hat{\beta}_1$ by the mean contribution when LLS was not offered, we find that LLS decreased the amount allocated to consumption by 22%, to lotto by 39%, and to traditional savings by 33% (and by as much

[14]In contrast to our experimental measures of risk aversion shown in Figure 1, which suggest that our subjects are largely risk loving, this result suggests that they are risk averse in some dimension. We suspect that some combination of higher order risk preferences (especially, skewness preferences) and responses to the experimental risk elicitation task explains this contradiction, but are unable to directly test this explanation.

as 40% for an LLS product offered alongside traditional savings with high interest). Thus, it would seem that the LLS is seen as an alternative to both lotto and traditional savings. We also find that LLS cannibalized more the traditional savings product when the interest on the traditional savings was high.

Our key result is that LLS increases savings– the amount of money that one chooses to hold for future use. This is likely welfare enhancing, as it may, for example, enable individuals to build emergency funds that can be used to address shocks. In addition, we explore other issues that are related to whether LLS improves welfare. First, in Appendix Table A3, we show the effect of the introduction of LLS on the expected portfolio return which, in each game round, is the sum of consumption, expected lottery winnings in two weeks and in eight weeks, all savings, and all interest payments. This rather basic measure of portfolio return ignores risk and time delays to returns. Because LLS diverts funds away from lottery and the LLS products are designed to have the same expected return as traditional savings, the introduction of LLS increases the expected portfolio return by 2-3%. Taken together, these results suggest that the lottery component of our prototype LLS product prompts individuals to sufficiently redirect funds from negative-return lottery to positive-return savings products that their overall returns improve. We take this as encouraging, albeit experimental, evidence of the potential of LLS to enhance financial inclusion, particularly as mobile-money-based financial services expand.

Second, as a small step beyond this lab-in-field setting, we can use the adminstrative SMS-Lotto data to assess how individuals used their lotto credit after participating in the experiment. Several individuals chose to add their own money to their SMS-Lotto account after using their lotto credit. This raises the troubling possibility that LLS may draw people to lottery play rather than nudging them in the other direction. We find that individuals who respond most aggressively to the LLS in the experiment are (marginally) less likely to contribute their own funds to their SMS-Lotto balance (correlation -0.09). This is but a first step, and any larger LLS pilot will require more careful evaluation in this regard.

Table 4: Effect of LLS on portfolio allocation

	(1)	(2)	(3)
	Individual fixed effects		
	Consumption	Lotto	Traditional savings
(a) LLS offered	-25.8***	-23.6***	-40.9***
	(3.0)	(2.3)	(3.7)
(b) Low Risk LLS	-0.2	0.3	1.2
	(1.8)	(0.8)	(1.9)
(c) Low Return LLS	-1.1	3.1	7.1
	(4.0)	(3.0)	(4.9)
(d) High Interest Savings	-6.2**	-7.4***	14.4***
	(2.5)	(1.7)	(2.9)
(e) LLS × High Interest Savings	4.0	5.7***	-7.4**
	(2.9)	(1.9)	(3.1)
Constant	119.6***	65.1***	115.0***
	(1.8)	(1.4)	(2.0)
Effect size in percent, relative to no LLS offered			
(a) LLS	-22.1	-38.5	-33.4
	[2.5]	[3.2]	[2.6]
(a+b) LLS- low risk	-22.3	-38.0	-32.5
	[2.6]	[3.2]	[2.6]
(a+c) LLS- low return	-23.1	-33.4	-27.7
	[2.5]	[3.5]	[2.7]
(a+e) LLS- high interest	-18.7	-29.2	-39.5
	[2.6]	[3.2]	[2.8]
Observations	1836	1835	1836
Participants	306	306	306
Mean, LLS not offered	116.5	61.4	122.2

Notes: Dependent variables are amounts allocated to consumption, lotto, and traditional savings. Robust standard errors clustered by individuals are shown in parentheses below the point estimates. Level of significance: *** p<0.01, ** p<0.05, * p<0.10. Bootstrapped standard errors, using 500 replications, are shown in brackets below the effect sizes in percent.

