

Commitments to Save: A Field Experiment in Rural Malawi*

Lasse Brune

Department of Economics, University of Michigan

Xavier Giné

Development Economics Research Group, World Bank
and Bureau for Economic Analysis and Development (BREAD)

Jessica Goldberg

Department of Economics, University of Maryland

Dean Yang

Ford School of Public Policy and Department of Economics, University of Michigan,
Bureau for Economic Analysis and Development (BREAD),
and National Bureau of Economic Research (NBER)

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Abstract

We report the results of a field experiment that randomly assigned Malawian smallholder farmers formal savings accounts. We tested two primary treatments, offering either: 1) “ordinary” accounts, or 2) both ordinary and “commitment” accounts. Commitment accounts allowed customers to restrict access to their own funds until a future date of their choosing. A control group was not offered any account but was tracked alongside the treatment groups. The commitment treatment led to increases in deposits at the partner bank, and over the next agricultural year caused increases in agricultural input use, crop sales, and household expenditures. The effects of the commitment treatment are not due to literally “tying the hands” of farmers, since farmers in that treatment mostly saved in ordinary accounts (rather than commitment accounts). We discuss other possible channels through which the commitment treatment’s effects may have operated, such as reduced sharing with one’s social network as well as other psychological channels.

Keywords: savings, commitment, hyperbolic preferences, self-control, sharing norms, mental accounting. JEL codes: D03, D91, O16, Q14.

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1. Introduction

Recent experimental studies have found high marginal returns to capital in developing countries in non-agricultural enterprises (de Mel, McKenzie and Woodruff, 2008; Fafchamps et al., 2011) as well as in agriculture (Duflo, Kremer and Robinson, 2008). These high returns stand in contrast to low utilization of modern inputs such as fertilizer in many low-income countries, particularly in sub-Saharan Africa (World Bank, 2008).

To raise input utilization in agriculture, many developing country governments and donors have implemented large-scale input subsidies. However, the scale of such programs takes a heavy toll on government budgets, casting doubt on their long-term sustainability.¹ Another popular response has been the introduction of microcredit programs. In 2009, the Microcredit Summit estimated that there were more than 3,500 microfinance institutions around the world with 150 million clients (Daley-Harris 2009). While these outreach numbers are impressive, microcredit today is largely devoted to non-agricultural activities (Morduch 1999; Armendariz de Aghion and Morduch 2005) due the substantial challenges inherent in agricultural lending.² As a result, many donors and academics (for example, Robinson, 2001 and the Bill and Melinda Gates Foundation) have emphasized the need for research on the potential beneficial impacts of formal savings.³

Low-income individuals have difficulty saving in formal banking institutions, and instead engage in more expensive and riskier ways to save informally (Rutherford, 2000 and Collins, Morduch, Rutherford and Ruthven, 2009). The alternatives to formal savings are cash held at home (subject to theft or fire) investments in durable assets with risky returns (such as livestock), participation in ROSCAs (rotating savings and credit associations), or use of deposit collectors (such as *susu* collectors in West Africa).

A number of explanations have been advanced for low levels of formal savings in developing countries. Transaction costs for formal savings may be high for a variety of reasons, including substantial distances to branches, costly and unreliable transport, and mistrust towards formal financial institutions. In addition, financial illiteracy may prevent households from

¹ For example, the cost of Malawi's large-scale fertilizer subsidy program amounted to 11 percent of the total government budget in the 2010-11 fiscal year.

² Giné, Goldberg, and Yang (forthcoming) find that imperfect personal identification leads to asymmetric information problems (both adverse selection and moral hazard) in the rural Malawian credit market.

³ Burgess and Pande (2005) find that a policy-driven expansion of rural banking reduced poverty in India, and provide suggestive evidence that deposit mobilization and credit access were intermediating channels.

opening accounts due to a lack of knowledge about the benefits of formal savings and lack of familiarity with account-opening procedures.

Psychological factors, such as impatience (a strong preference for the present over the future) and issues of self-control (competing preferences that dictate different actions at different times) may also lead to lower savings. There is evidence from both developed and developing countries that self-aware individuals seek to limit their options in advance in anticipation of self-control problems in the future. Demand for such commitment devices is consistent with the existence of present-biased time preferences. Ashraf, Karlan, and Yin (2006) investigate demand for and impacts of a commitment savings device in the Philippines. Duflo, Kremer and Robinson (forthcoming) find that offering a small, time-limited discount on fertilizer immediately after harvest has a larger effect on fertilizer use than much larger discounts offered later.

Another potential explanation for low savings levels in rural communities is obligations to share income with relatives and friends (see, e.g., Platteau, 2000; Maranz, 2001; Anderson and Baland 2002; Ligon, Thomas, and Worall, 2002; Hoff and Sen, 2006; Baland, Guirkinger and Mali, 2011; Jakiela and Ozier, 2011). Sharing obligations may discourage individuals from exerting effort or accumulating assets, and may encourage them to spend resources hastily before income is dissipated through demands from others. People who anticipate pressure to share cash with others in their social network may spend that money quickly in order to pre-empt requests for transfers (Goldberg, 2010). An important point is that commitment devices, by tying the hands of individuals, may also make it easier to resist demands for sharing with their social network. In other words, commitment devices may assist with “other”-control as well as self-control problems. The existing literature has only incompletely investigated whether the demand for and impact of commitment devices is (at least in part) due to other-control problems.

