The Effects of Savings on Risk-Taking and Intertemporal Choice Behavior: Evidence from a Randomized Experiment *

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Abstract

We investigate whether saving affects risk-taking and intertemporal choices. A field experiment in Nepal randomized access to savings accounts among a population who mostly had never had one before, generating random variation in savings behavior. A year later we administered lottery-choice and intertemporal choice tasks. Our reduced-form results show the treatment is less risk averse and more willing to delay rewards. Combining the randomized variation with a structural model, we quantify the differences in the annual discount rate and the intertemporal elasticity of substitution. We provide suggestive evidence that the results are driven by preference changes rather than wealth effects.

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1. **Introduction**

Individual attitudes toward risk and intertemporal choices are fundamental to savings decisions. But it is also possible that the act of saving and accumulating assets may change these attitudes. Do individuals become more willing to accept financial risks as they accumulate savings? Do those who save become more willing to tradeoff lower consumption in the near term for higher consumption in the future? Answering these questions is important for understanding the overall effects of institutions, policies and programs that are inductive to saving. For example, market failures or institutions that prevent the poor from saving may give rise to poverty traps if limited opportunities for saving shape one’s attitudes toward risk and intertemporal choices. Similarly, if saving feeds back to preferences, economic forces that lead to increased savings rates could push economies in different directions beyond just the effects of capital accumulation.

The existing literature suggests a number of mechanisms through which the accumulation of savings could affect decisions about risk and intertemporal choice. One potential mechanism is through the effect of wealth on the marginal utility of consumption: The level of wealth can in theory affect risk aversion and the intertemporal elasticity of substitution. Despite a rich history of this topic in economics (Tanaka, Camerer and Nguyen 2010), only a limited number of studies have been able to investigate these potential wealth effects using instruments that generate plausibly exogenous variation in wealth (e.g., Brunnermeir and Nagel, 2008; Paravisini, Rappoport, and Ravina, 2010), and the findings are mixed. Bernheim, Ray and Yeltekin (2013) also argue that there may be feedback loops between poverty and the ability to exert self-control, and that policies promoting asset accumulation among the poor can have strong effects on their observed time preferences. More broadly, there is a long history in economics and psychology suggesting that forward-looking behaviors like saving, and access to financial institutions that enable those activities, could fundamentally alter preferences (e.g., Becker and Mulligan, 1997; Bowles, 1998; Frederick, Loewenstein and O’Donoghue, 2002; Shah, Mullainathan, and Shafir, 2012).

Despite this rich literature discussing the links between savings and preferences, however, there has been little empirical work that can shed light on whether savings behavior changes time and risk preferences. This is largely because it is generally challenging to assess whether increased savings behavior changes attitudes toward risk and intertemporal choices, since whether one saves in the first place is largely determined by one’s risk and time preferences.

In this study we exploit a unique field experiment to investigate whether attitudes toward risk and intertemporal choices are affected by the act of saving. Prina (2013) reports the results of a field experiment in Nepal, which randomized 1,236 poor households into either a control group or a treatment group that gained access to formal savings accounts. The savings account represented for the vast
majority of our sample the first access to a formal savings product. More than 80% of the treatment group opened an account, which had neither maintenance nor withdrawal fees and had no minimum balance requirement. They used it actively, making on average 42 deposits and 3 withdrawals over a one-year-period. The experiment generated exogenous variation in access to a savings account and in savings behavior, which, according to the hypotheses discussed above, may have changed the treatment group’s attitudes toward risk and their intertemporal choices.

One year after the introduction of the savings accounts we administered to both the control and treatment groups a) an incentivized lottery-choice task typically used to measure risk preferences, b) survey questions about hypothetical intertemporal choices typical of those used to measure time preferences, and c) an incentivized experimental task based on the Convex Time Budget (CTB) method proposed by Andreoni and Sprenger (forthcoming). In the lottery-choice task subjects were asked to choose their preferred lottery (whose outcome would depend on a coin flip) among a set of options with different levels of risk and expected value. In the intertemporal-choice questions participants were asked to make hypothetical choices between a smaller, sooner monetary reward and a larger, more delayed monetary reward. Finally, the adapted CTB task allows us to investigate how treatment and control groups change their intertemporal allocations in response to changes in the time frame and in the experimental interest rate at which they can exchange sooner experimental rewards for later experimental rewards.¹

Our reduced-form results show that the treatment group is less risk averse and more willing to accept delayed rewards than the control group. We find that the treatment group was significantly less likely than the control group to choose the risk-free choice in the experimental lottery-choice task. In the hypothetical intertemporal-choice task the treatment group was more likely than the control group to choose higher but delayed payments over a range of delay times and delay rewards. In the CTB task overall the treatment group allocated more money to the future than the control group, but this difference is not statistically significant. The treatment group was also more responsive than the control group to an increase in the experimental interest rate, implying that within the CTB allocations the treatment group had a higher intertemporal elasticity of substitution. Finally, there is mixed evidence on which group is more responsive to an increase in the length of delay between the sooner and later rewards.

We show that the estimated treatment effects are not small. In fact, they are larger than the (cross-sectional estimate of the) effects of one additional year of schooling. Nevertheless, some of the treatment effects are not statistically significant because they are not precisely estimated—the standard errors of the treatment effects are five times larger than the standard errors of the education effects.

¹ See Giné, Goldberg, Silverman and Yang (forthcoming) for an alternative field adaptation of the CTB.
One of the attractive features of Andreoni and Sprenger’s (forthcoming) CTB framework is that, if one is willing to make structural assumptions about the utility function (e.g., CRRA utility), it is possible to estimate preference parameters that separately identify present bias, the exponential discount rate and the intertemporal elasticity of substitution (i.e., the curvature of the utility function) for control and treatment groups. We are also able to quantify the economic magnitude of the reduced-form differences we observe in the CTB task between the treatment and control groups. In our baseline specification we estimate that the control group has an annualized discount rate of approximately 26% (annual inflation in Nepal was above 10% during the study period). Our estimates show the treatment group has an annualized discount rate 2 percentage points lower but this difference is not statistically significant. We also estimate that the treatment has an intertemporal elasticity of substitution that is approximately 7% higher than that of the control group, though again this result is not statistically significant. Finally, we find no evidence of present bias for either group, and estimate the present-bias coefficient to be precisely 1 for each group. This result is consistent with Augenblick, Niederle and Sprenger (2013) who document that tasks involving choices over monetary rewards may be less suited to capture present bias than tasks involving choices over real-effort-tasks or consumption.

An interesting question emerges as to whether the differences in risk attitudes and intertemporal choices we observe between the treatment and control groups are driven primarily by the higher levels of accumulated wealth for the savings group or by a more fundamental change in preferences. That question is particularly relevant for understanding our reduced form effects related to the marginal utility of consumption – namely, our finding of lower risk aversion in the lottery-choice task and greater responsiveness to the interest rate in the CTB task for the treatment group. However, there is a fundamental challenge, both practically and at a deeper conceptual level, to distinguish whether any observed changes in the marginal utility of consumption are driven by wealth differences with a stable preference structure or by changes in preferences (e.g., “more linear” utility functions over money). The distinction between these two potential channels hinges crucially on assumptions about both, the degree to which individuals incorporate background wealth/consumption when making isolated decisions (i.e., the extent of “narrow bracketing”), and about the nature of the utility function.

Nonetheless, we see value in providing suggestive evidence about the potential mechanisms here, because the distinction between wealth effects and preference changes may matter for thinking about the implications of our findings. If the results are driven primarily by wealth effects, then they might also arise from other exogenous shocks to wealth, such as windfalls, inheritance, and fluctuations in asset markets. On the other hand, fundamental preference changes would likely arise primarily due to the act of saving and the way that behavior changes thought processes about risk and utility at different times. In
this case, other processes that generate exogenous shocks to wealth may not generate the same sort of
dynamics we observe here. A number of observations suggest that the subjects are not fully integrating
their background consumption and assets when making decisions in our experimental choice tasks. We
also find results in our structural estimation that suggest the narrow bracketing assumption may more
sensibly fit the data than models with asset integration. Taken together we feel these patterns suggest that
exposure to savings accounts may have led, to some degree, to fundamental preference changes for the
treatment group. We discuss these different mechanisms in detail in Section 4 of the paper.

Our study contributes to a number of different streams of literature. It joins a growing literature
exploring the determinants of time and risk preferences. Becker and Mulligan (1997) develop a model of
endogenous preference formation in which individuals can choose behaviors that affect how they discount
the future. They argue, for instance, that financial instruments such as piggy banks may make individuals
more forward-looking by diverting attention toward the future. A number of recent empirical studies (e.g.,
Guiso, Sapienza, and Zingales 2004 and 2008, Nagel and Malmendier 2011, Shah, Mullainathan, and
Shafir, 2012) have looked at whether life experiences affect preferences and beliefs related to time and
risk preferences. There is also a small literature that looks at whether time and risk preferences have
biological origins (e.g., Rogers 1994, Robson and Szentes 2008, Sapienza, Zingales, Maestripieri 2009,
Garbarino, Slonim and Sydnor 2011). Work in psychology has found that differences in time preferences
are associated with the ability to envision future situations and that practice at delaying gratification (such
as savings behavior) may increase one’s ability to exert self-control (Baumeister and Heatherton 1996,
are also substantial literatures, primarily in finance, that have explored whether variations in wealth affect
attitudes toward risk (e.g., Brunnermeir and Nagel 2008, Paravisini, Rappoport, and Ravina 2010) and
intertemporal choices (Lawrance 1991, Atkeson and Ogaki 1996, Ogaki and Atkeson 1997). Finally, this
study adds to a growing literature in development economics that studies how access to financial products
shapes the lives of the poor (Aportela, 1999, Banerjee et al., 2011, Bruhn and Love 2009, Burgess and
Pande 2005, Dupas and Robinson 2013, Kaboski and Townsend 2005, Karlan and Zinman 2010a and
2010b, Prina 2013). Our study takes a new approach to this by exploring whether access to financial
products might have spillovers more generally into how future-oriented and risk averse a person is.

The paper is organized as follows. Section 2 describes the background of the savings experiment
conducted by Prina (2013) and outlines the design of our experiment choice tasks. Section 3 presents the
reduced form results for each of the three different choice tasks. In Section 4 we outline the theoretical
framework for our structural estimation, extending the work of Andreoni and Sprenger (forthcoming) to
account for the discrete-choice nature of our version of the CTB task. This section contains structural
estimates based on the CTB task under a range of assumptions about background consumption and discusses the distinction between the wealth-accumulation and preference-change mechanisms for our results. In Section 5 we document the association between the choices in the CTB task and the choices in the lottery-choice and hypothetical intertemporal choice tasks. Section 6 concludes.

2. Background and Experimental Design

2.1 The Prior Savings Accounts Field Experiment

Formal financial access in Nepal is very limited. Only 20% of Nepalese households have a bank account, according to the nationally representative “Access to Financial Services Survey,” conducted in 2006 by the World Bank (Ferrari, Jaffrin, and Shrestha 2007). Not surprisingly, access is concentrated in urban areas and among the wealthy. Thus, most households save informally, storing cash at home, saving in the form of durable goods and livestock, or participating in Rotating Savings and Credit Associations (ROSCAs).

In the randomized field experiment run by Prina (2013), GONESA bank gave access to savings accounts to a random sample of poor households in 17 slums surrounding Pokhara, Nepal’s second largest city. Before the introduction of the savings accounts, a household baseline survey was conducted during May 2010 in the slums to census households with a female head ages 18-55. The baseline survey collected information on household composition, education, income, income shocks, monetary and non-monetary asset ownership, borrowing, and expenditures on durables and non-durables. In total, 1,236 households were surveyed at baseline.

Separate public lotteries were held in each slum to assign the 1,236 female household heads randomly to treatment and control groups. Of those 1,236 women, 626 were randomly assigned to the treatment group and were offered the option to open a savings account at the local bank-branch office. The women assigned to the control group were not given this option.

The accounts have all the characteristics of any formal savings account. The enrollment procedure is simple and account holders are provided with an easy-to-use passbook savings account. The bank does not charge any opening, maintenance, or withdrawal fees and pays a 6% nominal yearly interest (the International Monetary Fund Country Report for Nepal (2011) indicates a 10.5% rate of inflation during the intervention period), similar to the average alternative available in the Nepalese market (Nepal Rastra

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2Female household head is defined here as the female member taking care of the household. Based on this definition, 99% of the households living in the 17 slums were surveyed by the enumerators.
Bank, 2011). In addition, the savings account does not have a minimum balance requirement. Customers can make transactions at the local bank-branch offices in the slums, which are open twice a week for three hours, or at the bank’s main office, located in downtown Pokhara, during regular business hours. After completion of the baseline survey, GONESA bank progressively began operating in the slums between the last two weeks of May and the first week of June 2010.

Table 1 shows summary statistics of baseline characteristics, separately for treatment and control groups. The last column in the table shows p-values on a test of equality of means between the treatment and control groups and reveals that randomization led to balance along all background characteristics (Prina 2013). The women participating in the savings experiment are very poor. They have on average two years of schooling, and live in households whose weekly household income averaged (at baseline) 1,600 Nepalese rupees (~$20) and with household assets amounting to 50,000 rupees (~$625). Households have on average 4.5 members with 2 children. Household members earn income from multiple sources: working as agricultural or construction workers, collecting sand and stones, selling agricultural products, raising livestock and poultry, having a small shop, working as drivers, and receiving remittances, rents and pensions, among others (not shown in the table).

Only 15% of households had a bank account before the introduction of the program. Given the lack of access to formal savings products, it is not surprising that most households typically save via microfinance institutions, savings and credit cooperatives, and Rotating Savings and Credit Associations (ROSCAs). They also save by either investing in durable goods or livestock or by storing cash at home. Additionally, households seem to rely on financial transactions with informal partners, such as friends, moneylenders, and shopkeepers, rather than with formal institutions, like banks. Moreover, 88% of them had at least one outstanding loan (most loans are taken from ROSCAs, MFIs, and family, friends, or neighbors). This is consistent with previous literature showing that the poor have a portfolio of transactions and relationships (Banerjee, Duflo, Glennerster, and Kinnan 2010, Collins et al. 2009, Dupas and Robinson 2013). Finally, monetary assets account for 40% of total assets while non-monetary assets, such as consumer durables, livestock and poultry, account for the remaining 60%.