5 Heterogeneous effects of LLS

Using data from the survey and the risk preference elicitation, we investigate heterogeneous effects of the LLS by wealth and expenses, gender, savings, lottery play, and time and risk preferences. We estimate the following equation using panel fixed effects

$$TS_{ir} = \alpha_i + \gamma_1 LLS_{ir} + \boldsymbol{\gamma_1}(LLS_{ir} \times \mathbf{X_i}) + \epsilon_{ir} \tag{2}$$

where we interact the LLS_{ir} indicator variable with X_i, a vector of round-invariant individual characteristics and preferences. For wealth, we use principal component analysis to construct a wealth index from variables which indicate asset ownership.[15] For expenses, we use the household monthly food expense measure. For food insecurity, we use the sum of the food insecurity questions.[16] For savings, we use the sum of balances in various savings vehicles, namely savings in a sol, in a bank or other formal financial institution, at home or with friends and neighbors, or in a mobile money account. For lottery play, we construct a rough measure of weekly lotto expenses by multiplying the usual amount of days in a week one plays the lotto by the amount one bets on the lotto in a usual day. For all the above measures, we standardize the variables to have mean 0, and standard deviation 1.

Estimation results are presented in Column 1 of Table 5. Albeit somewhat noisy, we find evidence that participants from poorer households were less likely to increase savings when offered LLS. The effect of LLS on the participant's total savings increases with household wealth and food expenses, and decreases with food insecurity. But, only the food expense interaction term is statistically significant at the 5% level. Whereas for their sample of students Filiz-Ozbay et al. (2015) find that the effects of a prize-linked savings option encourages savings particularly among males, we find no similar differential effects of the LLS by gender in our sample.

[15] We ask about ownership of a motorcycle, refrigerator, television, sofa, gas stove, generator, flush toilet, solar panel, and tap tap (a public utility vehicle).

[16] This is a set of six questions regarding food anxiety and the lack of food in the household.

Table 5: Heterogeneous effects of LLS

	(1) Total savings	(2) Total savings	(3) Total savings
LLS offered	29.21***	26.66***	26.34***
	(4.33)	(2.31)	(1.80)
LLS offered × Wealth index	0.63		
	(2.40)		
LLS offered × Food expenses	2.31**		
	(0.97)		
LLS offered × Food insecurity	-1.14		
	(2.30)		
LLS offered × Male	-2.51		
	(5.09)		
LLS offered × Savings		1.04	
		(0.68)	
LLS offered × Lotto spending		-2.05	
		(2.00)	
LLS offered × In-game savings			-20.04***
			(2.57)
LLS offered × In-game lotto			8.94***
			(2.31)
Constant	120.59***	120.63***	122.22***
	(1.51)	(1.54)	(1.20)
Observations	1721	1709	1835
Individuals	287	285	306

Notes: Total savings is defined as the total secured principal received in eight weeks. The following variables are transformed into its standard normal version: wealth, food expenses, food insecurity, savings, lotto spending. In-game savings is the average savings in rounds 1 and 2, and in-game lotto is the average lotto spending in rounds 1 and 2. In-game savings and in-game lotto are also transformed into its standard normal version. Robust standard errors clustered by individuals are shown in parentheses. Level of significance: *** p<0.01, ** p<0.05, * p<0.10.

In Column 2 of Table 5, estimation results are presented for the survey measures of savings and lottery play. We find no statistically significant evidence of differential effects of the LLS by savings and lottery play, although the direction of the effects indicate that LLS might be more effective for individuals who have higher savings and lower lotto expenses. It is also important to note that our entire sample has already very little savings and plays the lotto frequently. This may explain why we are unable to precisely estimate any differential effects across these dimensions, and may suggest that these results may be quite different with a different population. Alternatively, we estimate heterogeneous effects of LLS by initial in-game savings defined as the average of savings in rounds 1 and 2, and initial in-game lotto spending defined as the average of lotto spending in rounds 1 and 2. These in-game measures of savings and lotto spending are also standardized to have mean 0, and standard deviation 1. Estimation results are presented in Column 3 of Table 5. A one standard deviation increase in savings in the initial rounds decreases the effect of LLS on total savings, whereas a one standard deviation increase in lotto spending in the initial rounds increases the effect of LLS on total savings. Note that these estimated heterogeneous effects are much larger than the heterogeneous effects estimated using the survey measures of baseline savings and lotto play. These results suggest that the LLS works for those with initially low savings and high lotto spending.[17,18] Atalay et al. (2014) similarly find that a prize-linked savings account was more effective for those with initially lower levels of savings.

We further estimate heterogeneous effects of the LLS by time and risk preferences. In the survey, we asked two simple questions to elicit time preferences.[19] Although not incentive-

[17]Using non-standardized measures, we find that each HTG increase in initial in-game savings decreases the effect of the LLS on total savings by 0.40 HTG, and that each HTG increase in initial in-game lotto increases the effect of the LLS on total savings by 0.27 HTG.