This discussion brings to the fore three interrelated questions that are the focus of this paper. First, does merely offering easy access to formal savings accounts improve savings and other household outcomes? Second, are such impacts magnified when the savings accounts offered have commitment features, such as an ability to voluntarily restrict one’s own ability to make withdrawals for a defined period of time? Third, if offering accounts with commitment features has larger impacts, what accounts for the increased impact?

To answer these questions, we implemented a field experiment among smallholder cash crop farmers in Malawi. We are able to shed light most clearly on the first two questions. With respect to the third question (on mechanisms of commitment impacts), we provide evidence against the

self-control channel, discuss some empirical evidence on the “other-control” channel, and speculate on other psychological channels that might be operative.

In our experiment, conducted in partnership with a local microfinance institution, we randomized offers of account-opening and deposit assistance for formal savings accounts. One randomly-selected group of farmers was simply offered assistance opening “ordinary” savings accounts with standard features. This treatment sheds light on the impact of simply facilitating access to savings accounts. To test the importance of offering accounts with commitment features, another randomly-selected group of farmers was offered a “commitment” savings account that allowed account holders to request that funds be frozen until a specified date (e.g., until the next planting season, so that funds could be preserved for farm input purchases).⁵ Other farmers were randomly assigned to a control group that was surveyed but not offered assistance with opening either type of savings account. This design allows us to test the relative impact of offering accounts with commitment features versus offering only ordinary savings accounts.

We designed a sub-experiment to test whether pressure to share with one’s social network reduces savings. Among farmers who were offered the savings treatments, we cross-randomized an intervention that provided a public signal of individual savings account balances. This sub-experiment was intended to test the hypothesis that public revelation of savings balances would lead to greater sharing of resources with other households and thus lower savings.

Our findings are distinguished from those in the existing literature in two ways. First, we are the first to show impacts of commitment savings offers (as opposed to offers of ordinary accounts) on important economic outcomes beyond savings.⁷ The commitment treatment had large positive effects on a range of outcomes of interest: deposits and withdrawals at our partner institution immediately prior to the next planting season, land under cultivation (an increase amounting to 9.8% of the control group mean), agricultural input use in that planting (27.4% increase over the control group mean), crop output in the subsequent harvest (21.8% increase), and household expenditures in the months immediately after harvest (17.4% increase). While the ordinary treatment’s effect on deposits and withdrawals was similar to that of the commitment treatment effect, the ordinary treatment effects on agricultural inputs and subsequent outcomes are uniformly smaller than those of the commitment treatment, and are never statistically

⁵ Farmers offered commitment accounts were also offered ordinary accounts, so the commitment treatment “nests” the ordinary savings treatment.

⁷ As a follow-up to Ashraf, Karlan, and Yin (2006), Ashraf, Karlan, and Yin (2010) show impacts of commitment account offers on female empowerment in the same Philippine experimental sample.

significantly different from zero. A joint hypothesis test finds that the impact of the commitment account offer on the set of agricultural and expenditure outcomes is statistically significantly larger than the effect of the ordinary account offer.

The second key contribution of this paper is to provide evidence against the claim that the impacts of the commitment savings offers occur via helping solve individuals' self-control problems. The basic facts are striking: the vast majority (89%) of deposits among individuals offered commitment accounts were in ordinary as opposed to commitment accounts, and the average amount deposited in commitment accounts was about an order of magnitude smaller than the commitment treatment's later impact on input use. (Total impacts on deposits in ordinary and commitment accounts, by contrast, do exceed the impact on later reported increases in inputs.) Clearly, the commitment treatment did not have its effect on input use by literally "tying the hands" of farmers in the months prior to planting time.

Through what other channels might the effects of the commitment treatment have operated? A key alternative hypothesis is that the commitment treatment helped farmers solve "other-control" problems, by somehow allowing them to better resist social network demands for their savings.⁸ As it turns out, we also find little evidence in support of this hypothesis. First of all, the commitment treatment did not reduce reported transfers to other households (in fact, we find that the commitment treatment led to a small increase in such transfers). Relatedly, the results of the sub-experiment that created public revelation of savings balances are not consistent with the hypothesis that social network demands for resources constrain savings: the public revelation treatment did not lead to lower savings.⁹ That said, our results cannot conclusively rule out the other-control channel, since it is still possible that the commitment treatment allowed study participants to keep funds from others within the household, or to refrain from consuming resources early in anticipation of future requests from others. We therefore believe the other-control channel should remain an important focus in future work.

⁸ Even though only a small minority of deposits went into commitment accounts, farmers might have been able to claim to others in their social network that their funds were tied up, since the distribution of funds across ordinary and commitment accounts was not public knowledge. The cross-randomized raffle treatments awarded raffle tickets on the basis of total funds across all accounts, so this treatment also did not reveal how much was saved in commitment accounts.