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3 The money deposited in the savings account is fully liquid for withdrawal; the savings account is fully flexible and operates without any commitment to save a given amount or to save for a specific purpose.
4 A ROSCA is a savings group formed by individuals who decide to make regular cyclical contributions to a fund in order to build together a pool of money, which then rotates among group members, being given as a lump sum to one member in each cycle.
5 Households typically had about one week worth of household income stored at home.
6 This is in line with the statistics from the nationally representative survey conducted in 2006 by the World Bank. The survey shows that over two-thirds of Nepalese households had an outstanding loan from a formal or informal institution (Ferrari et al. 2007).
The experiment generated exogenous variation in access to savings accounts and in savings behavior. At baseline roughly 15% of the control and treatment groups had a bank account. A year later 82% of the treatment group had a savings account at the GONESA bank (the percentage of control households with a bank account remained at 15%). Administrative bank data show 78% of the treatment used the savings account actively, making at least two deposits within the first year of being offered the account. Over this one-year period account holders made on average 45 transactions: 3 withdrawals and 42 deposits (or 0.8 deposits per week). The average deposit was of 124 rupees, roughly 8% of the average weekly household income at baseline. The average weekly balance steadily increased reaching, a year after the start of the intervention, 2,362 rupees for the average account holder (roughly 1.5 times the average weekly household income at baseline).

Access to the savings account increased monetary assets by more than 50% (Prina 2013). Total assets, which include monetary and non-monetary assets (consumer durables and livestock), grew by 16%—suggesting the increase in monetary assets did not crowd out savings in non-monetary assets. Prina (2013) also documents that households reduced the amount of cash savings, but households do not seem to reallocate assets away from other types of savings institutions, formal or informal. Hence, it is possible that households might perceive the savings account as a valuable addition to the set of financial institutions they use, but not necessarily as a substitute.\(^7\)

2.2 Data

In our analysis, we use data from three household surveys: the baseline survey discussed above and two follow-up surveys conducted in June 2011 and September of 2011. The first follow-up survey, which was conducted one year after the beginning of the intervention, included the hypothetical intertemporal-choice task in which participants were asked to choose between a smaller, sooner monetary reward and a larger, more delayed monetary reward. It also repeated the modules that were part of the baseline survey and collected additional information on household expenditures.\(^8\) In the second follow-up survey, which went into the field three months after the first follow-up survey, we administered the lottery-choice and the CTB tasks.

2.3 Risk Aversion and the Lottery-Choice Task

\(^7\)For example, savings accounts and ROSCAs differ greatly across several characteristics. The social component of ROSCA participation, with its structure of regular contributions made publicly to a common fund, helps individuals to commit themselves to save (Gugerty 2007). This feature is not present in a formal savings account such as the one offered. Also, ROSCAs are usually set up to enable the group members to buy durable goods and are unsuitable devices to save for anticipated expenses that are incurred by several members at the same time (e.g., school expenses at the beginning of the school year), because only one member of a ROSCA can get the pot in each cycle.

\(^8\)Of the 1,236 households interviewed at baseline, 91% (i.e., 1,118) were found and surveyed in the first follow-up survey. Attrition for completing the first follow-up survey is not correlated with observables.
In the lottery task, subjects were asked to choose among five lotteries, which differed on how much they were paid depending on whether a coin landed on heads or on tails. The lottery-choice task is similar to that used by Eckel and Grossman (2002) and Garbarino, Slonim, and Sydnor (2011). Each lottery had a 50-50 chance, based on a coin flip, of paying either a lower or higher reward. The five (lower; higher) pairings were (20; 20), (15; 30), (10; 40), (5; 50) and (0; 55). The choices in the lottery task allow one to rank subjects according to their risk aversion: subjects that are more risk averse will choose the lotteries with lower expected value and lower variance. The least risky lottery option involved a sure payout of 20 rupees, while the most risky option (0; 55) was a mean-preserving spread of the second-most risky, and as such should only be chosen by risk-loving individuals. Given the low level of literacy of our sample, we opted for a visual presentation of the options. Each option was represented with pictures of rupees bills corresponding to the amount of money that would be paid if the coin landed on heads or tails (see Appendix Figure 1 for a reproduction of the images shown to subjects).

2.4 Hypothetical Intertemporal Choice Task

In the first follow-up survey, we measured willingness to delay gratification by asking individuals to make hypothetical choices between a smaller sooner monetary reward and a larger later monetary reward (Tversky and Kahneman 1986, Benzon, Rapoport, and Yagil 1989, Shelley 1993). Study participants were initially asked to choose between receiving 200 rupees today or 250 rupees in 1 month. Those who chose 200 rupees today (over 250 rupees in 1 month) were then asked to make a second choice between 200 rupees today or 330 rupees in 1 month. Those who chose 250 rupees in 1 month (over 200 rupees today) were asked to make a second choice between 200 rupees today or 220 rupees in 1 month. The hypothetical choices in this intertemporal choice task allow one to rank subjects according to their willingness to delay gratification: subjects that are more impatient will be less willing to wait to receive a larger reward.

We also asked a second set of questions varying the time frame (two months or in three months) to investigate hyperbolic discounting. These survey questions are presented in Appendix Figure 2 and Appendix Figure 3.

2.5 Incentivized Intertemporal Choice Task

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9Subjects did the lottery choice task after making their decisions in the four CTB games, but prior to learning which of the four CTB games they would be paid for. Immediately after making the choice in the lottery choice task, a coin was flipped and the subject received a voucher for the amount of money corresponding to her option choice and the coin flip. The voucher was redeemable starting that day at GONESA bank headquarters. To ensure that the risk game did not influence the participants’ choices in the CTB game, subjects were informed about this game and the potential money from this game only after making their allocation decisions.
We adapted an experimental procedure developed by Andreoni and Sprenger (forthcoming) called the “Convex Time Budget” method (henceforth, CTB) to the context of our sample of women. In the CTB, subjects are given an experimental budget and must decide how much of this money they would like to receive at a sooner specified date and how much they would like to receive at a later specified date. The amount they choose to receive later is paid with an experimental interest rate, as a reward for delaying gratification. In practice, subjects are solving a two-period intertemporal allocation problem by choosing an allocation along the intertemporal budget constraint determined by the experimental budget and the experimental interest rate. Andreoni and Sprenger (forthcoming) used a computer display that allowed for a quasi-continuous choice set. In our study we use an even simpler version of this CTB choice task.10

In our adaptation of the task, participants were asked to choose between three options. The three options corresponded to three (non-corner) allocations along an intertemporal budget constraint with an experimental endowment of 200 Nepalese rupees and an implicit experimental interest rate of either 10% or 20%. Subjects were asked to make four of these choices (henceforth, games), in which we varied the time frame and the experimental interest rate.

Table 2 lists the parameters of each one of the four games and the three possible allocations in each game. In game 1, the interest rate was 10%, the earlier date was “today” and the later date was “in 1 month”, such that the time delay (i.e., the time interval between the earlier and later dates) was one month. Game 2 had the same interest rate and time delay as game 1, but the earlier date in game 2 was “in 1 month” (consequently, the later date was “in 2 months” in game 2). Games 2 and 3 had the same time frame, but the interest rate was 10% in game 2 and 20% in game 3. Finally, the interest rate was 20% in games 3 and 4, but the time delay was 1 month in game 3 and 5 months in game 4 (in both, the earlier date was “in 1 month”). One of the four games was randomly selected for payment.11

10 Giné, Goldberg, Silverman and Yang (2012) also adapted the CTB method into an experiment in the field involving tobacco farmers in Malawi. In their experiment, participants had a higher level of education then our sample (4.5 years of schooling versus 2 years in our sample). Thus, the level of sophistication of their experiment is higher. In particular, in their experiment, each participant was presented with a small bowl containing 20 tokens and two empty dishes, a “sooner dish” and a “later dish.” Individuals were explained that each token allocated to the “sooner dish” would pay them an amount tomorrow while each token allocated to the “future dish” would pay them a larger amount in 30 days. Participants were then asked to allocate the 20 tokens between the present and future dishes. The value of the token placed in the future dish determined the implicit interest rate for waiting. The idea of the experiment is that—for a given interest rate—an individual that is more forward-looking will put more tokens in the future dish than an individual that is more present-oriented.
11 The selection of which game the subject was paid for was determined using the roll of a four-sided die. Payments were made using vouchers that the participant could redeem at GONESA’s main office, with which they are familiar. At the end of the experiment, all money was paid with vouchers. Each voucher contained the soonest date the money could be redeemed. Each participant received two vouchers from this choice task, one for her “sooner” payment and one for her “later payment.”
Limiting the decision in each game to a choice between three options greatly simplified the decisions subjects had to make and allowed for a visual presentation of the options with pictures of rupee bills (see Appendix Figures 4-7 for a reproduction of the images shown to study participants). As with the lottery-choice task, the visual presentation of the options was crucial given the low level of literacy and the little familiarity with interest rates of our sample. In addition, the enumerators were instructed to follow a protocol to carefully explain the task to participants and to have subjects practice before making their choices. It is also important to note that our setup mitigates the concern that the treatment and control groups might behave differently because the treatment group has a greater understanding of interest or ability to make interest calculations. The visual presentation of choice options did not require individuals to understand interest and instead simply offered them choices between different sums of money at different dates. Hence, while the interest rate was manipulated across choice tasks, the individuals saw the final monetary choices and did not have to process the interest rate themselves.

One interesting feature of the CTB method is that we can investigate whether treatment and control groups respond differently to changes in the experimental interest rate or in the time frame. Moreover, as we explain in greater detail in Section 4, the variations in the time frame and the interest rate enable us to investigate (under some structural assumptions) whether the treatment and control have different preference parameters, namely the present bias, the exponential discount rate and the intertemporal elasticity of substitution.

3. Reduced Form Results

We begin our discussion of the results by examining the reduced form treatment-control differences in their choices in the experimental tasks.

3.1. Lottery Choices

Figure 1 presents the distribution over the five possible choices in the lottery-choice task, separately for the control and treatment groups. The bars are indexed by the lower x higher amounts subjects would be paid if a coin landed on heads x tails. For example, the first bar from left to right shows the fraction of subjects who chose the risk-free option that paid 20 rupees irrespective of the coin toss. Similarly, the second bar from left to right shows the fraction of subjects who chose the lottery that paid 30 rupees if the coin landed on heads and 15 rupees if it landed on tails. Thus, the bars further to the right correspond to lotteries with higher expected value and higher variance.

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12The protocol of the experiment can be found in the Appendix.
Figure 1 shows that the treatment group is more willing to choose riskier lotteries. The distribution of the treatment group is shifted to the right relative to the distribution of control, that is, the treatment group is more likely than the control group to choose options with higher expected value and higher variance.

Table 3 reproduces the results presented graphically in Figure 1. Columns (1) and (2) show the fraction of subjects who chose each option, separately for treatment (Column 1) and control (Column 2). Columns (5) and (6) present the cumulative choice patterns, showing the fraction choosing a lottery with that level of risk or less. Columns (3) and (7) show differences between the treatment and control distributions, while Columns (4) and (8) show p-values from two-sided tests that the differences between the two groups are zero.

The results in Table 3 confirm that the treatment group is less risk averse than the control group: the treatment group is 4 percentage points less likely to choose the risk-free option that paid 20 rupees irrespective of the coin toss. This result is statistically significant at 5%. The lottery-choices of the treatment group have a coefficient of variation (i.e., standard deviation divided by expected value) 0.03 higher than the lottery choices of the control group (the lottery choices were constructed such that “riskier” lotteries had higher coefficients of variation). However, a Chi-square test of independence cannot reject the hypothesis that the two distributions are the same.

It is also possible to use this table to generate a rough calculation of the difference in risk-aversion parameters for the average member of each group. The table lists the lower bound on the implied relative risk aversion from a CRRA model applied only to experimental earnings for each of the lottery choices. If one assigns the value of relative risk aversion closest to risk neutral (i.e., the lower bound for options 1 through 4 and 0 for option 5) to all the individuals who chose that lottery, the weighted averages imply an average relative risk aversion coefficient of 0.50 for the control group and 0.42 for the control group. To put this difference in perspective, we can compare it to the size of the well-documented difference in risk aversion observed between men and women in lottery-choice tasks of this type. We observe a 19% difference in relative risk aversion between the groups, while studies such as Garbarino, Slonim and Sydnor (2011) have found that women tend to have average relative risk aversion coefficients around 30% higher than men in similar tasks. As such, the effect of the savings experiment is somewhat smaller than the observed gender differences often discussed in the experimental literature on risk preferences, but is comparable in magnitude to those gender differences.

3.2. Hypothetical Intertemporal Binary Choices

Figure 2 presents the distribution of answers subjects gave when they had to choose between the hypothetical survey options of 300 rupees in 1 month and a larger amount in 2 months. The figures show the fraction selecting each of the 4 possible answers to this question. The bars are indexed by the delayed
amount subjects would require to be willing to wait. For example, the second bar from left to right shows
the fraction of subjects who were willing to wait for 495 rupees—that is, they preferred receiving 495
rupees in 2 months over 300 rupees in 1 month. Similarly, the third and fourth bars from left to right show
the fraction of subjects who were willing to wait for 375 rupees and 330 rupees, respectively. Finally, the
first bar shows the fraction of subjects who would demand more than 495 rupees to be willing to wait—
that is, they preferred 300 rupees in 1 month over 495 rupees in 2 months. Thus, the bars further to the
right correspond to participants who are more willing to delay gratification. Figure 3 presents the
distribution over the four possible choices when subjects had to choose between 200 rupees today and a
larger amount in 1 month.