[18]We have also tested for heterogeneous effects of the LLS by savings and lotto spending in the initial practice rounds. The direction of the heterogeneous effects are similar, but the estimates are smaller and slightly more imprecise. We have also tested whether individuals whose savings allocations are most sensitive to the interest rate hike between rounds 1 and 2 respond differently when offered the LLS. We find some weak evidence that the LLS savings response weakens as an individual's sensitivity to the interest rate before the LLS is offered increases.

[19]First we ask "If you could choose 1000 HTG in one week or 1200 HTG one month after that, what would you choose?". If the individual chose 1000 HTG, then we ask how much they would need to receive in a month in order to be willing to wait. Second we ask "If you could choose 1000 HTG in 6 months or 1500

Table 6: Heterogeneous effects of LLS: time and risk preferences

	(1) Total savings	(2) Total savings
LLS offered	28.96***	26.57***
	(3.13)	(2.23)
LLS offered × Discount rate	0.03	
	(0.17)	
LLS offered × Present bias	-6.59	
	(4.78)	
LLS offered × Risk loving		-3.00
		(2.56)
LLS offered × Probability weighting		-4.85**
		(2.43)
Constant	120.47***	122.21***
	(1.53)	(1.48)
Observations	1721	1805
Individuals	287	301

Notes: Total savings is defined as the total secured principal received in eight weeks. The following variables are transformed into its standard normal version: risk loving, and probability weighting. Robust standard errors clustered by individuals are shown in parentheses. Level of significance: *** p<0.01, ** p<0.05, * p<0.10.

compatible, this allows us to elicit crude measures of the discount rate and present-bias. In Column 1 of Table 6, we present differential effects of LLS by the discount rate and present-bias, and find no statistically significant differential effects. This is similar to our finding that the effect of LLS on total savings was unaffected by the interest rate on the traditional savings option.

Using the risk preference elicitation exercise, we test for differential effects of LLS by risk aversion (σ) and probability weighting (α). We standardized these constructed preference parameters. Results are presented in Column 2 of Table 6. We find that each one standard deviation increase in α decreases the effect of LLS on total savings by 4.85 HTG. Thus, an increase in the overweighting of small probabilities increases the effect of LLS on total savings.[20] On the other hand, we do not find statistically significant differential effects by risk

HTG in 7 months, what would you choose?". If the individual chose 1000 HTG, then we ask how much they would need to receive in a 7 months in order to be willing to wait.

[20]The correlation between the probability weighting parameter (α) and initial in-game lotto spending (the average of lotto spending in rounds 1 and 2) is 0.001, suggesting that these two measures are not one

aversion, σ. It is of course entirely possible - even likely - that a preference for skewness would show measurable differential effects of LLS on savings, but our risk elicitation experiment does not allow us to compute such higher order risk preferences.

6 Conclusions

We conducted experimental games in Port-au-Prince in which participants were asked to make a series of portfolio allocation decisions across three to four options: consumption, lotto, traditional savings, and lotto-linked savings (LLS) which combined features of the lotto and traditional savings options. We find that the introduction of LLS increased total savings by 22 percent. The increase in total savings came at the expense of equally large reductions in the amount allocated to lotto and traditional savings.

Furthermore, we test various features of the LLS. First, we find that an LLS with a higher savings-to-lotto ratio resulted in a higher increase in total savings, suggesting that a reduction in the intensity of the lotto component did not reduce investment in the LLS. Second, we find no difference on the effect on total savings between an LLS product which had an expected return equal to traditional savings and another which had a lower expected return. Finally, we use a risk preference elicitation exercise to explore which mechanisms might be driving the effect of LLS on total savings. On average, individuals in our sample were risk-loving and tended to overweight small probabilities. Furthermore, we find that the effect of LLS on total savings was higher for those who more heavily weighted small probabilities. This implies that such a behavioral bias may be driving the effectiveness of LLS.

Overall, our research adds to the emerging literature which demonstrates the effectiveness of savings products with a lottery component (Atalay et al., 2014; Filiz-Ozbay et al., 2015). The LLS product we explore leverages a unique Haitian lotto culture to improve savings

and the same. Initial spending in the lotto is thus not driven by the overweighting of small probabilities. Moreover, the overweighting of small probabilities and the initial allocation to the lottery are likely operating in different ways to increase the effectiveness of the LLS in increasing savings.

among the poor. Such increases in savings and access to savings accounts may further serve as a gateway to broader financial inclusion and access to other financial services such as credit and insurance. The viability of an LLS product like the one we test hinges on the potential profitability for the private firms offering the lotto and savings services. Our results suggest that a lower expected return LLS product would be the most cost effective means of increasing savings among the products we tested in our experiment. While this is encouraging from a market viability perspective, there are several additional factors that will deserve careful consideration.