⁹ The public revelation treatment may have had little effect because withdrawals from the accounts occurred earlier than we had expected. Public revelation of balances occurred after most funds had already been withdrawn, which likely led to substantially attenuated effects. We therefore cannot rule out that public revelation of savings balances may have had significant effects if it had occurred earlier in time.

Another possibility is that the commitment treatment led to increases in input use (and other subsequent outcomes) via other psychological channels, such as a mental accounting channel (Thaler 1990). In the commitment treatment we asked farmers to specify in advance how much money from their crop sales they wanted to be directly deposited into their ordinary and commitment accounts. This may have created mental accounts for treated farmers: a “consumption” account to be spent immediately, and an “investment” account to be spent on the next season’s agricultural inputs. Another psychological explanation relies on evidence that influencing individuals’ intentions can affect their actual behavior at a later date (see Webb and Sheeran 2006 for a review). This literature suggests that merely asking farmers prior to harvest how much they wanted to deposit into their commitment accounts (which were presented as savings accounts for future investments) could have been the key causal factor behind the commitment treatment’s impact. We can offer no direct evidence to support or contradict that these psychological channels may have been at work. Future research should prioritize investigation of these and potentially other psychological channels.

This paper contributes to the burgeoning literature on the effects of formal savings accounts, and in particular of making offers of commitment savings. Dupas and Robinson (2010) offer ordinary savings accounts to Kenyan urban entrepreneurs, finding positive impacts on investment and income for women. In this paper, by contrast, we test the differential impacts of offering commitment savings versus ordinary savings accounts. Atkinson et al. (2010) offer microcredit borrowers in Guatemala savings accounts with different features, including reminders about a monthly commitment to save and a default of 10% of loan repayment as a suggested monthly savings target. They find that both features increase savings balances substantially. Dupas and Robinson (2011) test the impact of commitment features for health savings in western Kenyan ROSCAs; their qualitative findings from a post-intervention survey are suggestive of a mental accounting channel.

The remainder of this paper is organized as follows. Section 2 explains the study design and briefly describes the characteristics of the sample. Section 3 describes the estimation strategy. Section 4 presents the main empirical results. Section 5 presents a benefit-cost analysis, and Section 6 concludes.

2. Experimental design and survey data

The experiment was a collaborative effort of Opportunity International Bank of Malawi (OIBM), Alliance One, Limbe Leaf, the University of Michigan and the World Bank. Opportunity International is a private microfinance institution operating in 24 countries that offers savings and credit products. Alliance One and Limbe Leaf are two large private agribusiness companies that offer extension services and high-quality inputs to smallholder farmers via an out-grower tobacco scheme.¹⁰ Farmers in the study were organized by the tobacco companies into clubs of 10-15 members and all had group liability tobacco production loans from OIBM prior to enrollment in the study. In the central Malawi region we study, tobacco farmers have similar poverty and income levels to those of non-tobacco-producing households.¹¹

While all farmers in the study were loan customers of OIBM at the start of the project, the loans provided a fixed input package that for the majority of farmers fell short of optimal levels of fertilizer use on their tobacco plots.¹² This is an important fact, because it means that, ex ante, the savings intervention we implemented could have been expected to lead to increases in input utilization on tobacco from baseline levels. In addition, while a minority of farmers was using optimal levels of fertilizer at baseline, even such farmers could use savings generated by the intervention to obtain additional inputs and expand land under tobacco cultivation, or shift land from other crops towards tobacco. Finally, the savings intervention could also affect use of fertilizer and other inputs on maize (the main staple crop in Malawi) and other crops.¹³

Table 1 presents summary statistics of baseline household and farmer club characteristics. All variables expressed in money terms are in Malawi Kwacha (MK145/USD during the study period). Baseline survey respondents own an average of 4.7 acres of land and are mostly male (only six percent were female). Respondents are on average 45 years old. They have an average

¹⁰ Tobacco is central to the Malawian economy, as it is the country's main cash crop. About 70% of the country's foreign exchange earnings come from tobacco sales, and a large share of the labor force works in tobacco and related industries.

¹¹ Based on authors' calculations from the 2004 Malawi Integrated Household Survey (IHS), individuals in tobacco farming rural households in central Malawi live on PPP\$1.48/day on average, while the average for central Malawian rural households overall is PPP\$1.51/day.

¹² 60.4% of farmers were applying less than the recommended amount of nitrogen on their tobacco plots at baseline. The figures for the two other key nutrients for tobacco are even more striking: 83.2% and 84.7% of farmers used less than the recommended amount of phosphorus and potassium, respectively. For each of the three nutrients, among farmers using less than recommended levels, the mean ratio of actual use to optimal use was about 0.7. Optimal use levels were determined by Alliance One and Limbe Leaf in collaboration with Malawi's Agricultural Research and Extension Trust (ARET), and are similar (but not identical) to nutrient level recommendations in the United States (Pearce et al. 2011).