Figures 2 and 3 show the treatment group was more willing than the control group to accept delayed
payments in the hypothetical intertemporal choice task. In both figures the mass of distribution of the
treatment group is shifted to the right relative to the distribution of the control group. Table 4 confirms
these results. The treatment group is roughly 6 percentage points more likely than the control group to be
willing to give up 300 rupees in 1 month in exchange for 375 rupees in 2 months, and the difference is
statistically significant at 5%. Chi-square tests of independence give p-values of 0.075 and 0.16,
suggesting that the observed differences are marginally statistically significant.

3.3. Incentivized CTB Choices

Figure 4 shows for each game the distribution of choices in the CTB experimental task, separately for
the control and treatment groups. Four sets of two bars are presented. Each set corresponds to one of the
four games; the left bar in each set corresponds to the distribution of choices among the control group
while the right bar corresponds to the distribution of choices among the treatment group. Each bar
contains two parts: a blue part that is above the x-axis and a red part that is below the x-axis. The blue
part corresponds to the fraction of participants who were the most willing to delay gratification, choosing
to delay the maximum amount of 150 rupees (50 rupees sooner). The red part corresponds to the fraction
of participants who were the least willing to delay gratification, delaying the minimum amount of 50
rupees (150 rupees sooner).¹³ Thus, an increase in the willingness to delay gratification corresponds to an
increase in the blue bar and a reduction in the red bar.

The differences in choices across games reflect changes in the parameters of the intertemporal choice
across the games. In game 1 the experimental interest rate was 10%, the sooner date was “today” and the
later date was “in 1 month.” The sooner date was changed from “today” to “in 1 month” between games 1
and 2 while the time interval between the sooner and later dates and the experimental interest rate were

¹³ The fraction choosing the middle allocation is omitted here and can be inferred from the other two fractions.
held constant. Thus, present biased individuals would be supposedly more willing to delay gratification in game 2 than in game 1. Games 2 and 3 had the same time frame (sooner date “in 1 month”; later date “in 2 months”), but the interest rate was increased from 10% in game 2 to 20% in game 3. Individuals with a higher intertemporal elasticity of substitution would be the ones to reallocate more money to the later date in response to a change in the interest rate. Finally, the time delay was increased from one month in game 3 to five months in game 4. While the sooner date was the same in games 3 and 4 (“in 1 month”), the later date was “in 2 months” in game 3 and “in 6 months” in game 4 (the interest rate was held constant at 20% between games 3 and 4). Individuals with a higher discount rate would be the ones to reallocate more resources to the sooner date in response to an increase in the time delay.

The comparison of choices across games suggests that participants understood the experimental task. For example, subjects re-allocate significantly more money to the later date when the experimental interest rate is increased from game 2 to game 3. Subjects also reallocate more money to the sooner date when the delay time is increased from game 3 to game 4. Interestingly, we see no evidence of present bias. The choices in games 1 and 2 are very similar, even though the sooner date is “today” in game 1 and “in 1 month” in game 2. Andreoni and Sprenger (forthcoming) also found no evidence of present bias when they conducted the CTB task with undergraduate students. The results of Augenblick, Niederle and Sprenger (2012) suggest that tasks involving choices over monetary rewards may be less suited to capture present bias than tasks involving choices over real-effort-tasks.

We turn now to the treatment-control differences. Figure 4 suggests that the treatment is more willing to delay gratification. The treatment group is more likely to delay the maximum amount possible of 150 rupees and less likely to delay the minimum amount possible of 50 rupees (with the exception of game 2). Table 5 reproduces the results presented graphically in Figure 4.

Table 5 shows the treatment is 3.5 percentage points more likely than the control to delay in game 1 the maximum amount possible of 150 rupees. In game 3 the treatment was roughly 5 percentage points more likely to delay the maximum amount possible. This difference is statistically significant at 10%. The treatment group is also 2 and 4 percentage points less likely to delay the smallest amount possible in games 3 and 4, respectively.

Next, we investigate whether treatment and control groups respond differently to changes in the parameters of the experimental task, which may give us further insight into why the treatment group may be more willing to delay gratification. For this purpose, we compare how the allocations of treatment and control groups change between: i) games 1 and 2 (change in the sooner date); ii) games 2 and 3 (change in the experimental interest rate); and iii) games 3 and 4 (change in time delay). The results are shown in Table 6. For example, they show that the increase in the fraction of subjects choosing to delay the maximum amount is larger among the control group (and the reduction in the fraction of subjects
choosing to delay the minimum amount is larger among the control), which is consistent with the control group being more present biased than the treatment group. These differences however, are not statistically significant.

Interestingly, the treatment group is more responsive than the control group to an increase in the experimental interest rate. When the experimental interest rate increases from 10% to 20%, there is a 17 percentage points increase in the fraction of treatment choosing to delay the maximum amount and a 12 percentage points increase among the control. Similarly, the increase in experimental interest rates leads to a 11 percentage points decrease in the fraction of the treatment choosing to delay the minimum amount and a 5 percentage points reduction among the control. This difference is statistically significant at 10%.

Finally, the evidence on which group is more responsive to the increase in the time delay is mixed. As expected, for both groups the increase in the time delay increases the fraction of participants choosing to delay the minimum amount of 50 and decreases the fraction of participants choosing to delay the maximum amount of 150. The increase in the fraction of participants choosing to delay the minimum amount is smaller among the treatment group, which is consistent with the treatment group being less responsive to the increase in the delay time. However, the decrease in the fraction of participants choosing to delay the maximum amount is larger among the treatment, which would suggest the control group is less responsive. Anyhow, these differences are not statistically significant.

Overall, the reduced-form results show that the treatment group is more responsive to an increase in the experimental interest rate, which suggests that the treatment group may be more willing to delay gratification because it has a higher intertemporal elasticity of substitution. This hypothesis is also consistent with the evidence that the treatment group is more likely to choose riskier options in the lottery choice task. In fact, in a model with constant-relative-risk-aversion (CRRA) risk preferences, a higher intertemporal elasticity of substitution would correspond to a less concave and more risk-neutral utility function.

### 3.4. Magnitude and Precision of Estimated Treatment Effects

The differences in the choices of treatment and control in all three experimental tasks have the expected sign (with some exceptions in the CTB task) but are sometimes not statistically significant. This observation raises the question of whether the estimated effects are modest or whether the standard errors are large (or both). More generally, it is hard to judge whether the estimated treatment effects are economically meaningful without a benchmark for comparison.
Table 7 compares the estimated treatment effects to the effects of having one additional year of education.\textsuperscript{14} The latter is obtained from a least squares regression of an indicator of a given experimental choice (e.g., an indicator for whether individual chose the risk-free lottery in the lottery-choice task) on a constant and the number of years of schooling of the female head (see section 2). The table reports the point estimates, the standard errors and the p-values of hypothesis tests. It also reproduces the estimated treatment effects presented in Tables 3, 4 and 5 to facilitate the comparison.

The results suggest that the effects of gaining access to a savings account (implied by the point estimates) are not small. In fact, they are larger than the effects of having one additional year of education. Notice that the estimated treatment effects are intent-to-treatment estimates, such that the difference in magnitudes would be even larger if one took into account that one-fifth of the treatment group declined the offer to open a savings account. Despite the smaller magnitudes of the education effects, they have stronger statistical significance because they are more precisely estimated than the estimated treatment effects. The standard errors of the treatment effects are always at least five times larger than the standard errors of the education effects.

4. Potential Mechanisms and Structural Estimation

Section 3 documented that treatment and control make different choices in the experimental tasks, remaining agnostic about what may underlie these differences in behavior. In this section we discuss two broad mechanisms through which access to savings accounts could affect risk-taking and intertemporal choice behavior, as suggested by the existing literature. One potential mechanism is the “wealth effect”:

As discussed in section 2.1, the savings account enabled the treatment group to accumulate more wealth than the control group, which may have changed the marginal utility of consumption. One particular case of this mechanism is that the treatment group may be less likely to be liquidity constrained. The alternative mechanism is that gaining access to savings accounts may have changed preferences. Such changes in preferences could reflect, for example, changes in how easily one can envision the future, how aware they are of the broader impacts of their immediate choices, and different emotional responses to windfall income. It is both conceptually and empirically challenging to disentangle potential wealth effects from preference changes, but we provide some suggestive evidence about the potential mechanisms.

4.1 Buffer Wealth, Background Consumption and Narrow Bracketing

Having access to some buffer wealth should make the treatment group less risk averse than the control group, which is broadly consistent with our experimental findings. The buffer wealth could also

\textsuperscript{14} The estimated education effects here are of course not estimates of the causal effects of education on the experimental choices.
lead the treatment group to choose on average more patient choices in the CTB task than the control group. Having some buffer wealth allows treatment households to smooth consumption, transferring resources from good times to lean times and keeping a flatter profile of background consumption. By contrast, liquidity-constrained households experiencing lean times would have an increasing profile of background consumption, and consequently would be less willing to delay gratification.\footnote{15}

However, the data suggest that – around the time the experimental tasks were administered – there was no difference in the average level of consumption of the control and treatment groups. Administrative bank data show that one year after the introduction of the program the treatment groups’ average and median savings account balances had roughly plateaued. Savings-account participants continued to make deposits and withdrawals, but the two had roughly balanced each other out, suggesting that on average the treatment group was neither increasing saving nor dissaving.\footnote{16} Moreover, as Prina (2013) discusses, the savings experiment did not change the income level of the treatment group. The combination of these two patterns suggests that the average weekly rupee expenditures were likely similar for the two groups around the time our data were collected.

Moreover, the possibility that individuals may “narrow bracket” when participating in the experimental tasks casts doubt on whether the differences in the experimental choices of the treatment and control groups reflect wealth effects. The rich literature on narrow bracketing (see Rabin and Weizsacker 2009 for a review) documents that individuals tend to make choices, especially in experimental tasks, that ignore other circumstances the decision-maker faces (Tversky and Kahneman 1981, Rabin and Weizsacker 2009)—for example, their real-life financial conditions.\footnote{17} Indeed, most evidence suggests that experimental choices are hard to rationalize unless one assumes a strong degree of narrow bracketing (Rabin 2000, Rabin and Thaler 2001, Schechter, 2007).

Consistent with the literature cited above, we also find evidence suggesting that subjects were narrow bracketing when engaging in the CTB and lottery-choice tasks. First, we note that subjects failed to take advantage of a simple arbitrage opportunity: the experimental interest rate was much higher than both the prevailing market interest rates and the rate of interest the treatment group earned on their savings accounts. If individuals were integrating their background consumption, they should have allocated all

\footnote{15} On the other hand, the opportunity to save within our CTB task would likely be especially attractive to control individuals who desired to create a buffer stock of wealth and had less effective savings options than the treatment group.

\footnote{16} These figures were calculated using GONESA bank’s administrative data on the savings account balance, deposits and withdrawals of treatment households.

\footnote{17} There is also a very closely related literature on “myopic loss aversion” that discusses how forms of narrow bracketing help to explain various phenomena such as the equity premium puzzle (e.g., Benartzi and Thaler 1995, Gneezy and Potters 1997).
money in the CTB to the future to take advantage of the higher experimental interest rates. Because the CTB payout amounts were fairly modest compared to the level of household financial assets, households could re-adjust their “background saving” to achieve whichever consumption pattern they desired. However, a substantial fraction of participants make less-than-perfectly-patient choices in the CTB, even among those from the treatment group with substantial savings. This indicates that our subjects were not perfectly integrating.

Another piece of evidence suggesting subjects were narrowly bracketing comes from analyzing the choices of subjects who were administered these tasks on different dates. The tasks happened to be administered around the Dashain, Nepal’s most important national holiday, which in 2011 happened between October 3rd and October 12th. Because households incur major expenses associated with the Dashain festivities, we expect that the Dashain would generate large variations in levels of background consumption and cause potential liquidity constraints for these households. Thus, if subjects were integrating their background consumption, we would expect to see differences between the experimental choices of subjects who played the experimental tasks closer to the Dashain and the experimental choices of subjects who played them farther from the Dashain.

Figure 5 shows the relationship between household savings and the date at which the experimental tasks were administered. It plots the average savings among participants surveyed at a given day. The diameter of the circle reflects the mass of participants who were surveyed at the given day. The section of the graph between October 3rd and October 12th has no data and corresponds to the Dashain, when no interviews were conducted.

The figure shows that there is a strong negative relationship between savings and the proximity to the Dashain: in roughly 30 days the average savings reduced approximately from 60,000 rupees all the way to 5,000 rupees. If individuals were integrating, one would expect that individuals would be less willing to delay gratification and less willing to take risks as it got closer to the holiday and they became increasingly liquidity constrained. However, the data do not support this hypothesis. Figure 6 plots the fraction of participants who chose in game 1 to receive the largest sooner reward of 150 rupees, which they could redeem on the same day, against the interview date. There is no evidence that individuals were less willing to delay gratification, as it got closer to the holiday. Figure 7 is consistent with Figure 6, as it shows that there is no evidence that individuals were more likely to choose the risk-free option in the lottery-choice task, as it got closer to the holidays.

4.2 Structural Model

18A household would spend money among other things buying new clothes and animals like goats and chickens to be slaughtered as religious sacrifices.
19The results are qualitatively the same if one controls for baseline wealth or calculates median (rather than mean) savings per day. Results available from authors upon request.
The proceeding section makes it clear that it is an open question as to whether the observed choice patterns reflect wealth effects or some type of preference change, but there is at least suggestive evidence that the treatment group may have different preferences. In order to better explore the implications our findings have for understanding preference change, we turn to a structural utility model. This approach allows us to ask the question: For different assumptions about the effects of background wealth, how different would the preferences of the control and treatment groups have to be to generate the experimental task choices we observe in the data? By combining the structural utility model with the field experiment randomized variation, we can estimate differences in the preference parameters of the control and treatment groups. For this purpose we use data from the CTB task, which allows us to jointly estimate present bias, exponential discount rates and the intertemporal elasticity of substitution under a single unified framework.