First, it is unclear what interest rate should be the benchmark for evaluating an LLS product because interest-bearing mobile money savings accounts do not yet exist in Haiti. It is, however, clear that the effective interest rates offered in our experimental products are likely higher than sustainable rates. At least part of the effect we find is due to relative comparisons between the allocations; how much is attributable to the absolute (effective) interest rate remains an open question that requires additional testing. Second, to the extent that an LLS product provides an effective gateway to a broader range of financial services, private firms may find it profitable to formulate loss-leader or other cross-subsidization strategies that leverage dynamic interdependencies with other products to improve market viability of an LLS product. Finally, if continued piloting corroborates the finding that an LLS product may promote financial inclusion among the working poor, there may also be interest in the donor or NGO community to help offset some of the costs associated with offering the product. For example, an NGO may be willing to offer modest 'matched savings' support whereby a portion of the interest incentive is initially covered by donors interested in financial inclusion. While these and other considerations loom large, we consider the findings of this experiment to be an intriguing first step toward channeling Haitians' passion for lottery play to more productive financial strategies.

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Appendix

Figure A1: Example of tablet screen image for risk preference elicitation

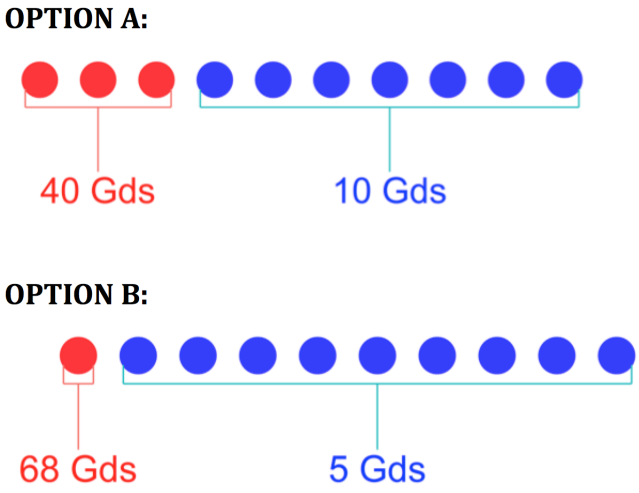

Table A1: Risk preference elicitation

	First Set				Second Set			
	Option A		Option B		Option A		Option B	
	Tokens							
	1-3	*4-10*	*1*	*2-10*	*1-9*	*10*	*1-7*	*8-10*
	Payouts in HTG							
1	40	10	68	5	40	30	54	5
2	40	10	75	5	40	30	56	5
3	40	10	83	5	40	30	58	5
4	40	10	93	5	40	30	60	5
5	40	10	106	5	40	30	62	5
6	40	10	125	5	40	30	65	5
7	40	10	150	5	40	30	68	5
8	40	10	185	5	40	30	72	5
9	40	10	220	5	40	30	77	5
10	40	10	300	5	40	30	83	5
11	40	10	400	5	40	30	90	5
12	40	10	600	5	40	30	100	5
13	40	10	1,000	5	40	30	110	5
14	40	10	1,700	5	40	30	130	5

Table A2: Effect of LLS on total savings, controlling for randomly assigned order

	(1)	(2)	(3)	(4)	(5)	(6)
	Individual fixed effects					
	Total savings	Total savings + interest	Total savings + interest + expected winnings	Total savings	Total savings + interest	Total savings + interest + expected winnings
(a) LLS offered	26.5***	21.1***	46.3***	21.1***	18.9***	54.6***
	(2.2)	(2.5)	(2.7)	(3.1)	(3.3)	(3.7)
(b) Low Risk LLS				17.4***	17.7***	0.8
				(1.9)	(2.0)	(2.2)
(c) Low Return LLS				-8.0**	-7.8*	-10.8**
				(3.8)	(4.1)	(4.7)
(d) High Interest Savings				14.4***	34.6***	34.6***
				(2.9)	(3.3)	(3.3)
(e) LLS × High Interest				1.4	-5.6	-6.8*
Savings				(3.1)	(3.5)	(3.7)
Order 5-6-3-4	-3.3	-3.8	-4.7	-2.3	-2.7	-3.3
	(4.7)	(5.1)	(5.6)	(4.6)	(5.1)	(5.6)
Constant	123.9***	139.9***	140.4***	116.2***	122.1***	122.4***
	(3.5)	(3.9)	(4.1)	(3.7)	(3.9)	(4.1)
Effect size in percent, relative to no LLS offered						
(a) LLS	21.7	15.3	33.6	17.2	15.5	39.5
(a+b) LLS- low risk				31.4	29.9	40.1
(a+c) LLS- low return				10.6	9.1	31.7
(a+e) LLS- high interest				18.4	10.9	34.7
Observations	1835	1835	1835	1835	1835	1835
Participants	306	306	306	306	306	306