¹³ At baseline, 89.5% and 99.9% of farmers were applying less than the recommended amount of nitrogen and phosphorus, respectively, on their maize plots. Among farmers applying less than the recommended amount of nitrogen (phosphorus) on maize, the ratio of actual use to optimal use was 0.48 (0.14). (Potassium is not recommended for maize.) Nutrient recommendations for maize in central Malawi are from Benson (1999).

of 5.5 years of formal education, and have low levels of financial literacy: 42% of respondents were able to compute 10% of 10,000, 63% were able to divide MK 20,000 by five and only 27% could apply a yearly interest rate of 10% to an initial balance to compute the total savings balance after a year.

Sixty three percent of farmers at baseline had an account with a formal bank (mostly with OIBM).¹⁴ The average reported savings balance at the time of the baseline in bank accounts was MK 2,083 (USD 14), with an additional MK 1,244 (USD 9) saved in the form of cash at home.

Figure 1 presents the timing of the experiment with reference to the Malawian agricultural season. The baseline survey and interventions were administered in April and May 2009, immediately before the 2009 harvest.

Financial Education Session

After the baseline was administered, all clubs (treatment as well as control) attended a financial education session that reviewed basic elements of budgeting and explained the benefits of formal savings accounts, in particular how they could be used to set aside funds for the future (such as for school fees or agricultural inputs). The full script of the financial education session can be found in Appendix A.

The financial education session was deliberately provided to both treatment and control groups so that treatment effects could be attributed solely to the provision of the financial products, abstracting from the effect of financial education (for example, strategies for improved budgeting) implicitly provided during the product offer. For this reason, we can estimate neither the impact of the ordinary and commitment treatments without such financial education, nor the impact of the financial education alone.

Ordinary and Commitment Treatments

Farmers were randomly assigned to one of three savings treatment conditions. To minimize cross-treatment contamination, randomization was carried out at the level of farmer clubs (of which there were 299, described further below). The first experimental group was the control group and only received the financial education session described above.

Implementation of the savings treatment took advantage of the existing system of depositing crop sale proceeds into OIBM bank accounts. Production loans provided by OIBM were repaid directly to the lender via garnishing of farmers' tobacco sale proceeds. In the control group, the

¹⁴ This number includes a number of "payroll" accounts opened in a previous season by OIBM and one of the tobacco buyer companies as a payment system for crop proceeds, and which do not actually allow for savings accumulation. Our baseline survey unfortunately did not properly distinguish between these two types of accounts.

process followed the status quo, as follows. At harvest, farmers sold their tobacco to the company that had organized them as clubs at the price prevailing on the nearest tobacco auction floor. The proceeds from the sale were then electronically transferred to OIBM, which deducted the loan repayment (plus fees and surcharges) of all borrowers in the club, and then credited the remaining balance to a club account at OIBM. Club members authorized to access the club account (usually the chairman or the treasurer) came to OIBM branches and withdrew the funds in cash. Farmers then divided up the cash among members of the club. In the treatment groups, farmers were offered the opportunity to have their crop sale proceeds deposited directly into individual savings accounts, as we now describe.

Farmers in the savings treatment groups were given the same financial education session provided to the control group, and in addition were also given account opening assistance and offered the opportunity to have their harvest proceeds (net of loan repayment) directly deposited into individual accounts in their names (see Figure 2 for a schematic illustration of the money flows). After their crop was sold, farmers traveled to the closest OIBM branch to confirm that positive proceeds net of repayment were available at the club level. Authorized members of the clubs (often together with other club members) then filled out a sheet specifying the division of the total amount between farmers. Depending on whether a club member had opted for the individual accounts or not, funds were then either transferred to the individual's account(s) or paid out in cash.

There were two savings treatment conditions. In the first, farmers were offered only an ordinary savings account (the “ordinary” treatment). In the second, farmers were offered both an ordinary and a commitment savings account (the “commitment” treatment). Farmers in the control group and the “ordinary” treatment group who may have learned about and requested commitment accounts were not denied those accounts, but they were not given information about or assistance in opening them.¹⁵

An ordinary savings account is a regular OIBM savings account with an annual interest rate of 2.5%. The commitment savings account has the same interest rate but allows farmers to

¹⁵ Among farmers in the control group, nobody requested an ordinary or a commitment account during the savings training at baseline. According to OIBM administrative records, eight farmers in the control group had commitment accounts by the end of October 2009 (opened without our assistance or encouragement), but none of these had any transactions in the accounts.

specify an amount and a “release date” when the bank would allow access to the funds.¹⁶ Farmers who chose to open a commitment savings account were also required to have an ordinary account where uncommitted funds would be deposited.

During the account opening process, farmers stated how much they wanted in the ordinary and commitment savings accounts after their tobacco crops would be sold. For example, if a farmer stated that that he wanted MK 5,000 in an ordinary account and MK 10,000 in a commitment savings account, funds would first be deposited into the ordinary account until MK 5,000 had been deposited, then into the commitment savings account for up to MK 10,000, with any remainder being deposited back into the ordinary account. Farmers were allowed to revise the allocation of funds made during the initial account opening process when they visited the bank after the crop sale.