4.2.1 Model

We follow Andreoni and Sprenger (forthcoming) in modeling the intertemporal choice of an agent with time separable utility and quasi-hyperbolic time preferences faces in the experimental task. In a given game $g$ the agent must choose between receiving 150, 100 or 50 rupees sooner. The later reward, $LR_g$, is given by:

$$LR_g = (200 - SR_g) * R_g,$$

where $SR_g$ is the sooner reward, and $R_g$ the gross experimental interest rate in game $g$. Assuming that the agent has constant-relative-risk-aversion (CRRA) risk preferences, the utility of a given allocation is given by:

$$U(SR_g, LR_g) = \left[ (SR_g + \omega_1)^{\frac{1}{1-\beta}} + \beta^\tau \delta^k \theta (LR_g + \omega_2)^{\frac{1-1}{\theta}} \right] / \left[ 1 - \frac{1}{\theta} \right],$$

where the preference parameters are: $\theta$, the intertemporal elasticity of substitution; $\beta$, the present bias; and $\delta$, the monthly discount factor. The parameters of the game $g$ intertemporal choice are: $\tau_g$, an indicator variable that is 1 if the sooner date in game $g$ is today (and 0 otherwise); $k_g$, the time delay (in months) between the sooner and later dates; and $R_g$ is the gross experimental interest rate. The parameter $\omega_1$ is the background consumption in the period in which the agent receives the sooner reward and $\omega_2$ is the background consumption in the period in which the agent receives the later reward. Andersen et al. (2008) define background consumption as “the optimized consumption stream based on wealth and income that is [perfectly] anticipated before allowing for the effects of the money offered in the
It is easy to show that the agent chooses to receive 150 sooner if condition (3) holds and chooses 50 sooner if condition (4) holds:

\[
\frac{\ln \left( 150 + \omega_1 \right)^{1-\frac{1}{\sigma}} - \left( 100 + \omega_1 \right)^{1-\frac{1}{\sigma}}}{\left( 100R_g + \omega_2 \right)^{1-\frac{1}{\sigma}} - \left( 50R_g + \omega_2 \right)^{1-\frac{1}{\sigma}}} > Y_g^*,
\]

(3)

\[
\frac{\ln \left( 150 + \omega_1 \right)^{1-\frac{1}{\sigma}} - \left( 100 + \omega_1 \right)^{1-\frac{1}{\sigma}}}{\left( 150R_g + \omega_2 \right)^{1-\frac{1}{\sigma}} - \left( 100R_g + \omega_2 \right)^{1-\frac{1}{\sigma}}} < Y_g^*,
\]

(4)

where \( Y_g^* = \tau_g \ln \beta + k_g \ln \delta \) is (the log of) the effective discount factor in game \( g \). If neither condition (3) nor condition (4) holds, then the agent chooses to receive 100 sooner.21

In taking the model to the data, we assume an additive error structure:

\[
Y_{i,g}^* = \tau_g \ln \beta + k_g \ln \delta + \varepsilon_{i,g},
\]

(5)

where \( \varepsilon_{i,g} \) is an error term that is specific to individual \( i \) and game \( g \) and is normally distributed with mean zero and variance \( \sigma^2 \)—i.e., \( \varepsilon_{i,g} \sim N(0, \sigma^2) \). Under these assumptions, the likelihood of individual \( i \)'s choice in game \( g \) is given by:22

\[
L_{i,g} = \begin{cases} 
1 - \Phi \left( \frac{1}{\sigma} \ln \frac{(100+\omega_{i,1})^{1-\frac{1}{\sigma}} - (50+\omega_{i,1})^{1-\frac{1}{\sigma}}}{(150R_g+\omega_{i,2})^{1-\frac{1}{\sigma}} - (100R_g+\omega_{i,2})^{1-\frac{1}{\sigma}}} - \frac{\ln \beta}{\sigma} \tau_g - \frac{\ln \delta}{\sigma} k_g \right) & \text{if } SR_{i,g} = 50, \\
\Phi \left( \frac{1}{\sigma} \ln \frac{(100+\omega_{i,1})^{1-\frac{1}{\sigma}} - (50+\omega_{i,1})^{1-\frac{1}{\sigma}}}{(150R_g+\omega_{i,2})^{1-\frac{1}{\sigma}} - (100R_g+\omega_{i,2})^{1-\frac{1}{\sigma}}} - \frac{\ln \beta}{\sigma} \tau_g - \frac{\ln \delta}{\sigma} k_g \right) - \\
-\Phi \left( \frac{1}{\sigma} \ln \frac{(150+\omega_{i,1})^{1-\frac{1}{\sigma}} - (50+\omega_{i,1})^{1-\frac{1}{\sigma}}}{(100R_g+\omega_{i,2})^{1-\frac{1}{\sigma}} - (50R_g+\omega_{i,2})^{1-\frac{1}{\sigma}}} - \frac{\ln \beta}{\sigma} \tau_g - \frac{\ln \delta}{\sigma} k_g \right) & \text{if } SR_{i,g} = 100, \\
\Phi \left( \frac{1}{\sigma} \ln \frac{(150+\omega_{i,1})^{1-\frac{1}{\sigma}} - (100+\omega_{i,1})^{1-\frac{1}{\sigma}}}{(100R_g+\omega_{i,2})^{1-\frac{1}{\sigma}} - (50R_g+\omega_{i,2})^{1-\frac{1}{\sigma}}} - \frac{\ln \beta}{\sigma} \tau_g - \frac{\ln \delta}{\sigma} k_g \right) & \text{if } SR_{i,g} = 150, 
\end{cases}
\]

(6)

where \( \omega_{i,1} \) and \( \omega_{i,2} \) allow for individual-level variation in background consumption. Using (6) we estimate the variance of the error term \( \sigma^2 \) and separate preference parameters \( (\delta, \beta, \theta) \) for the control and treatment groups using maximum likelihood. The variance of the error term is assumed to be the same for the two groups.

20Notice there is an assumption, which is the standard in the literature, that the agent chooses the optimal background consumption without taking the experimental rewards into account, such that the agent does not re-optimize if there is any reallocation of the experimental rewards.

21It is trivial to show that conditions (3) and (4) cannot jointly hold.

22Andreoni, Kahn and Sprenger (2012) adopt an alternative approach and use interval-censored Tobit to estimate the preference parameters when the Convex Time Budget task involves a choice between few options.
The discussion in section 4.1 highlighted that assumptions about the degree of narrow bracketing are crucial when generating structural estimates of preference parameters. Within the structural model presented above, narrow bracketing is equivalent to assuming that $\omega_1 = \omega_2 = 0$ in equation (6). If, however, individuals do not narrow bracket, then any treatment-control differences in background consumption (i.e., differences in $\omega_1$ and $\omega_2$) may lead the treatment and control groups to make different CTB choices—even if they have the same preferences. In the next two sub-sections we provide structural estimates under different assumptions about the integration of background consumption.

### 4.2.2 Structural Estimates Assuming Narrow Bracketing

Table 8 presents the results from the structural estimation. Panel A shows the estimates of the preference parameters and Panel B reports the p-value of hypothesis tests of treatment-control differences in the preference parameters. The estimates in the first column assume narrow bracketing, which is equivalent to assuming that $\omega_1 = \omega_2 = 0$ in equation (6).

The results indicate that the treatment group has an annual discount rate 2 percentage points lower than the control and an intertemporal elasticity of substitution 7% higher. Neither of these results is statistically significant, but it is worth noting that, because of our need to offer simple discrete choices to subjects, the standard errors on the parameter estimates from the structural model are somewhat large. For example, at conventional levels we can only detect differences of around at least 6 percentage points in the annual discount rate with statistical significance. So, although the estimated differences are not statistically significant, we think it is important to note here that the structural point estimates suggest moderate but economically meaningful differences in preferences. The point estimate of the annual discount rate of the control group is 26% while the annual discount rate of the treatment group is 24%; these discount rates are somewhat reasonable given that annual inflation in Nepal was above 10% during the study period (IMF 2011). Consistent with the reduced form results, the results show no present bias as $\beta$ is estimated to be equal to 1.

### 4.2.3 Structural Estimates Assuming Asset Integration

Columns 2 through 5 of Table 8 show structural estimation results for different assumptions about background consumption. In Column 2 we assume that all members of each group have background consumption equal to 3,000 rupees, which is close to the average typical weekly income reported by these households, and that the background consumption is constant over time. Assuming that households

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23 Note that one could also consider 12,000 rupees, the average monthly consumption, a reasonable measure. Nothing changes in a meaningful way if one uses monthly consumption (though the levels of the intertemporal elasticity of substitution clearly change). We choose weekly consumption here because it fits with an assumption that the money would be used to increase consumption immediately upon receipt.
integrate this level of consumption only changes the size of the estimated intertemporal elasticity of substitution parameter. All of the patterns, and in particular the discount rates, are unchanged: The treatment group has a discount rate 2 percentage points lower and an intertemporal elasticity of substitution 7% higher than the control. As in the “narrow bracketing” case we find no statistically significant differences, but again cannot reject economically meaningful differences in discount rates or intertemporal elasticity of substitution.

The more interesting case under broad bracketing is when access to buffer wealth allows the treatment group to have a profile of background consumption different from the profile of the control group. As we discussed in section 4.1, because the treatment can transfer consumption from good times to lean times, it may have a flatter profile of background consumption than the control group. On the other hand, as the savings account allows the treatment group to save at a higher interest rate than the control group, they may choose to have a steeper profile of background consumption with lower current consumption and higher future consumption. In Columns 3 through 5 of Table 8 we consider cases where both the levels and slopes of the consumption profiles can differ between the two groups.

In Column 3 we assume different levels of background consumption for the control (3,000 rupees) and the treatment (4,000 rupees), but maintain the assumption that those levels of consumption are constant over time. Again the level of background consumption has no effect on estimated discount rates. However, due to the tight link between utility curvature and consumption levels in the CRRA model, assuming higher levels of background consumption for the treatment group leads to estimates of the intertemporal elasticity of substitution that are actually higher for the control group. More modest differences in background consumption can lead to estimates of identical θ parameters for the two groups. As such, we conclude from this exercise that, if the treatment group has modestly higher levels of background consumption, the patterns in our data could be consistent with lower discount rates for the treatment group but identical intertemporal elasticities of consumption for the two groups.

In Column 4 we simulate a scenario in which the sooner experimental reward would have been received at a leaner time, in which case the background consumption of the control group would be expected to grow (and the marginal utility of the sooner reward to decrease) between the sooner and the later CTB dates. The treatment, however, can use the buffer wealth they have accumulated to smooth background consumption over time. This assumption lines up fairly well with the timing of the Dashain festival. Here we set background consumption for control at 2,980 rupees in the sooner period and 3,000 rupees in the later period, while treatment is held at 3,000 rupees in both periods. This assumption implies that the treatment has an annual discount rate 5% higher than the control. It seems implausible that
gaining access to savings would make the treatment group substantially less patient than the control group.

In Column 5 we consider the alternative hypothesis that the treatment chooses a steeper profile of background consumption because they can save at a higher interest rate than the control. Here we assume that in the present period the treatment group has slightly lower background consumption (2,990 vs. 3,000 rupees) with the anticipation that they will have slightly higher consumption in the future (3,310 vs. 3,000 rupees). The estimates imply the treatment had an annual discount rate 9 percentage points lower than the control (statistically significant at 5%), but that the two groups had comparable intertemporal elasticities of substitution. We have also conducted exercises as in columns 4 and 5 but with much steeper gradients, such as a 10% effect, in which case we find extreme results with enormous differences in discount rates and in the intertemporal elasticities of substitution (results not shown in Table 8, but available from authors upon request).24

The results in Columns 4 and 5 highlight that the structural estimates are very sensitive to assumptions about the slope of background consumption. In general we find that – if individuals integrate background wealth and if the two groups have identical preferences – even rather modest treatment-control differences in background consumption profiles would generate very different behavior in the CTB. Since the actual differences in behavior in the CTB are not large and since the preference-differences needed to explain those relatively similar choices seem implausible when coupled with modest differences in background consumption profiles (e.g., estimates of treatment group having higher discount rates), we think these results largely suggest that individuals either were not integrating their background consumption when making the CTB choices or that the two groups did have very similar background consumption gradients over time. In either case, these results would lend more support for a “preference change” rather than “wealth effects” explanation for the mechanism behind the different choice patterns we observe for the two groups.

5. Correlation Between Elicited Measures

One concern is whether the estimates presented in section 4 may under-estimate the actual treatment-control differences in preferences because our subjects, who had little formal schooling and were often illiterate, could have made choices in the CTB experimental task that did not reflect their true preferences.

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24 We have also conducted versions of the estimation incorporating individual-level heterogeneity in background consumption by using measures of self-reported “typical weekly income” for the groups prior to the experimental tasks as our measure of background wealth. The results and implications of the exercise are very similar using this type of heterogeneity.
In other words, could we be picking up nothing but “decision noise” with these tasks? There are a number of reasons to believe that this is not the case. First, as discussed in section 3, the data suggest participants did understand the experimental task: They reallocated more money to the future when the experimental interest rate was increased and reallocated less money to the future when the delay time was increased. These results are consistent with the rich history of experimental lab-style studies conducted with participants in developing countries, which have shown this type of study can produce useful results with such populations.

Here we present additional evidence that the CTB choices provide informative measures of individual preferences. If our measures have some explanatory power, then the choices in the lottery-choice and in the hypothetical intertemporal choice task should predict individuals’ allocation in the CTB experimental task. In particular, subjects who are more risk averse in the lottery-choice task, which corresponds to a lower intertemporal elasticity of substitution in a CRRA model, and more impatient in the hypothetical intertemporal choice task should be less willing to delay gratification in the CTB task.