Notes: Total savings is defined as the total secured principal received in eight weeks, which equals the sum of the amount allocated to savings (excluding interest) and the amount allocated to LLS which will be paid back with certainty (excluding lotto winnings). Robust standard errors clustered by individuals are shown in parentheses. Level of significance: *** p<0.01, ** p<0.05, * p<0.10.

Table A3: Effect of LLS on total expected portfolio return

	(1) Expected Return	(2) Expected Return
(a) LLS offered	6.7***	8.1***
	(1.0)	(1.2)
(b) Low Risk LLS		0.8
		(1.0)
(c) Low Return LLS		-5.6***
		(1.6)
(d) High Interest Savings		22.5***
		(1.2)
(e) LLS × High Interest Savings		1.8
		(1.5)
Constant	303.7***	292.4***
	(0.8)	(0.5)
Effect size in percent, relative to no LLS offered		
(a) LLS	2.2	2.7
(a+b) LLS- low risk		2.9
(a+c) LLS- low return		0.8
(a+e) LLS- high interest		3.2
Observations	1834	1834
Participants	306	306

Notes: Expected return is defined as the sum of consumption, expected lotto winnings (in 2 weeks and in 8 weeks), and any savings including interest payments. Robust standard errors clustered by individuals are shown in parentheses. Level of significance: *** p<0.01, ** p<0.05, * p<0.10.

Experimental Protocol and Script

RECRUITMENT

Prior to each experiment day, mobilizer will recruit participants according to the following criteria:

- All participants should have a Digicel account and a functioning Mon Cash wallet. The Mobilizer can assist in the activation of these accounts, if needed.
- All participants should have an SMS-lotto wallet. The mobilizer can assist in the activation of these wallets, if needed.
- All participants should have played the lottery in the recent past.
- Preferably, and to the extent possible:
  - Participants are the working poor.

- Participants should not know the mobilizer well.
- Participants should not know each other; this minimizes learning spillovers across sessions and network effects within sessions.
- Participants should be balanced by gender within each session.

Each mobilizer will recruit accounting for possible attrition (i.e. 22-23 participants per session, for a target of 20 participants per session). On the experiment day, the mobilizer responsible for the session will be present to assist in ensuring high attendance rate.

REGISTRATION AND SURVEYS

Enumerators 1 and 2 will handle registration, while Facilitator will handle all payments. Enumerators 3, 4, and 5 will conduct surveys with participants.

- As each participant arrives on the experiment day, an enumerator completes the registration form.
- An enumerator then reads out the consent script and completes the consent process.
- After consent, each participant will randomly be assigned a participant number card with a number from 901-920, which serves as her participant ID.
- Facilitator will send the participant 150 Gourdes (participation fee) + 8 Gourdes (withdrawal fee) via Mon Cash during registration. This will be sent via the SEFIS wallet; this will confirm that her Mon Cash account is functional. Enumerator must confirm with respondent that she has received the transfer.
- Facilitator gives the participant the contact card.
- Enumerator then conducts the survey with each participant.

GROUP SESSION: EXPERIMENT EXPLANATION

After the registration process is completed, each enumerator should be sitting next to their assigned respondents, as follows: Enumerator 1: 901-904 Enumerator 2: 905-908 Enumerator 3: 909-912 Enumerator 4: 913-916 Enumerator 5: 917-920

Script:

Welcome! Thank you for agreeing to participate in this research project. My name is [Facilitator], and in the room we have my teammates [Enumerators], who will help in facilitating today's activities. We will be asking you to make a series of decisions. Specifically, we will be asking you how you would like to allocate 300 Gourdes into different financial products, in denominations of 10 Gourdes. [Show to participants the 10 Gourde notes worth 300 Gourdes]. I will explain to you four of these financial products. Here, I have four trays. Each tray represents a different financial product:

TRAY 1: [Point to Tray 1] This is the first tray, or the consumption tray. For every 100 Gourdes you place in this consumption tray, you will get back that 100 Gourdes 2 weeks

from today, on [date 1a]. [Demonstrate, placing bills on tray] For example, if you place 20 of your 300 Gourdes in this consumption tray, you will get back the 20 Gourdes in 2 weeks, on [date 1a]. Or, if you place all of your 300 Gourdes in this tray, then you will get back the 300 Gourdes in 2 weeks, on [date 1a]. Any money you are to be paid in 2 weeks will be paid through the Mon Cash account you have registered. Do you have any questions regarding this consumption tray? [Answer any questions]

TRAY 2: [Point to Tray 2] This is the second tray, or the lottery tray. For every 100 Gourdes you place in this lottery tray, you can bet 100 Gourdes in the bolet game 2 weeks from today, on [date 1a]. In this bolet game, you select one two-digit number, from 00-99, and you choose the amount you want to bet on that selected number. [Show bolet payout chart]. The winning numbers are based on the New York lottery, which draws three winning numbers, where the 1st is a three-digit number and the 2nd and 3rd are two-digit numbers. If your chosen number matches the last two-digits of the winning number in the 1st position then you win 50 times your bet, if it matches the winning two-digit number in the 2nd position then you win 20 times your bet, and if it matches the two-digit winning number in the 3rd position then you win 10 times your bet.

- *You can select one or more two-digit numbers to bet on,*
- *And you will choose the corresponding bet amount for each of the numbers you have selected to bet on.*
- *Your total bet amount should equal your allowed bet, which is equal to the amount that you place in this lottery tray.*

*[Demonstrate, placing bills on tray] For example, if you place 20 of your 300 Gourdes in this lottery tray, then you can bet 20 Gourdes in the bolet in 2 weeks, on [date 1a]. Or, if you place all of your 300 Gourdes in this tray, then you can bet 300 Gourdes in the bolet in 2 weeks on [date 1a]. In order to play, you will receive your total bet amount as SMS-lotto credit on [date 1a], which allows you to play the bolet. Playing the bolet with your SMS-lotto credit is very simple. Just dial * 882 * 1 * number selected * bet amount, followed by # sign and then press send. For example, if you select number 41 and bet 100 gourdes, then press: * 882 * 41 * 100 # Send. You will then receive a message confirming your SMS ticket purchase request and a message confirming the transaction, the numbers played, and the date and time of the draw for which the ticket was purchased.After the draw, you will receive a message if your ticket is a winner. If you do not receive a message this means that your ticket is not winning. You can claim your winnings from any Mon Cash or SMS-lotto agent. Do you have any questions regarding this lottery tray? [Answer any questions]*

TRAY 3: [Point to Tray 3] This is the third tray, or the savings tray. For every 100 Gourdes you place in this savings tray, you will get back 105 Gourdes in 8 weeks, on [date 2a]. This means that for every 100 Gourdes, you will get back your 100 Gourdes in 8 weeks and also receive 5% interest in 8 weeks, on [date 2a]. Some of the details might change, but this is the basic idea of the savings tray—you will get back the amount you have placed in the savings tray in 8 weeks, and additionally you will receive some interest in 8 weeks. [Demonstrate, placing bills on tray] For example, if you place 20 of your 300 Gourdes in this savings tray, then you will get back 21 Gourdes in 8 weeks, on [date 2a]. Or, if you place all

of your 300 Gourdes in this tray, then you will get back 315 Gourdes in 8 weeks, on [date 2a]. Any money you are to be paid in 8 weeks will be paid through the Mon Cash account you have registered. Do you have any questions regarding this savings tray? [Answer any questions]

TRAY 4: [Note: the following script is for AM sessions, for PM sessions, highlighted numbers are different.] [Point to Tray 4] This is the fourth tray, or the save-to-win tray. Here is one example of the save-to-win tray. For every 100 Gourdes you place in this save-to-win tray, you will get back for sure 65 of the 100 Gourdes in 8 weeks, and additionally you can bet 50 Gourdes in the bolet game in 8 weeks, on [date 2a]

Similar to the lottery tray:

- *The winning numbers are based on the New York lottery*
- *You can select one or more two-digit numbers to bet on.*
- *And you will choose the corresponding bet amount for each of the numbers you have selected to bet on.*

Unlike the lottery tray:

- *You get back some of the money you place in this tray. For example, here you get back 65 Gourdes of 100 Gourdes for sure in 8 weeks.*
- *Your total bet amount is equal to 50 Gourdes for every 100 Gourdes you place in this save-to-win tray.*
- *You will play the bolet of the save-to-win in 8 weeks, instead of in 2 weeks.*

[Demonstrate, placing bills on tray] For example, if you place 20 of your 300 Gourdes in this save-to-win tray, you will get back 13 of the 20 Gourdes for sure in 8 weeks, on [date 2a], and you can additionally bet 10 Gourdes in the bolet in 8 weeks, [on date 2a]. Or, if you place all of your 300 Gourdes in this tray, then you will get back for sure 195 of the 300 Gourdes in 8 weeks, on [date 1a], and you can additionally bet 150 Gourdes in the bolet in 8 weeks [on date 2a]. Some of the details might change, but this is the basic idea of the save-to-win tray— you get back some of the money you put in 8 weeks, and you can bet some amount in the bolet in 8 weeks. Similar to the lottery tray, in order to play, you will receive your total bet amount as SMS-lotto credit on [date 2a], which allows you to play the bolet. Do you have any questions regarding this save-to-win tray? [Answer any questions]

ALLOCATION:

Remember, you will be given a total of 300 Gourdes and you will allocate your 300 Gourdes across these various financial products, in 10 Gourde denominations. Here, for example, you will allocate your 300 Gourdes across three financial products: the consumption tray, lottery tray, and savings tray. Of your 300 Gourdes, you will decide how much you want to play on the lottery and how much you want to save; then you should place in the consumption tray any money that you do not want to play on the lottery or to save.

Let's go through a few more examples together, to make sure that you understand each of these financial products.

[Example 1- Basic]

Here's one example. Of my 300 Gourdes, let's say I put 100 Gourdes in the consumption tray, 100 Gourdes in the savings tray, and 100 Gourdes in the lottery tray. [Demonstrate]. Because I put 100 Gourdes in the consumption tray, I will get back 100 Gourdes via my Mon Cash account 2 weeks from today, on [date 1a]. Because I put 100 Gourdes in the lottery tray, I can bet 100 Gourdes in the bolet in 2 weeks, on [date 1a]. And, because I put 100 Gourdes in the savings tray, I will get back 105 Gourdes via my Mon Cash account in 8 weeks, on [date 2a].

[Example 2- Role Play]

You will be making similar decisions in private, and your enumerator will guide you through these decisions. Let's pretend that I am the enumerator and [Enumerator 1] is you. [Enumerator 1 comes up to the front, and Facilitator hands 300 Gourdes to Enumerator 1] Facilitator [speaking to Enumerator 1]: I want you to choose how you will allocate your 300 Gourdes across each of the following financial products: In the consumption tray, every 100 Gourdes will pay 100 Gourdes in 2 weeks. In the lottery tray, every 100 Gourdes will allow you to bet 100 Gourdes in the bolet in 2 weeks. In the savings tray, every 100 Gourdes will pay 105 Gourdes in 8 weeks, or a 5% interest. Please allocate your 300 Gourdes across each of these financial products. [Enumerator 1, demonstrates, by allocating 70 Gourdes to consumption, 110 to lottery, and 120 to savings.] Facilitator [speaking to group]: Enumerator 1 has placed 70 Gourdes in the consumption tray, 110 Gourdes in the lottery tray, and 120 Gourdes in the savings tray. Facilitator [speaking to Enumerator 1]: Because you put 70 Gourdes in the consumption tray, you will get back 70 Gourdes via your Mon Cash account 2 weeks from today, on [date 1a]. Because you put 110 Gourdes in the lottery tray, you can bet 110 Gourdes in the bolet in 2 weeks, [on date 1a]. And, because you put 120 Gourdes in the savings tray, you will get back 126 Gourdes via your Mon Cash account in 8 weeks, on [date 2a]. Is this the allocation you want, or would you like to change your allocation? Enumerator 1: This is the allocation I want. [Facilitator thanks Enumerator 1, and Enumerator goes back to the group.]

- *There is no right or wrong allocation.*
- *You can even allocate all of your 300 Gourdes to only one of the financial products,*
- *And you can choose to allocate nothing to one or more of the financial products.*
- *But, remember that all of your allocations have to be in denominations of 10 Gourdes.*

Your decisions will be private. We ask that you do not discuss with any other person in this room how you plan to allocate your 300 Gourdes. Do you have any questions or clarifications? [Answer any questions] At this point, each of you will make some allocation decisions and the enumerators will guide you through the process.