Raffle Treatments

To study the impact of public information on savings and investment behavior, we implemented a cross-cutting randomization of a savings-linked raffle. Participants in each of our two savings treatments were randomly assigned to one of three savings-linked raffle conditions. These raffles provided a mechanism for randomly-assigned public revelation of an individual’s savings balances. We distributed tickets for a raffle to win a bicycle, where the number of tickets each participant received was determined by his savings balance as of pre-announced dates. Every MK 1,000 saved with OIBM (in total across ordinary and commitment savings accounts) entitled a participant to one raffle ticket. Tickets were distributed twice. The first distribution took place in early September, and was based on savings as of August 19. The second distribution took place in November, and was based on savings as of October 22. By varying the way in which tickets were distributed, we sought to exogenously vary the information that club members had about each other’s savings. One third of clubs that was assigned to either ordinary or commitment savings accounts was randomly determined to be ineligible to receive raffle tickets (and was not told about the raffle). Another one third of clubs with savings accounts was randomly selected to have raffle tickets distributed privately. Study participants were called to a meeting for raffle ticket distribution but were handed their tickets out of view of other study participants. The final third of clubs with savings accounts was randomly selected for public

¹⁶ By design, funds in the commitment account could not be accessed before the release date. In a small number of cases OIBM staff allowed premature withdrawals of funds when clients presented evidence of emergency needs, e.g. health or funeral expenditures.

distribution of raffle tickets. In these clubs, each participant's name and the number of tickets received was announced verbally to everyone that attended the raffle meeting.

Because of the simple formula for determining the number of tickets, farmers in clubs where tickets were distributed publicly could easily estimate how much other members of the club had saved. Private distribution of tickets, though, did not reveal information about individuals' account balances. The raffle scheme was explained to participants at the time of the baseline survey using a simulation. Members were first given hypothetical balances, and then given raffle tickets in a manner that corresponded to the distribution mechanism for the treatment condition to which the club was assigned. In clubs assigned to private distribution, members were called up one by one and given tickets in private (out of sight of other club members). In clubs assigned to public distribution, members were called up and their number of tickets was announced to the group.

Thus, the final design of the project includes seven treatment conditions: a pure control condition without savings account offers or raffles; ordinary savings accounts with no raffles, with private distribution of raffle tickets, and with public distribution of raffle tickets; and commitment savings accounts with no raffles, with private distribution of raffle tickets, and with public distribution of raffle tickets (see Table 2).

The randomization was carried out at the club level. The list of tobacco clubs in central Malawi (all of which had existing production loans with OIBM) was provided by OIBM in cooperation with the two tobacco buyer companies. Prior to randomization, treatment clubs were stratified by location,¹⁸ tobacco type (burley, flue-cured or dark-fire) and week of scheduled interview. The stratification of treatment assignment resulted in 19 distinct location/tobacco-type/week stratification cells.

The sample consists of 299 clubs with 3,150 farmers surveyed at baseline, and 298 clubs with 2,835 farmers surveyed at endline.¹⁹ Attrition from the baseline to the endline survey was 10.0% and does not vary substantially by treatment status (as shown in Appendix Table 1).

¹⁸ "Locations" are the tobacco buying companies' geographically-defined administrative units within which extension services and contract buying activities are coordinated.

¹⁹ 60 clubs in two locations had to be excluded from the sample because of serious implementation irregularities. Clubs in Kasungu Central were discovered to contain substantial numbers of "ghost" (nonexistent) club members and served as vehicles for larger landowners to fraudulently obtain very large loans from our partner institution; survey data collected for these individuals is thus likely to be fictitious. Clubs in Mndolera were excluded because of clerical and communications errors that led to ambiguity in treatment assignment. In the two locations subject to these issues, we excluded all clubs (amounting to three stratification cells) from the sample. Because entire stratification cells were excluded, inference among the remaining stratification cells yields internally valid results.

While attrition is uncorrelated with treatment assignment for five out of the six treatment groups, farmers in the ordinary (private raffle) treatment group have a three percentage point lower rate of attrition from baseline to endline survey, compared to the control group, and this difference is statistically significant at the 10% level (p-value 0.085 in the specification with full baseline controls). Since the focus of the paper is on the impacts of ordinary and commitment (no raffle) treatments, and the difference is very small, we do not view this as an important concern.

Balance of baseline characteristics across treatment conditions

To examine whether randomization across treatments achieved balance in pre-treatment characteristics, Table 3 presents the differences in means of 17 baseline variables for the six treatment groups vis-a-vis the control group. For statistical inference about the differences in means we estimate the following regression for farmer i in club j for each baseline variable Y_{ij} :

$$(1) Y_{ij} = \delta + \alpha_1 \text{Commitment}_j + \alpha_2 \text{Ordinary}_j \\ + \alpha_3 \text{Com_Raf}_j + \alpha_4 \text{Com_PubRaf}_j \\ + \alpha_5 \text{Ord_Raf}_j + \alpha_6 \text{Ord_PubRaf}_j \\ + \beta' \mathbf{S}_{ij} + \varepsilon_{ij}$$

Commitment_i is an indicator variable for assignment to the commitment treatment and Ordinary_i is an indicator variable for assignment to the ordinary treatment. Com_Raf_j is an indicator for assignment to any raffle treatment (either private or public), and Com_PubRaf_j is an indicator for assignment to the public raffle treatment specifically. Ord_Raf_j and Ord_PubRaf_j are defined analogously, but for the ordinary treatment. \mathbf{S}_{ij} is a vector that includes stratification cell dummies. ε_{ij} is a mean-zero error. Because the unit of randomization is the club, standard errors are clustered at this level (Moulton 1986).