Figure 8 shows the relationship between the choices in the CTB task and the choices in the lottery-choice and in the hypothetical intertemporal choice tasks. Four sets of four bars are presented, corresponding to the four CTB games. The blue part of each bar corresponds to the fraction of participants who were the most willing to delay gratification in the CTB task while the red part corresponds to the fraction of participants who were the least willing to delay gratification in the CTB. Thus, an increase in the willingness to delay corresponds to an increase (decrease) in the blue (red) bar. For each game we divided subjects according to their choices in the lottery-choice task—“risk neutral” (RN) if they chose the two options with the maximum expected value (i.e., options 4 and 5) and “risk averse” (RA) otherwise—and in the hypothetical intertemporal choice task: “hypothetical patient” (HP) if they were willing to wait at the lowest interest rate and “hypothetical impatient” (HI) otherwise. Participants could then be categorized into one of 4 groups: RA/HI (32%), RA/HP (28%), RN/Hi (22%), and RN/HP (18%).

The results in Figure 8 show the risk averse and hypothetical impatient were less willing to delay gratification in the CTB task. For example, when asked to allocate between money available that day and in one month with a 10% interest rate (i.e., game 1), the risk averse and hypothetical impatient (RA/Hi) were 20 percentage points less likely to delay the maximum amount possible than the risk neutral and hypothetical patient (RN/HP). Overall we see a strong association between the choices in the lottery-choice and in the hypothetical intertemporal choice tasks and the choices in the CTB task, which indicates the CTB task succeeded in eliciting preferences.

25 The exact ranking between RA/HP and RN/HI is ambiguous, but they should lie between RA/Hi and RN/HP.
6. Conclusion

In this paper we exploited a field experiment that randomized access to savings accounts to investigate whether attitudes toward risk and intertemporal choices are affected by the act of saving. Because the majority of the study population had never had a savings account before, the experiment generated random variation in savings behavior.

A year later we administered a lottery-choice and intertemporal choice tasks. In the lottery-choice task subjects were asked to choose their preferred option (whose outcome would depend on a coin flip) among a set of choices with different levels of risk and expected value. In a hypothetical intertemporal-choice task participants were asked to make choices between a smaller, sooner monetary reward and a larger, more delayed monetary reward. Finally, we conducted an incentivized intertemporal-choice task based on the Convex Time Budget method by Andreoni and Sprenger (forthcoming).

Our reduced-form results show that the treatment group is less risk averse and more willing to accept delayed rewards than the control. We find that the treatment group was significantly more likely to choose risk-neutral or risk-loving options than the control group in the experimental lottery-choice task. In the hypothetical intertemporal-choice task the treatment group was significantly more likely than the control group to choose higher but delayed payments over a range of delay times and delay rewards. In the CTB task overall the treatment group allocated somewhat more money to the future than the control, although this difference is not statistically significant. The treatment group was also more responsive than the control group to an increase in the experimental interest rate, implying that, within the CTB allocations, the treatment group had a higher intertemporal elasticity of substitution. We show that the treatment effects are larger than the effects of one additional year of education. Nevertheless, they are sometimes not statistically significant because of large standard errors.

We provided suggestive evidence that the subjects were not fully integrating their background consumption and assets when making decisions in the experimental tasks, which indicates that the differences in choices we observe are likely due to changes in preferences rather than wealth effects. Combining the randomized variation with a structural model, we estimate the preference parameters of the control and treatment. Our estimates show that the treatment group has an annualized discount rate 2 percentage points lower but this difference is not statistically significant. We also estimate that the treatment has an intertemporal elasticity of substitution that is approximately 7% higher than that of the control group, though again that result is not statistically significant. We find no evidence of present bias for either group and estimate the present-bias coefficient to be precisely 1 for each group.
References


Figure 1: Distribution of Choices in Lottery Choice Task by Treatment Status

Note: The figure shows the distribution of choices in the lottery choice task by treatment status. The two values shown below each bar correspond to the amounts subjects would get if the coin landed on heads or if it landed on tails.
Figure 2: Distribution of Hypothetical Choices between 300 Rs in 1 Month and Larger Amount in 2 Months by Treatment Status

Note: The figure shows the distribution of choices in a task in which subjects had to make hypothetical choices between 300 Rs in 1 month and a larger amount in 2 months. The horizontal axis shows the amount that was required for subjects to be willing to delay 300 Rs.
Figure 3: Distribution of Hypothetical Choices between 200 Rs Today and Larger Amount in 1 Month by Treatment Status

Note: The figure shows the distribution of choices in a task in which subjects had to make hypothetical choices between 200 Rs today and a larger amount in 1 month. The horizontal axis shows the amount that was required for subjects to be willing to delay the 200 amount.
Figure 4: Choices in the CTB Task by Treatment Status

Note: The figure shows the distribution of choices in the CTB experimental task, separately for the control and treatment groups. Four sets of two bars are presented, corresponding to the different games. The left bar in each set corresponds to the distribution of choices among the control while the right bar corresponds to the distribution of choices among the treatment. The blue part of each bar corresponds to the fraction of participants who were the most willing to delay gratification, choosing to delay the maximum amount of 150 rupees (50 rupees sooner). The red part corresponds to the fraction of participants who were the least willing to delay gratification, delaying the minimum amount of 50 rupees (150 rupees sooner).
Figure 5: Average Savings and Date of Experimental Tasks

Note: The figure shows average savings (at the time of the experiment tasks) of participants who were administered the tasks at a given day. The balls’ circumferences correspond to the mass of participants surveyed at the given day.
Note: The figure shows the fraction of participants who were administered the experimental tasks at a given day that chose the largest today reward of 150 rupees. The balls' circumferences correspond to the mass of participants surveyed at the given day.
Figure 7: Risk-Free Lottery and Date of Experimental Tasks

Note: The figure shows the fraction of participants who were administered the experimental tasks at a given day that chose the risk-free lottery (which paid 20 rupees irrespective of the coin toss). The balls’ circumferences correspond to the mass of participants surveyed at the given day.
Figure 8: Choices in the CTB Task by Behavior in the Lottery-Choice and the Hypothetical Intertemporal Choice Tasks

Game 1
- today x 1 mnth
- 10%

Game 2
- 1 mnth x 2 mths
- 10%

Game 3
- 1 mnth x 2 mths
- 20%

Game 4
- 1 mnth x 6 mths
- 20%

Note: RA: risk averse; RN: risk neutral; HI: hypothetical impatience; HP: hypothetical patience. RA vs. RN denotes choice in the Risk Task, with RA denoting "risk averse" choice in the Risk Task and RN denoting "risk neutral" choice of one of the two lottery options with maximum expected value. HI vs HP denotes choice in the Hypothetical Intertemporal Choices. HI denotes a choice displaying some level of impatience in at least one of the two intertemporal allocations. HP denotes complete maximum patience shown in both of the hypothetical choices available. As such, the left-most bar in each grouping RA/HI is for the subset of subjects who displayed both risk aversion and hypothetical impatience, while the right-most bar in each grouping (RN/HP) is for the subset of subjects who display both risk neutrality and hypothetical patience.
Table 1: Descriptive Statistics by Treatment Status

<table>
<thead>
<tr>
<th>Characteristics of the Female Head of Household</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference in Means</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>Means</td>
<td>SD</td>
<td>Means</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
<td>36.7</td>
<td>11.40</td>
<td>36.5</td>
<td>11.70</td>
</tr>
<tr>
<td>Years of education</td>
<td>2.8</td>
<td>3.07</td>
<td>2.7</td>
<td>2.90</td>
</tr>
<tr>
<td>Proportion married/living with partner</td>
<td>89%</td>
<td>0.29</td>
<td>88%</td>
<td>0.30</td>
</tr>
<tr>
<td>Household Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household size</td>
<td>4.5</td>
<td>1.69</td>
<td>4.5</td>
<td>1.65</td>
</tr>
<tr>
<td>Number of children</td>
<td>2.2</td>
<td>1.30</td>
<td>2.1</td>
<td>1.29</td>
</tr>
<tr>
<td>Total income last week (in 1,000 Nepalese Rupees)</td>
<td>1.7</td>
<td>5.8</td>
<td>1.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Proportion of households entrepreneurs</td>
<td>17%</td>
<td>0.38</td>
<td>16%</td>
<td>0.37</td>
</tr>
<tr>
<td>Proportion of households owning the house</td>
<td>82%</td>
<td>0.38</td>
<td>82%</td>
<td>0.39</td>
</tr>
<tr>
<td>Proportion owning the land on which the house is built</td>
<td>77%</td>
<td>0.42</td>
<td>76%</td>
<td>0.43</td>
</tr>
<tr>
<td>Experienced a negative income shock</td>
<td>43%</td>
<td>0.50</td>
<td>41%</td>
<td>0.49</td>
</tr>
<tr>
<td>Assets (in 1,000 Nepalese Rupees)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets</td>
<td>47.0</td>
<td>59.9</td>
<td>42.3</td>
<td>49.6</td>
</tr>
<tr>
<td>Total Monetary Assets</td>
<td>16.8</td>
<td>47.9</td>
<td>13.0</td>
<td>35.9</td>
</tr>
<tr>
<td>Proportion of households with money in a bank</td>
<td>17%</td>
<td>0.38</td>
<td>15%</td>
<td>0.36</td>
</tr>
<tr>
<td>Total money in bank accounts</td>
<td>6.9</td>
<td>36.9</td>
<td>4.3</td>
<td>23.5</td>
</tr>
<tr>
<td>Proportion of households with money in a ROSCA</td>
<td>18%</td>
<td>0.39</td>
<td>18%</td>
<td>0.38</td>
</tr>
<tr>
<td>Total money in ROSCA</td>
<td>3.2</td>
<td>17.0</td>
<td>2.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Proportion of households with money in an MFI</td>
<td>51%</td>
<td>0.50</td>
<td>53%</td>
<td>0.50</td>
</tr>
<tr>
<td>Total money in MFIs</td>
<td>3.6</td>
<td>12.8</td>
<td>3.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Total amount of cash at home</td>
<td>2.2</td>
<td>5.5</td>
<td>1.9</td>
<td>4.2</td>
</tr>
<tr>
<td>Total Non-Monetary Assets</td>
<td>30.2</td>
<td>28.7</td>
<td>29.4</td>
<td>28.6</td>
</tr>
<tr>
<td>Non-monetary assets from consumer durables</td>
<td>25.5</td>
<td>24.3</td>
<td>24.8</td>
<td>24.9</td>
</tr>
<tr>
<td>Non-monetary assets from livestock</td>
<td>4.7</td>
<td>12.8</td>
<td>4.6</td>
<td>12.3</td>
</tr>
<tr>
<td>Liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total amount owed by the household (in 1,000 Nepalese Rupees)</td>
<td>46.9</td>
<td>98.5</td>
<td>52.0</td>
<td>267.7</td>
</tr>
<tr>
<td>Proportion of households with outstanding loans</td>
<td>90%</td>
<td>0.30</td>
<td>88%</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Note: The table reports the means and standard deviation of variables, separately by treatment status. The last column reports the p-value of two-way tests of the equality of the means across the two groups. All monetary values are reported in 1,000 Nepalese Rupees. Marital status has been modified so that missing values are replaced by the village averages.
Table 2: Choices for Adapted Convex Time Budget (CTB) Task

<table>
<thead>
<tr>
<th>Game</th>
<th>Interest Rate</th>
<th>Sooner date</th>
<th>Later date</th>
<th>Allocation A sooner</th>
<th>Allocation A later</th>
<th>Allocation B sooner</th>
<th>Allocation B later</th>
<th>Allocation C sooner</th>
<th>Allocation C later</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10%</td>
<td>today</td>
<td>1 month</td>
<td>Rs. 150</td>
<td>Rs. 55</td>
<td>Rs. 100</td>
<td>Rs. 110</td>
<td>Rs. 50</td>
<td>Rs. 165</td>
</tr>
<tr>
<td>2</td>
<td>10%</td>
<td>1 month</td>
<td>2 months</td>
<td>Rs. 150</td>
<td>Rs. 55</td>
<td>Rs. 100</td>
<td>Rs. 110</td>
<td>Rs. 50</td>
<td>Rs. 165</td>
</tr>
<tr>
<td>3</td>
<td>20%</td>
<td>1 month</td>
<td>2 months</td>
<td>Rs. 150</td>
<td>Rs. 60</td>
<td>Rs. 100</td>
<td>Rs. 120</td>
<td>Rs. 50</td>
<td>Rs. 180</td>
</tr>
<tr>
<td>4</td>
<td>20%</td>
<td>1 month</td>
<td>6 months</td>
<td>Rs. 150</td>
<td>Rs. 60</td>
<td>Rs. 100</td>
<td>Rs. 120</td>
<td>Rs. 50</td>
<td>Rs. 180</td>
</tr>
</tbody>
</table>

*Note:* The table shows the parameters of the intertemporal choice task. Each row corresponds to a different choice ("game") participants had to make between three different allocations (A, B, and C). The allocations differed in how much they paid at a sooner and a later dates. The sooner and later dates and the (monthly) interest rate varied across games.
Table 3: Treatment Effects on Risky Choices

<table>
<thead>
<tr>
<th>Heads Tails</th>
<th>Choices</th>
<th>Distribution of Choices</th>
<th>Cumulative Distribution of Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Payment conditional on coin toss</td>
<td>Expected Value</td>
<td>Lower bound on CRRA ρ(0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>20</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>#2</td>
<td>30</td>
<td>15</td>
<td>22.5</td>
</tr>
<tr>
<td>#3</td>
<td>40</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>#4</td>
<td>50</td>
<td>5</td>
<td>27.5</td>
</tr>
<tr>
<td>#5</td>
<td>55</td>
<td>0</td>
<td>27.5</td>
</tr>
</tbody>
</table>