The Enumerator then walks to her station with her first participant to conduct the first set of individual decisions (individual session A). The remaining participants wait with the group to wait for their turn to make their individual decisions. Small snacks will be provided while waiting. The Facilitator will ensure that the individuals remaining in the group do not discuss with each other.

INDIVIDUAL SESSION: PORTFOLIO ALLOCATION

Each enumerator will conduct individual sessions with each of her assigned participants. For each game (including practice games), enumerators should:

- Place the corresponding product card in front of each Tray that is being played for a given tray and then point to each card as she briefly explains each Tray.
- After the individual has made an allocation, confirm out loud the allocation that the respondent has chosen, and dictate the corresponding return and timing of return from each Tray based on the payout matrix (cheat sheet). Then ask: "Is this the allocation you want, or would you like to change the allocation?" The enumerator should not show the payout matrix to the respondent.
- Allow the participant to change the allocation, if she wants.
- Repeat the confirmation process each time the respondent makes a change to her allocation.
- Record the final decision.

Enumerator: I will first ask you to make a few practice allocations, before I ask you to make the real allocation decisions.

PLAY PRACTICE 1

PLAY PRACTICE 2

PLAY PRACTICE 3

For these practice decisions, it is especially crucial that you encourage the participant to ask questions if there are certain aspects she does not understand.

The order of the following actual games will be randomized: order 1: 1-2-3-4-5-6 and order 2: 1-2-5-6-3-4

- Enumerators 1, 2, and 3 will conduct order 1 for AM sessions and order 2 PM sessions
- Enumerators 4 and 5 will conduct order 2 for AM sessions and order 1 for PM sessions.
- The number of the game, as presented to the participant, will correspond to the actual order in which the games are played.

Enumerator: I will be asking you to make a total of six allocation decisions. Here are six tokens, numbered from one to six, representing each of the six allocation decisions I will ask you to make. At the end of all the allocation decisions, we will randomly select one of the six allocation decisions to be played out for real. Remember, there is no right or wrong allocation and each of your decisions are private.

For each game, Enumerator: This is the (i.e. first) allocation decision. Here is token (i.e. #1), which represents the decision you make now. If token (i.e. #1) is selected later, then your decision now will be played out for real. Here are three trays representing three financial products.

PLAY GAME 1

PLAY GAME 2
PLAY GAME 3
PLAY GAME 4
PLAY GAME 5
PLAY GAME 6

Thank you. For now, we will ask that you wait with the group as the others make their allocation decisions.

Enumerator will walk the participant back to the group, and takes another one of her participants to her station to complete individual session.

GROUP SESSION: SELECTION OF GAME TO PLAY

After all participants have completed all six games, the Facilitator concludes:

Thank you. Now, let's select one of the six games to be played for real. We will select one token from the bag. [Let a volunteer participant select the token from the bag]. We will thus be playing [selected game] for real! The enumerator will now remind each of you one-on-one how you had allocated in the allocation decision number [selected game], and the enumerator will also confirm with you the payments you are to receive.

The Enumerator then walks to her station with each participants, to conduct the game summary.

GAME SUMMARY

One at a time, in private, the Enumerator completes the summary with each participant.

For [selected game], you allocated [X1] to the consumption tray, [X2] to the lottery tray, [X3] to the savings tray and [X4] to the save-to-win tray [if applicable]. Based on the amount you allocated to the consumption tray, you will receive [Y1] in 2 weeks, [date 1a], via your Mon Cash account. Based on the amount you allocated to the lottery tray, you are allowed to bet [Y2] in the bolet game in 2 weeks, on [date 1a]. Based on the amount you allocated to the savings tray, you will receive [Y3] in 8 weeks, [date 2a], via your Mon Cash account. [If applicable] Finally, based on the amount you allocated to the save-to-win tray, you will receive [Y4a] in 8 weeks, and you are allowed to bet [Y4b] in the bolet game in 8 weeks, on [date 2a].

The Enumerator completes the payout summary form, and provides the participant with the summary card.

RISK PREFERENCE ELICITATION

After all individual game summaries have been completed, the Facilitator will then discuss the risk game with all of the participants jointly, and then each participant will play the risk game on the tablets individually. Enumerators will be available to assist participants who have questions or have difficulty using the tablets. The Facilitator will then send the payout for the risk game to the participant's Mon Cash account. The risk game will make a payout of ~120 Gourdes. After receiving the risk game payment, all experimental procedures have been completed and the participant may leave the session.