Coefficients α_1 and α_2 measure the difference in means of the dependent variable between the commitment treatment and the ordinary treatment, respectively (without additional raffle treatments) vis-à-vis the control group. The difference ($\alpha_2 - \alpha_1$) represents the difference in means between the commitment treatment and the ordinary treatment (each without layered-on raffle treatments). The coefficient α_3 is the difference in means between the no-raffle commitment treatment group and the commitment treatment combined with the private raffle treatment. The coefficient α_4 represents the difference in means between the commitment treatment with a public raffle and the commitment treatment group with private raffle. Similarly, the coefficient α_5 measures the difference in means between the no-raffle ordinary treatment group and the ordinary treatment group with private raffle. The coefficient α_6 is the difference in means between the ordinary treatment with a public raffle and the ordinary treatment group with private

raffle.

With a few exceptions, baseline variables for the ordinary and commitment (without raffle) treatment groups are well balanced with the control group. The exceptions are that individuals in the ordinary group are more likely to be female (column 1), less likely to be married (column 2), and less likely to be “patient now, impatient later” (column 14); and individuals in the commitment group are more likely to be female. Overall, however, for both the ordinary and commitment (no raffle) groups we cannot reject the null that means of all 17 baseline variables are jointly equal to those in the control group (see p-values of F-tests at the bottom of Table 3).

The situation is similar for the coefficients on the interactions between the savings and raffle treatments – most outcomes are balanced vis-à-vis the corresponding “no raffle” savings treatment, with a scattering of statistically significant differences that are not too different from what would likely have arisen by chance. Again, for none of the raffle sub-treatments can we reject the null at conventional levels that the full set of baseline variables is jointly equal to the mean for the corresponding “no raffle” treatment.

To alleviate any concern that baseline imbalance may be driving our results, we follow Bruhn and McKenzie (2009) and include the full set of baseline characteristics in Table 3 as controls in our main regressions, in addition to the stratification cell fixed effects.²⁰

3. Estimation strategy

A number of dependent variables are of interest, such as deposits and withdrawals prior to the next planting season, inputs used in the next planting, crop output and sales in the next planting, and household expenditures after the next harvest.

To estimate the impact of the treatments we estimate the following regression analogous to equation 1 above:

$$(2) Y_{ij} = \delta + \alpha_1 \text{Commitment}_j + \alpha_2 \text{Ordinary}_j \\ + \alpha_3 \text{Com_Raf}_j + \alpha_4 \text{Com_PubRaf}_j \\ + \alpha_5 \text{Ord_Raf}_j + \alpha_6 \text{Ord_PubRaf}_j \\ + \beta' X_{ij} + \varepsilon_{ij}$$

Y_{ij} is the dependent variable of interest for farmer i in club j . The savings treatment indicators Commitment_i and Ordinary_i and the respective interactions with the raffle treatment

²⁰ Results turn out to be very similar when only stratification cell fixed effects are included. See Appendix Tables 2, 3 and 4.

indicators Com_Raf_j , Com_PubRaf_j , Ord_Raf_j , and Ord_PubRaf_j , are defined as in equation 1. X_{ij} is a vector that includes stratification cell dummies and control variables measured in the baseline survey, prior to treatment (the 17 baseline variables in Table 3). Following closely the interpretation of equation 1 above, the coefficients on the treatment indicators (α_1 and α_2) reflect the impact on the dependent variable of the ordinary treatment and the commitment treatments (without additional raffle treatments), respectively, vis-à-vis the control group, as well as the differential impacts of the savings treatments when combined with the private raffle (α_3 and α_5). Coefficients α_4 and α_6 represent the additional impacts of making the raffle public, over and above the private raffle treatment, for the commitment and ordinary treatments respectively.

Therefore, $\alpha_1 + \alpha_3$ is the total impact of the commitment treatment with private raffle, and $\alpha_1 + \alpha_3 + \alpha_4$ is the total impact of the commitment treatment with public raffle. $\alpha_2 + \alpha_5$ is the total impact of the ordinary treatment with private raffle, and $\alpha_2 + \alpha_5 + \alpha_6$ is the total impact of the ordinary treatment with public raffle.

We focus on intent-to-treat (ITT) estimates because not every club member offered account opening assistance decided to open the account. We do not report average treatment on the treated (TOT) estimates. It is plausible that members without accounts are influenced by the training script itself or by members who do open accounts in the same club, either of which would violate SUTVA (Rubin, 1974).

4. Empirical results: impact of treatments

To understand the impacts of access to formal savings, we first study the extent to which funds flowed into and out of the savings accounts in the pre-planting and planting periods. Then we examine impacts on agricultural inputs, farm output, household expenditures and other household outcomes.