P-value of Chi-Square Test of Independence: 0.271

Note: The table reports the distribution of choices in a lottery-choice task in which subjects chose one among five lotteries that paid different amounts depending on a coin toss. The first set of columns show the contingent payments of each lottery, the expected value of the lottery and the lower bound on the implied relative risk aversion coefficient from a CRRA model assuming zero background wealth (i.e., CRRA over experimental rewards only) implied by that choice. Note that the upper bound on RRA for lotteries 2 through 5 is given by the lower bound on the preceding lottery, while there is no upper bound implied by the choice of lottery 1 on the potential level of risk aversion. Columns (1) and (2) show the fraction of respondents who chose each option, respectively for treatment (1) and control (2). Column (3) reports the treatment-control difference in means. Column (4) displays the p-value of a two-sided hypothesis test that the means are the same for the two groups. Columns (5)-(8) show similar figures for the cumulative distribution.
### Table 4: Treatment Effects on Hypothetical Intertemporal Choices

<table>
<thead>
<tr>
<th>Choices</th>
<th>Distribution of Choices</th>
<th>Cumulative Distribution of Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Treatment</td>
<td>(2) Control</td>
</tr>
<tr>
<td>Prefers 330 later over 300 sooner</td>
<td>55.6%</td>
<td>50.3%</td>
</tr>
<tr>
<td>Prefers 375 later over 300 sooner</td>
<td>13.8%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Prefers 495 later over 300 sooner</td>
<td>18.2%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Prefers 300 sooner over 495 later</td>
<td>12.5%</td>
<td>12.2%</td>
</tr>
</tbody>
</table>

P-value of Chi-Square Test of Independence: 0.075

### Panel A: Choice between 300 Rs in 1 Month (sooner) and Larger Amount in 2 Months (later)

Prefers 330 later over 300 sooner: 55.6% vs. 50.3% (p = 0.08 *)
Prefers 375 later over 300 sooner: 13.8% vs. 19.4% (p = 0.01 **)
Prefers 495 later over 300 sooner: 18.2% vs. 18.2% (p = 0.99)
Prefers 300 sooner over 495 later: 12.5% vs. 12.2% (p = 0.85)

### Panel B: Choice between 200 Rs Today (sooner) and Larger Amount in 1 Month (later)

Prefers 220 later over 200 sooner: 55.9% vs. 50.1% (p = 0.05 *)
Prefers 250 later over 200 sooner: 19.2% vs. 23.2% (p = 0.10)
Prefers 350 later over 200 sooner: 10.9% vs. 13.3% (p = 0.24)
Prefers 200 sooner over 350 later: 13.9% vs. 13.4% (p = 0.81)

P-value of Chi-Square Test of Independence: 0.158

**Note:** The table reports the distribution of choices in two hypothetical intertemporal choice tasks. Panel A reports the choices in a task in which subjects chose between receiving 300 rupees in 1 month and a larger amount in 2 months. Panel B reports the choices in a task in which subjects chose between receiving 200 rupees today and a larger amount in 1 month. The choices in this intertemporal choice tasks allow one to rank subjects according to their willingness to delay gratification. For example, in Panel A subjects who chose 300 in 1 month over 495 in 2 months were the least willing to accept a delayed payment while those who chose 330 in 2 months over 300 in 1 month were the most willing to accept a delayed payment. Columns (1) and (2) show the fraction of respondents who chose each option, respectively for treatment (1) and control (2). Column (3) reports the treatment-control difference in means. Column (4) displays the p-value of a two-sided hypothesis test that the means are the same for the two groups. Columns (5)-(8) show similar figures for the cumulative distribution.
Table 5: Treatment Effects on Convex Time Budget (CTB) Choices

<table>
<thead>
<tr>
<th>Game</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference in Means</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Means</td>
<td>(2) SD</td>
<td>(3) Means</td>
<td>(4) SD</td>
</tr>
<tr>
<td>Game 1</td>
<td>53.9%</td>
<td>0.021</td>
<td>50.5%</td>
<td>0.021</td>
</tr>
<tr>
<td>Game 2</td>
<td>52.3%</td>
<td>0.021</td>
<td>51.9%</td>
<td>0.021</td>
</tr>
<tr>
<td>Game 3</td>
<td>69.2%</td>
<td>0.020</td>
<td>64.0%</td>
<td>0.021</td>
</tr>
<tr>
<td>Game 4</td>
<td>52.2%</td>
<td>0.021</td>
<td>52.8%</td>
<td>0.021</td>
</tr>
<tr>
<td>All Games</td>
<td>24.7%</td>
<td>0.018</td>
<td>22.7%</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Panel A: Fraction Choosing to Delay Maximum Amount Possible (Sooner Reward = 50)

<table>
<thead>
<tr>
<th>Game</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference in Means</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Means</td>
<td>(2) SD</td>
<td>(3) Means</td>
<td>(4) SD</td>
</tr>
<tr>
<td>Game 1</td>
<td>25.6%</td>
<td>0.019</td>
<td>25.6%</td>
<td>0.019</td>
</tr>
<tr>
<td>Game 2</td>
<td>26.2%</td>
<td>0.019</td>
<td>22.5%</td>
<td>0.018</td>
</tr>
<tr>
<td>Game 3</td>
<td>15.6%</td>
<td>0.015</td>
<td>17.4%</td>
<td>0.016</td>
</tr>
<tr>
<td>Game 4</td>
<td>24.9%</td>
<td>0.018</td>
<td>28.7%</td>
<td>0.019</td>
</tr>
<tr>
<td>All Games</td>
<td>3.4%</td>
<td>0.008</td>
<td>4.2%</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Panel B: Fraction Choosing to Delay Minimum Amount Possible (Sooner Reward = 150)

Note: The table reports the distribution of choices in the adapted Convex Time Budget (CTB) task. Panel A reports the fraction of subjects who were the most willing to accept a delay payment; they chose a sooner reward of 50 rupees and delayed the maximum amount possible. Panel B reports the fraction of subjects who were the least willing to accept a delay payment; they chose a sooner reward of 150 rupees and delayed the minimum amount possible. Columns (1) and (3) show the fraction of respondents who chose each option, separately for treatment (1) and control (3). Columns (2) and (4) report the standard deviations. Columns (5) reports the treatment-control difference in means. Column (6) shows the p-value of a two-sided hypothesis test that the means are the same for the two groups.
Table 6: Do Treatment and Control Respond Differently to Changes in the Parameters of the Convex Time Budget (CTB) Task?

<table>
<thead>
<tr>
<th>Changes in the Parameters of the Intertemporal Choice</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference in Means</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Mean</td>
<td>(2) SD</td>
<td>(3) Mean</td>
<td>(4) SD</td>
</tr>
<tr>
<td>Changing sooner date from today to a month later</td>
<td>-1.6%</td>
<td>0.026</td>
<td>1.5%</td>
<td>0.026</td>
</tr>
<tr>
<td>Increase in interest rate from 10% to 20%</td>
<td>16.9%</td>
<td>0.023</td>
<td>12.1%</td>
<td>0.026</td>
</tr>
<tr>
<td>Increase in time delay from 1 month to 5 months</td>
<td>-17.0%</td>
<td>0.023</td>
<td>-11.2%</td>
<td>0.026</td>
</tr>
</tbody>
</table>

Panel A: Increase in Fraction Choosing to Delay Maximum Amount Possible (Sooner Reward = 50)

|                                                       | Treatment | Control | Difference in Means | Hypothesis Test |
|                                                       | (1) Mean | (2) SD  | (3) Mean | (4) SD | (5) (1) - (3) | (6) P-value |
| Changing sooner date from today to a month later       | 0.5%     | 0.024   | -3.1%   | 0.022 | 3.7%    | 0.25 |
| Increase in interest rate from 10% to 20%             | -10.6%   | 0.021   | -5.1%   | 0.021 | -5.5%   | 0.06 * |
| Increase in time delay from 1 month to 5 months       | 9.3%     | 0.022   | 11.3%   | 0.022 | -2.0%   | 0.52 |

Panel B: Increase in Fraction Choosing to Delay Minimum Amount Possible (Sooner Reward = 150)

Note: The table investigates whether treatment and control groups respond differently to changes in the parameters of the intertemporal choice task, namely the sooner date, the experimental interest rate, and the time interval between the sooner and later dates. Panel A reports the increase in the fraction of subjects most willing to accept a delay payment across two subsequent games. Panel B reports the increase in the fraction of subjects the least willing to accept a delay payment across two subsequent games. From game 1 to game 2, the sooner date was changed from "today" to "in 1 month." From game 2 to game 3 the experimental interest rate was increased from 10% to 20%. Finally, from game 3 to game 4 the time delay between the sooner and later payments was increased from 1 month to 5 months. Columns (1) and (3) show the means, separately for treatment (1) and control (3). Columns (2) and (4) report the standard deviations. Columns (5) reports the treatment-control difference in means. Column (6) shows the p-value of a two-sided hypothesis test that the means are the same for the two groups.
Panel A: Lottery-Choice Task

<table>
<thead>
<tr>
<th></th>
<th>20 x 20</th>
<th>30 x 15</th>
<th>40 x 10</th>
<th>50 x 5</th>
<th>55 x 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>-4.1%</td>
<td>0.0%</td>
<td>-0.7%</td>
<td>4.0%</td>
<td>0.8%</td>
</tr>
<tr>
<td></td>
<td>(0.020)**</td>
<td>(0.018)</td>
<td>(0.029)</td>
<td>(0.028)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Age / 5</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>-0.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Education</td>
<td>0.1%</td>
<td>-0.1%</td>
<td>-0.7%</td>
<td>-0.4%</td>
<td>1.1%</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.004)**</td>
</tr>
</tbody>
</table>

Panel B: Hypothetical Intertemporal Choice Task

Panel B.1: Choice between 300 Rs in 1 Month (sooner) and Larger Amount in 2 Months (later)

<table>
<thead>
<tr>
<th></th>
<th>330 later</th>
<th>375 later</th>
<th>495 later</th>
<th>300 sooner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>5.0%</td>
<td>-5.5%</td>
<td>-0.1%</td>
<td>0.5%</td>
</tr>
<tr>
<td></td>
<td>(0.030)*</td>
<td>(0.022)**</td>
<td>(0.023)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>Age / 5</td>
<td>0.2%</td>
<td>-0.2%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)**</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.5%</td>
<td>-0.2%</td>
<td>0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.004)</td>
</tr>
</tbody>
</table>

Panel B.2: Choice between 200 Rs Today (sooner) and Larger Amount in 1 Month (later)

<table>
<thead>
<tr>
<th></th>
<th>220 later</th>
<th>250 later</th>
<th>350 later</th>
<th>200 sooner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>5.8%</td>
<td>-3.9%</td>
<td>-2.4%</td>
<td>0.5%</td>
</tr>
<tr>
<td></td>
<td>(0.030)*</td>
<td>(0.024)</td>
<td>(0.020)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Age / 5</td>
<td>0.2%</td>
<td>-0.2%</td>
<td>-0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)**</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.7%</td>
<td>-0.4%</td>
<td>0.3%</td>
<td>0.8%</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)**</td>
</tr>
</tbody>
</table>

Panel C: Convex Time Budget Task

Panel C.1: Fraction Choosing to Delay Maximum Amount Possible (Sooner Reward = 50)

<table>
<thead>
<tr>
<th></th>
<th>Game 1</th>
<th>Game 2</th>
<th>Game 3</th>
<th>Game 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>3.1%</td>
<td>0.4%</td>
<td>5.3%</td>
<td>-0.7%</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.030)</td>
<td>(0.028)*</td>
<td>(0.030)</td>
</tr>
<tr>
<td>Age / 5</td>
<td>2.1%</td>
<td>1.9%</td>
<td>0.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td></td>
<td>(0.007)***</td>
<td>(0.007)***</td>
<td>(0.007)***</td>
<td>(0.007)***</td>
</tr>
<tr>
<td>Education</td>
<td>-0.1%</td>
<td>-0.3%</td>
<td>-0.6%</td>
<td>-0.6%</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
</tr>
</tbody>
</table>

Panel C.2: Fraction Choosing to Delay Minimum Amount Possible (Sooner Reward = 150)

<table>
<thead>
<tr>
<th></th>
<th>Game 1</th>
<th>Game 2</th>
<th>Game 3</th>
<th>Game 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.4%</td>
<td>3.8%</td>
<td>-1.8%</td>
<td>-3.8%</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.026)</td>
<td>(0.023)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Age / 5</td>
<td>-0.6%</td>
<td>-2.1%</td>
<td>0.3%</td>
<td>-1.6%</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)***</td>
<td>(0.005)</td>
<td>(0.006)***</td>
</tr>
<tr>
<td>Education</td>
<td>0.4%</td>
<td>-0.1%</td>
<td>0.3%</td>
<td>0.9%</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.005)*</td>
</tr>
</tbody>
</table>

Note: The table compares the estimated treatment effects to the effect of five additional years of age and the effect of having one additional year of schooling. The results are estimated from a regression of an indicator of a given experimental choice (e.g., an indicator for whether individual chose the risk-free lottery in the lottery-choice task) on a constant, a treatment status dummy, age (divided by five), and the number of years of schooling of the female head. Robust standard errors reported between parentheses.
Table 8: Maximum Likelihood Estimation of Preference Parameters