A. Savings transactions (deposits and withdrawals)

Table 4 presents regression results from estimation of equation 1. The dependent variables are various deposit and withdrawal outcomes from administrative records of our partner institution, OIBM. The first column presents results in which the dependent variable is an indicator variable for whether any transfers were made from the club account to the farmer's individual account after the group loan had been repaid. This is essentially an indicator for "take-up" of the savings treatments. Columns 2 to 7 present results for three types of savings behaviors

in March to October 2009, the “pre-planting” period: total deposits (separately for ordinary, commitment and other accounts, as well as the sum across all accounts), total withdrawals, and net deposits into OIBM accounts.²¹ This pre-planting period is when funds are accumulated from the previous season’s harvest and when inputs are purchased for the 2009-2010 growing season.

Results from column 1 show that while none of the farmers in the control group transferred money via direct deposit into an OIBM account (since they were not offered direct deposit or account opening assistance), 16% of farmers in the ordinary account, no raffle treatment did transfer money. This percentage is somewhat larger at 21% for farmers in the commitment savings treatment without raffle. There are no statistically significant differential effects of either the public or private raffle on this take-up indicator.

Turning to dependent variables related to deposits, both ordinary and commitment treatments led to higher total deposits as well as higher total withdrawals during the pre-planting period compared to the control group. Coefficients on both types of savings treatments are statistically significantly different from zero for deposits (column 2) as well as for withdrawals (column 3). The coefficient on the commitment (no raffle) treatment is nearly identical to the coefficient on the ordinary (no raffle) treatment.

To further explore the impact on deposits, we separately examine impacts on three different components of deposits in the pre-planting period: deposits into ordinary accounts (column 4), commitment accounts (column 5), and other accounts not set up by the project (column 6). It is clear that most of pre-planting deposits go into ordinary accounts, even among farmers in the commitment (no raffle) treatment. The relative sizes of the coefficients on the commitment (no raffle) treatment in columns 4 and 5 indicate that 89% of pre-planting deposits (MK 19,431.76 out of total deposits of MK 21,829.20) resulting from the commitment (no raffle) treatment actually were into the ordinary savings accounts set up by the project, rather than the commitment accounts.

This finding that the most of the savings in the commitment (no raffle) treatment were actually deposited in ordinary accounts is one of the key results of the paper, and casts light into the mechanism behind the finding (to be discussed in the next subsection) that the commitment treatment led to increases in input use. The fact that the commitment (no raffle) treatment led to increases in input use that are on average several times the amounts deposited into commitment accounts indicates that increases in input use did not derive from “tying the hands” of farmers by

²¹ Net deposits are deposits minus withdrawals.

mechanically restricting their access to their own funds before the planting season. It cannot be the case that increases in input use due to the commitment treatment came about via helping farmers deal with self-control problems.

Finally, we turn to net deposits during the pre-planting period (column 7). The commitment savings (no raffle) treatment led to a small and statistically significant increase in net deposits, while the effect of the ordinary (no raffle) treatment was not statistically different from zero. The difference in coefficients between ordinary and commitment treatments is not statistically significantly different from zero, however.

The “planting” period, from November 2009 to April 2010, is usefully divided into November and December 2009, when fertilizer is typically applied on crops, and January through April 2010, which is the lean or “hungry” season when households may have depleted stocks of maize from the previous season’s harvest and have not yet harvested crops or received payments for the 2010 harvest. In column 8 of the table, we examine net deposits during the first two months of the planting season, November and December 2009. The commitment (no raffle) treatment, on net, led to higher withdrawals during the planting season, as did the ordinary (no raffle) treatment. The coefficients are small in magnitude, however, indicating impacts on net withdrawals of around MK1,000 for both treatments during this time period.

In column 9, the dependent variable is net deposits in the January to April 2010 lean or “hungry” season; coefficients on the commitment and ordinary (no raffle) treatments are small and not statistically significantly different from zero. Neither treatment appears to have led to more access to saved resources during the 2010 lean season.

We now turn to discussion of the differential impacts of the treatments when accompanied by the private and public raffles. The differential impact of the treatments when accompanied by the private raffle (compared to the corresponding no-raffle treatments) is given in the rows labeled “Commitment x Raffle” and “Ordinary x Raffle”. Coefficients for total deposits (column 2) and total withdrawals (column 3) indicate that the private raffle leads to lower deposits as well as lower withdrawals for both types of treatments. The effect of the private raffle on the impact of the ordinary treatment is significantly different from zero at the 5% level for both total deposits and total withdrawals.