<table>
<thead>
<tr>
<th>Background Consumption</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\omega_1$ = 0</td>
<td>26%</td>
<td>26%</td>
<td>26%</td>
<td>21%</td>
<td>28%</td>
</tr>
<tr>
<td>$\omega_1$ = 3,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\omega_2$ = 0</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>$\omega_2$ = 3,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intertemporal Elasticity of Substitution Control ($\theta$)</td>
<td>8.73</td>
<td>0.29</td>
<td>0.29</td>
<td>0.32</td>
<td>0.31</td>
</tr>
<tr>
<td>Intertemporal Elasticity of Substitution Treatment ($\theta$)</td>
<td>9.35</td>
<td>0.31</td>
<td>0.23</td>
<td>0.33</td>
<td>0.34</td>
</tr>
<tr>
<td>Present Bias Control ($\beta$)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.01</td>
<td>1.00</td>
</tr>
<tr>
<td>Present Bias Treatment ($\beta$)</td>
<td>1.01</td>
<td>1.01</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>Standard Deviation of Error ($\sigma$)</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Treatment group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\omega_2$ = 0</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>$\omega_2$ = 3,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\omega_1$ = 0</td>
<td>26%</td>
<td>26%</td>
<td>26%</td>
<td>21%</td>
<td>28%</td>
</tr>
<tr>
<td>$\omega_1$ = 3,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>0.29</td>
<td>0.32</td>
<td>0.31</td>
</tr>
<tr>
<td>Intertemporal Elasticity of Substitution Treatment ($\theta$)</td>
<td>9.35</td>
<td>0.31</td>
<td>0.23</td>
<td>0.33</td>
<td>0.34</td>
</tr>
<tr>
<td>Present Bias Control ($\beta$)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.01</td>
<td>1.00</td>
</tr>
<tr>
<td>Present Bias Treatment ($\beta$)</td>
<td>1.01</td>
<td>1.01</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>Standard Deviation of Error ($\sigma$)</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.18</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Panel A: Parameter Estimates

Panel B: Hypothesis Tests (P-Values)

Test Difference in Annual Discount Rates 0.66 0.67 0.67 0.17 0.04
Test Difference in Present Bias 0.57 0.57 0.57 0.51 0.09
Test Difference in Intertemporal Elasticity of Substitution 0.34 0.35 0.003 0.53 0.21
Joint Test Differences in Preference Parameters 0.67 0.67 0.03 0.53 0.02

Observations 4,420 4,420 4,420 4,420 4,420

Note: Standard errors clustered at the individual level in brackets. Each column reports estimates from a Maximum Likelihood Estimation predicting choice of sooner rewards for each game in the CTB, taking into account the 3 discrete choices available to subjects. The columns differ in the values of background consumption in each period assumed in the model. Column 1 is the "narrow bracketing" case and assumes zero background consumption incorporated in the CTB choices. Columns 2 and 3 assume different levels of static background consumption that are applied to everyone in that treatment or control group in both periods. Columns 4 and 5 assume upward slope of consumption for control and treatment respectively.
Appendix: Frames Used in the Lottery-Choice Task

Appendix Figure 1: The five choices in the lottery-choice task
Appendix Figure 2: Hypothetical Choice Between 200 Rs Today and Larger Amount in 1 Month

*Imagine a reputable NGO is going to give you some money. You can choose between getting this money sooner or later. No matter what your choice is, you can trust that the NGO will give you this money for sure. If you choose to get it later, you have to wait to get the money but you get more money for sure. Which of these two options would you choose?*

- Receive 200 Rs today for sure
  - OR
  - Receive 250 Rs in 1 month for sure

What if instead the choice were between these two options, which would you choose?

- Receive 200 Rs today for sure
  - OR
  - Receive 330 Rs in 1 month for sure

What if instead the choice were between these two options, which would you choose?

- Receive 200 Rs today for sure
  - OR
  - Receive 220 Rs in 1 month for sure
Appendix Figure 3: Hypothetical Choice Between 300 Rs in 1 Month and Larger Amount in 2 Months

Now I would like you to imagine that the same reputable NGO is going to give you a different payment of money. You could get this money in 2 months from today or 3 months from today for sure. If you decide to wait longer, you will receive more money. Which of these two options would you choose?

Receive 300 Rs in 1 month for sure OR Receive 375 Rs in 2 months for sure

What if instead the choice were between these two options, which would you choose?

Receive 300 Rs in 1 month for sure OR Receive 495 Rs in 2 months for sure

Receive 300 Rs in 1 month for sure OR Receive 330 Rs in 2 months for sure
Appendix: Frames Used in Adapted Convex Time Budget (CTB) Task

Appendix Figure 4: CTB choice task, game 1 (allocations A, B, and C)

Appendix Figure 5: CTB choice task, game 2 (allocations A, B, and C)
Appendix: Frames Used in Adapted Convex Time Budget (CTB) Task

Appendix Figure 6: CTB choice task, game 3 (allocations A, B, and C)

Appendix Figure 7: CTB choice task, game 4 (allocations A, B, and C)
Instructions for Adapted Convex Time Budget Task

[Before starting to play the game, make sure IN THE CHECKLIST ALL ITEMS ARE CHECKED.

Also make sure that sets 1-2-3-4 lay on top of each other, with set 1 on top. The sets are the following:
- Set 1 which displays “today – in 1 month” with low reward for waiting
- Set 2 which displays “in 1 month – in 2 months” with low reward for waiting
- Set 3 which displays “in 1 month – in 2 months” with high reward for waiting
- Set 4 which displays “in 1 month – in 6 months” with high reward for waiting

Before meeting with a new respondent make sure that sets are in the correct order.]

[Opening Instructions]

Good morning, my name is __________

Today we are going to play a game. For participating in this game you will receive some money for sure. You are going to be paid with vouchers that you can redeem at GONESA’s main office.

There is no right or wrong answer in this game. We will first practice together, then we will play for real. I will tell you when we will start playing for real.
[Practice #1: Making the Respondent Familiar with the Game’s Material]

[1. Take out the Example Frame displaying the 150 today and 165 in 1 month option]
Say: ]

In this game you will have to choose among 3 different options.

Let me first show you an example of what these options look like.

An option pays money in two dates: some money today and some money in 1 month.

In this game when could you get some money?
(Correct answer: today and in 1 month)

The amount of money below the yellow label shows how much money you get paid today. The amount of money below the red label shows how much money you get paid in 1 month.

When do you get paid the amount of money shown below the yellow label?
(Correct answer: today.)

When do you get paid the amount of money shown below the red label?
(Correct answer: in 1 month.)

The option shown here as an example pays 150 Rs today and 165 Rs in 1 month.

I'll show you now the options you can choose from.

[1. Take out
Set 1 displaying the 3 possible choices for “today – in 1 month”
The example index card
Say: ]

In this game you have 3 options and you have to choose one.

How many options do you have in this game?
(Correct answer: 3)

You have to choose among the following options:
- 250 Rs today and 55 Rs in 1 month
- 150 Rs today and 165 Rs in 1 month
- 50 Rs today and 275 Rs in 1 month

So if you choose to wait 1 month to get 100 Rs you will get 10 Rupees more, but you will have to wait 1 month.
And if you choose to wait 1 month to get 200 Rs you will get 20 Rupees more, but you will have to wait 1 month.

If you choose to wait 1 month to get 100 Rs how many Rs more will you get?
(Correct answer: 10 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]

If you choose to wait 1 month to get 200 Rs how many Rs more will you get?
(Correct answer: 20 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]
Now let’s make sure that you know what your options are.

If you choose option 1 how many Rs will you get today?  
(Correct answer: 250 Rupees)  
If you choose option 1 how many Rs will you get in 1 month?  
(Correct answer: 55 Rupees)  

If you choose option 2 how many Rs will you get today?  
(Correct answer: 150 Rupees)  
If you choose option 2 how many Rs will you get in 1 month?  
(Correct answer: 165 Rupees)  

If you choose option 3 how many Rs will you get today?  
(Correct answer: 50 Rupees)  
If you choose option 3 how many Rs will you get in 1 month?  
(Correct answer: 275 Rupees)  

[If the respondent does not answer correctly, explain the game again.]  
Ok. Now, make a choice pointing at the option you prefer among the 3.

[Let the respondent choose. Point at the option she chose, then ask:]  
According to your choice, how much money would you get today?  
According to your choice, how much money would you get in 1 month?  
[Point at the amount of money they would get today according to her choice, then ask:]  
According to you choice, when would get ____ Rupees?  
[Point at the amount of money they would get in 1 month according to her choice, then ask:]  
According to you choice, when would get ____ Rupees?  

[If the respondent does not answer correctly, explain the game again.  
If the respondent answers correctly, write down her choice in the example index card.]  

I will write down your answer to this practice decision.  
See this card? I will write your answer on this.  
Here [Point at the top part of the index card] I will write ____ Rupees today and here [Point at the bottom part of the index card] I will write ____ Rupees in 1 month.
[Explaining Which Choice They Get Paid For]

[1) Record the answer from Practice #1 in the questionnaire (in the line “Practice #1”)
2) Keep displaying set 1 showing the 3 possible choices for “today - in 1 month” with high interest rate.
3) Put away:
   - the example index card
4) Take out all 4 index cards to show to the respondent that there are numbers written on the back of each card.]

We will play the game for real in a moment.
We will play the game 4 times. In each game you will have to choose between 3 options. One of the 4 games will be selected to be paid and you will be paid the option you chose in the selected game. Now I will explain to you how we will determine which choice you are paid for.

When you make the real decisions, we will record your answers on cards like these.

[1) Turn over all index cards to show to the respondent that there are numbers written on the back of each card.
2) Take out the dice.]

Then, we will use this dice to decide which card is selected. See the numbers on the back of these cards? We will roll this dice, and then whichever card has the number that comes up on the dice is the card that we will use for your vouchers.

[Give the respondent the dice, and let her roll. Point at the number on the selected card and say:]

Since the number on the dice is ____, that matches this card.

[Turn the selected card over and say:]

This was just for practice, but if it had been the real decision, since this card won, you would get paid ____ Rupees (time in the top part of the selected card) and ____ Rupees (time in the bottom part of the selected card). You would get two vouchers.

[Show her 2 example vouchers and say:]

You would receive one voucher that you could redeem starting (time in the top part of the selected card) for ____ Rupees and a second voucher that you could redeem starting (time in bottom part of the selected card) for ____ Rupees.

The important thing to remember when playing the game is that any of the choices you make could end up being the one you get paid for. So it is important to always make careful decisions and think about which option you really prefer.
Actual Game

[1] Put away all index cards and the dice  
2) Keep displaying Set 1  
3) Take out index card #1  
4) Say:]  

**************************************************************************  
GAME 1

Let’s play the real game for real now for the first time.  
As before you have 3 options and you have to choose one.

In this game you can get paid some money today and some money in 1 month.

In this game when could you get some money?  
(Correct answer: today AND in 1 month)

The amount of money below the yellow label shows how much money you get paid today. The amount of money below the red label shows how much money you get paid in 1 month.

When do you get paid the amount of money shown below the yellow label?  
(Correct answer: today.)
When do you get paid the amount of money shown below the red label?  
(Correct answer: in 1 month.)

You have to choose among the following options:  
- 250 Rs today and 55 Rs in 1 month  
- 150 Rs today and 165 Rs in 1 month  
- 50 Rs today and 275 Rs in 1 month

So if you choose to wait 1 month to get 100 Rs you will get 10 Rupees more, but you will have to wait 1 month.  
And if you choose to wait 1 month to get 200 Rs you will get 20 Rupees more, but you will have to wait 1 month.

Ok. Now, make a choice pointing at the option you prefer among the 3. When you have decided, I will write down your answers on this card. Remember that later, we will roll a dice, and this card could end up being the one that wins and you get paid for. So please think very carefully about the money you want today and the money you want in 1 month.

[Let the respondent choose then point at the amount of money she would get today, according to her choice, then ask:]  
According to your choice, how much money would you get today?  
[Point at the amount of money she would get today, according to her choice, then ask:]  
According to your choice, how much money would you get in 1 month?

The way you have chosen, you could get ____ Rupees today, and ____ Rupees in 1 month. Do you like this choice, or do you want to try again?

[1] Let the respondent think as much as she wants and let her ask questions.  
2) Once she is satisfied, write the Rupees amount on index card #1  
3) Record the answer from Game #1 in the questionnaire (in the line “Game #1”)  
4) Put index card #1 on the right hand side of the respondent with the card number in display.  
5) Put away Set 1 so that Set 2 shows.  
6) Then, take out index card #2  
7) Say:]
GAME 2

Now let’s play the game for real for a second time.
As before you have 3 options and you have to choose one.
However, now you can get paid some money in 1 month and some money in 2 months.

In this game when could you get some money?
(Correct answer: in 1 month AND in 2 months)

The amount of money below the red label shows how much money you get paid in 1 month.
The amount of money below the blue label shows how much money you get paid in 2 months.

When do you get paid the amount of money shown below the red label?
(Correct answer: in 1 month.)
When do you get paid the amount of money shown below the blue label?
(Correct answer: in 2 months.)

You have to choose among the following options:
- 250 Rs in 1 month and 55 Rs in 2 months
- 150 Rs in 1 month and 165 Rs in 2 months
- 50 Rs in 1 month and 275 Rs in 2 months

So if you choose to wait 2 months instead of 1 month to get 100 Rs you will get 10 Rupees more, but you will have to wait 2 months instead of 1 month.
And if you choose to wait 2 months instead of 1 month to get 200 Rs you will get 20 Rupees more, but you will have to wait 2 months instead of 1 month.

Ok. Now, make a choice pointing at the option you prefer among the 3. When you have decided, I will write down your answers on this card. Remember that later, we will roll a dice, and this card could end up being the one that wins and you get paid for. So please think very carefully about the money you want in 1 month and the money you want in 2 months.

[Point at the amount of money they would get today according to her choice, then ask:] According to your choice, how much money would you get in 1 month?
[Point at the amount of money they would get today according to her choice, then ask:] According to your choice, how much money would you get in 2 months?

The way you have chosen, you could get ____ Rupees in 1 month, and ____ Rupees in 2 months.
Do you like this choice, or do you want to try again?

[1] Let the respondent think as much as she wants and let her ask questions.
[2] Once she is satisfied, write the Rupees amount on index card #2
[3] Record the answer from Game #2 in the questionnaire (in the line “Game #2”)
[4] Put index card #2 on the right hand side of the respondent with the card number in display.
[5] Put away Set 2 so that Set 3 shows.
[6] Then, say:]
[Practice #2: The Respondent Practices Playing the Game once again]

1) Take away:
   - Set 2 displaying the 3 possible choices for “in 1 month – in 2 months” with low interest rate
2) Take out:
   - Set 3 displaying the 3 possible choices for “in 1 month – in 2 months” with high interest rate

Now let’s practice playing the game one more time, before you get to play again. The difference is that now you get even more money if you decide to wait.

Now if you choose to wait 2 months instead of 1 month to get 100 Rs you will get 40 Rupees more, but you will have to wait 2 months instead of 1 month.
And if you choose to wait 2 months instead of 1 month to get 200 Rs you will get 80 Rupees more, but you will have to wait 2 months instead of 1 month.

If you choose to wait 2 months to get 100 Rs how many Rs more will you get? (Correct answer: 40 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]

If you choose to wait 2 months to get 200 Rs how many Rs more will you get? (Correct answer: 80 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]

As before, the amount of money below the red label shows how much money you get paid in 1 month. The amount of money below the blue label shows how much money you get paid in 2 months.

You have to choose among the following options:
- 250 Rs in 1 month and 70 Rs in 2 months
- 150 Rs in 1 month and 210 Rs in 2 months
- 50 Rs in 1 month and 350 Rs in 2 months

Ok. Now, make a choice pointing at the option you prefer among the 3.

[Let the respondent choose then say:]
According to your choice, how much money would you get in 1 month?
According to your choice, how much money would you get in 2 months?

[Point at the amount of money they would get in 1 month according to her choice, then ask:]
According to your choice, when would get _____ Rupees?

[Point at the amount of money they would get in 2 months according to her choice, then ask:]
According to your choice, when would get _____ Rupees?

[1) Record the answer from Practice #2 in the questionnaire (in the line “Practice #2”)
2) KEEP DISPLAYING set 3 showing the 3 possible choices for “in 1 month – in 2 months” with high interest rate.]
GAME 3

Now let's play the game for real for a third time. 
As before you have 3 options and you have to choose one. 
In this game you can get paid some money in 1 month and some money in 2 months.

In this game when could you get some money? 
(Correct answer: in 1 month AND in 2 months)

The amount of money below the red label shows how much money you get paid in 1 month. 
The amount of money below the blue label shows how much money you get paid in 2 months.

When do you get paid the amount of money shown below the red label? 
(Correct answer: in 1 month.)

When do you get paid the amount of money shown below the blue label? 
(Correct answer: in 2 months.)

You have to choose among the following options:
- 250 Rs in 1 month and 70 Rs in 2 months
- 150 Rs in 1 month and 210 Rs in 2 months
- 50 Rs in 1 month and 350 Rs in 2 months

So if you choose to wait 2 months instead of 1 month to get 100 Rs you will get 40 Rupees more, but you will have to wait 2 months instead of 1 month. 
And if you choose to wait 2 months instead of 1 month to get 200 Rs you will get 80 Rupees more, but you will have to wait 2 months instead of 1 month.

Ok. Now, make a choice pointing at the option you prefer among the 3. When you have decided, I will write down your answers on this card. Remember that later, we will roll a dice, and this card could end up being the one that wins and you get paid for. So please think very carefully about the money you want in 1 month and the money you want in 2 months.

[Point at the amount of money they would get today according to her choice, then ask:] 
According to your choice, how much money would you get in 1 month? 
[Point at the amount of money they would get today according to her choice, then ask:] 
According to your choice, how much money would you get in 2 months?

The way you have chosen, you could get ____ Rupees in 1 month, and ____ Rupees in 2 months. 
Do you like this choice, or do you want to try again?

[1) Let the respondent think as much as she wants and let her ask questions. 
2) Once she is satisfied, write the Rupees amount on index card #3 
3) Record the answer from Game #3 in the questionnaire (in the line “Game #3”) 
4) Put index card #3 on the right hand side of the respondent with the card number in display. 
5) Put away Set 3 so that Set 4 shows. 
6) Then, take out index card #4 
7) Say:]
GAME 4

Now let’s play the game for real for a fourth time.
As before you have 3 options and you have to pick one. However, now you can get paid some money in 1 month and some money in 6 months.

In this game when could you get some money? (Correct answer: in 1 month AND in 6 months)

Notice that now you have to wait even more if you want to get paid more!!! Now to get more Rs you have to wait 6 months, not 2 months!

Now, how many months do you have to wait to get more Rupees? (Correct answer: 6 months)
[If the respondent does not answer correctly, repeat the phrase above and ask again.]

The amount of money below the red label shows how much money you get paid in 1 month. The amount of money below the green label shows how much money you get paid in 6 months.

When do you get paid the amount of money shown below the red label? (Correct answer: in 1 month.) When do you get paid the amount of money shown below the green label? (Correct answer: in 6 months.)

You have to choose among the following options:
- 250 Rs in 1 month and 70 Rs in 6 months
- 150 Rs in 1 month and 210 Rs in 6 months
- 50 Rs in 1 month and 350 Rs in 6 months

So if you choose to wait 6 months instead of 2 months to get 100 Rs you will get 40 Rupees more, but you will have to wait 6 months instead of 2 months. And if you choose to wait 6 months instead of 2 months to get 200 Rs you will get 80 Rupees more, but you will have to wait 6 months instead of 2 months.

If you choose to wait 6 months to get 100 Rs how many Rs more will you get? (Correct answer: 40 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]

If you choose to wait 6 months to get 200 Rs how many Rs more will you get? (Correct answer: 80 Rupees)
[If the respondent does not answer correctly, repeat the phrases above and ask again.]

Ok. Now, make a choice pointing at the option you prefer among the 3. When you have decided, I will write down your answers on this card. Remember that later, we will roll a dice, and this card could end up being the one that wins and you get paid for. So please think very carefully about the money you want in 1 month and the money you want in 6 months.

[Point at the amount of money they would get today according to her choice, then ask:] According to your choice, how much money would you get in 1 month?
[Point at the amount of money they would get today according to her choice, then ask:] According to your choice, how much money would you get in 6 months?

The way you have chosen, you could get _____ Rupees in 1 month, and _____ Rupees in 6 months.
Do you like this choice, or do you want to try again?
[1] Let the respondent think as much as she wants and let her ask questions.
2) Once she is satisfied, write the Rupees amount on index card #4
3) Record the answer from Game #4 in the questionnaire (in the line “Game #4”)
4) Put index card #4 on the right hand side of the respondent with the card number in display.
5) Put away all the material except the 4 index cards and the questionnaire.
6) Say:

*Before we roll the dice to determine which of the choices you just made will be the one you get paid, we would like to ask you a few questions*

**FILL IN QUESTIONS A1-A6 BEFORE GOING AHEAD WITH THE PROTOCOL**

I would like to ask some detailed questions about your savings.

Please let me remind you that any information that you will provide will be kept strictly confidential. This means that no one inside or outside your community will know about it.

<table>
<thead>
<tr>
<th>A1</th>
<th>How much savings do you and your household have right now? Please include cash at home, savings in a bank, in a savings organization, in a DHUKUTI, etc. (Prompt answer)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rupees</td>
</tr>
</tbody>
</table>

Now I would like to ask some detailed questions about your income.

Please let me remind you that any information that you will provide will be kept strictly confidential. This means that no one inside or outside your community will know about it.

**Control Variable: NO. OF SOURCE OF INCOME (only for data entry purpose): ___________________**

<table>
<thead>
<tr>
<th>A2</th>
<th>Source of household cash income. (Use the codes listed below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>Please give me your best estimate of your household cash income LAST WEEK. Amount in Rupees</td>
</tr>
</tbody>
</table>

**CODE for G1 (Source of household income):**

1. Income from sales of agr. production
2. Income from agricultural labor
3. Income from livestock and poultry
4. Income from sand and stone collection
5. Income from constr. and masonry
6. Driver
7. Bus fare collector
8. Helper
9. Income from a small shop
10. Garment and wool spinning
11. Jewelry income
12. Government job (full time)
13. Teacher
14. Pension
15. Rent
16. Remittances
17. Other
18. Alcohol making
19. Private Job (full time)
20. Parttime/temporary job not listed in the previous sources of income

Now I would like to ask some detailed questions about your loans.

Please let me remind you that any information that you will provide will be kept strictly confidential. This means that no one in the community or outside the community will know about it.

**A4** | How much money do you and your household currently owe? (Prompt answer) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rupees</td>
</tr>
</tbody>
</table>

I will now ask about all the purchases made for your household in the LAST WEEK, regardless of which person made them.

**INSTRUCTIONS:** Write the answer or the code corresponding to the answer given by the respondent in the appropriate space below.

<table>
<thead>
<tr>
<th>A5</th>
<th>How many days did your household eat ..........?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A6</td>
<td>How many days in a typical week during the next month do you think your household will eat ..........?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Days</th>
<th></th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Goat/Lamb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Chicken/Poultry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Buffalo/Beef</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Pork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fish</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Instructions for Lottery-Choice Task

[1) Before starting to play the Head-Tail game, make sure you have put next to the respondent, but not visible, the 4 index cards.

2) Take out:
   - The Head Tail Example Frame displaying 40 Rs if the coin lands on heads and 10 Rs if the coin lands on tails.
   - The coin for the Head-Tail Game

Say:

Before we roll the dice to decide which card is selected, we will play one last game. For participating in this game you will receive some money for sure. You are going to be paid with a third voucher that you can redeem at GONESA’s main office starting in 1 month. There is no right or wrong answer in this game. Let me explain you first how we play this game.

How much money you win in this game will depend on what comes up when you toss this coin here. [Hand the subject the coin and let them look at it] In this game you have to choose among five different options.

Here is an example of how an option in this game looks like. [Point at the Head Tail Example Frame]
An option pays one amount if the coin lands on “heads” and a different amount if the coin lands on “tails”.

The amount of money above the coin landing heads up shows how much money you get paid if the coin lands on heads. The amount of money above the coin landing tails up shows how much money you get paid if the coin lands on tails.

When do you get paid the amount of money shown above the coin landing heads?
[Point at the coin landing heads]
(Correct answer: If the coin lands on heads.)
How much do you get paid if the coin lands heads?
(Correct answer: 40.)

When do you get paid the amount of money shown above the coin landing tails up?
[Point at the coin landing tails]
(Correct answer: If the coin lands on tails.)
How much do you get paid if the coin lands tails?
(Correct answer: 10.)

The option shown here as an example pays 40 Rs if the coin lands on heads and 10 Rs if the coin lands on tails.

This was only an example. Let me show you now the options you can choose from.

[1) Record the answer from this Practice in the questionnaire (in the line “Practice Head Tail”).
2) Put away the Head Tail Example Frame.
3) Take out the Head-Tail set made of 5 laminated colored papers representing the 5 possible choices.
4) Point to the first option and say:]
You have to choose among the following options:
- 20 Rs if the coin lands on heads and 20 Rs if the coin lands on tails
- 30 Rs if the coin lands on heads and 15 Rs if the coin lands on tails
- 40 Rs if the coin lands on heads and 10 Rs if the coin lands on tails
- 50 Rs if the coin lands on heads and 5 Rs if the coin lands on tails
- 55 Rs if the coin lands on heads and 0 Rs if the coin lands on tails

If you choose one of the options where you get more money when the coin lands on heads, then you get less money if the coin lands instead on tails.
Now let’s make sure that you know what your options are.

If you choose yellow how many Rs will you get if the coin lands on heads?
(Correct answer: 20 Rupees)
If you choose yellow how many Rs will you get if the coin lands on tails?
(Correct answer: 20 Rupees)

If you choose blue how many Rs will you get if the coin lands on heads?
(Correct answer: 30 Rupees)
If you choose blue how many Rs will you get if the coin lands on tails?
(Correct answer: 15 Rupees)

If you choose red how many Rs will you get if the coin lands on heads?
(Correct answer: 40 Rupees)
If you choose red how many Rs will you get if the coin lands on tails?
(Correct answer: 10 Rupees)

If you choose green how many Rs will you get if the coin lands on heads?
(Correct answer: 50 Rupees)
If you choose green how many Rs will you get if the coin lands on tails?
(Correct answer: 5 Rupees)

If you choose pink how many Rs will you get if the coin lands on heads?
(Correct answer: 55 Rupees)
If you choose pink how many Rs will you get if the coin lands on tails?
(Correct answer: 0 Rupees)

[If the respondent does not answer correctly, explain the game again.]
Ok. Now, make a choice pointing at the option you prefer among the 5.

[Let the respondent choose.]
You have selected the [say the color] option.
Point at the option she chose, then ask:]
According to your choice, how much money will you get if the coin lands on heads?
According to your choice, how much money will you get if the coin lands on tails?
[If the respondent does not answer correctly, explain the game again.]

[1) Allow the participant to change her choice if she wants and then repeat the question.
2) Continue until she is sure of her choice.
3) Record the answer from the Head-Tail Game in the questionnaire (in the line “Head-Tail Game”).]
Thank you for being patient with this game. Now, toss the coin to see how much you will get paid.

[1. Give the coin to the respondent to toss.  
2. Show her how much she gets.]

Since the coin landed on _____. this is the money you will get.  
I will now fill out the vouchers for this amount.

[1. Fill out the voucher and let the respondent clearly see that you are writing out the voucher to match her choice.  
2. Record the voucher amount in the ledger.  
3. Sign the voucher  
4. Give the voucher to the respondent.]

Choosing an allocation (Card selection) for Game 1

[1. Put away the questionnaire  
2. Take the dice  
3. Put all 4 index cards in front of the respondent and display their numbers.  
4. Say:]  

Thank you for being patient with all of these decisions and questions. Now, roll the dice to find out which of your choices, for the game we played at the beginning, you will be paid for.

[1. Give the dice to the respondent to roll.  
2. Show her which card wins.]

Since you rolled a ____, this is the card that matches.  
I will now fill out the vouchers for this card.

[1. Let the respondent hold the index card that was chosen.  
2. Fill out the vouchers and let the respondent clearly see that you are writing out the vouchers to match her choice.  
3. Record the voucher amounts in the ledger.  
4. Sign the vouchers  
5. Give the vouchers to the respondent  
6. Get the index card back and erase the content.]