This result is a surprise: we had expected that the private raffle, by providing an incentive to save without direct revelation of the individual’s savings balance, would have a positive effect, or at worst a zero effect. We speculate that, contrary to our intentions, the implementation of the private raffle may have actually also provided some signal of individuals’ savings balances. As

we discussed in section 2 above, distribution of the raffle tickets for both types of raffle involved inviting study participants to a meeting. Individuals who had no savings would have known they would not receive raffle tickets and therefore had no need to attend this meeting. So even though in the private raffle treatment individuals in the meeting were taken aside and privately given tickets, simply showing up at the meeting would have been a signal that the individual had positive savings of at least MK1,000 (the minimum amount necessary to receive a raffle ticket). Recall that only a minority of study participants (see column 1, Table 4) had positive deposits into their ordinary or commitment accounts.²²

The coefficient on “Ordinary x Raffle x Public” is the differential effect of the public raffle vs. the private raffle for the ordinary treatment. In columns 2 and 3 these coefficients are about the same magnitude as the corresponding coefficients on “Ordinary x Raffle” but of the opposite sign, and are statistically significantly different from zero at the 10% level. These results indicate that the negative effect of the private raffle on the ordinary treatment effect does not also hold for the public raffle. It is possible that the public treatment may have led to differentially higher savings by fostering competition or social comparisons with others in the group, offsetting the negative effect of the private raffle.²³ The coefficients on the corresponding raffle indicators in for the commitment treatment are of similar signs, but are uniformly smaller in magnitude and are not statistically significantly different from zero.

Overall, the private and public raffle results were unexpected, and so our interpretation of the patterns is somewhat speculative. In subsequent results tables, nearly all coefficients on the raffle interaction terms are not statistically significantly different from zero. We will limit further discussion of the raffle results in this paper and leave further exploration to future research.

B. Inputs, crop sales, and expenditures

We now turn to impacts of the treatments on land cultivated, inputs, crop output, and household expenditures in Table 5. Across the five dependent variables the coefficient on the

²² There are other possible explanations for the negative effect of the private raffle on savings. Study participants may have overestimated the expected value of their raffle tickets, and saved less as a result. In addition, individuals may have planned to deposit funds at some later date (because the raffle tickets would be awarded based on balances as of specific dates in August and October), but may have ended up depleting their cash stocks in the interim or otherwise failing to make those later deposits.

²³ At the same time, the private raffle treatment may have “primed” individuals to worry about demands from others who might learn they were saving, while the public treatment may have primed individuals to raise their social status by saving more than others. Key references in the psychology literature on priming include Bornstein (1989), Bettman and Sujan (1987), and Zajonc (1968), who document situations where decisions can be influenced by highly local or transitory influences, such as the introduction of certain concepts.

commitment (no raffle) treatment is large, positive, and statistically significant in four out of five columns (the exception is column 4 for farm profits, where the coefficient is marginally significant). In comparison, the coefficients on the ordinary savings (no raffle) indicator are all smaller in magnitude and none are statistically significantly different from zero at conventional levels. In no case does the private raffle lead to a statistically significantly different effect vis-à-vis the corresponding no-raffle treatment. Similarly, in none of the regressions does the public raffle have effects that are statistically significantly different from the private raffle.

The first two columns of the table reveal that the commitment (no raffle) treatment had a large positive and statistically significant effect on both land under cultivation and the total value of inputs used (which include seed, fertilizer, pesticides, hired labor, transport and firewood for curing) in the late-2009 planting. Farmers in the commitment group cultivated on average 0.42 more acres of land than the control group (which had 4.28 acres of land under cultivation). The commitment coefficient is statistically significantly different (p-value 0.057) from the ordinary coefficient of 0.05 (which in turn is not statistically significantly different from zero). Compared to MK60,372 in inputs used by control group farmers on average, commitment treatment farmers used MK16,534 (or 27.4%) more. By contrast, while the coefficient on the ordinary (no raffle) treatment is also positive, it is only about half the magnitude of the commitment (no raffle) treatment coefficient and it is not statistically significantly different from zero. The difference in the coefficients on the two treatments in column 2, however, is not statistically different from zero at conventional levels.

Examination of the timing of withdrawals in Table 4 helps shed light on when funds were likely to have been accessed for input purchases. Most funds used to purchase inputs must have come from withdrawals in October or before: column 3 of Table 4 indicates that total withdrawals in the period leading up to and including October amounted to more than MK20,000 on average, leaving only slightly more than MK1,000 in the account at the end of that period on average (column 7, Table 4), which were then also mostly withdrawn in November and December (column 8, Table 4). This time pattern suggests that farmers withdrew funds prior to the planting season, possibly with the objective of purchasing inputs in somewhat in advance.²⁵

The increase in input use due to the commitment (no raffle) treatment is 8.3 times the impact on deposits in commitment accounts in the pre-planting period (MK 16,534 from column 2 of

²⁵ Duflo, Kremer, and Robinson (2011) show that interventions encouraging advance fertilizer purchases raise fertilizer use in western Kenya.

Table 5 divided by MK 1,994 from column 5 of Table 4), but is well within the total amount of deposits into ordinary and commitment savings accounts (MK 21,829 from column 2 of Table 4). The bulk of funds used to purchase inputs therefore must have come from ordinary savings, and thus were available to farmers during the pre-planting period, instead of physically being locked away at the bank. This result is inconsistent with the hypothesis that the commitment accounts helped to solve farmers' self-control problems by keeping them from accessing the funds prior to the planting season.

Column 3 indicates that the larger input use caused by the commitment treatment resulted in higher total crop output in the 2010 harvest. The coefficient on the commitment (no raffle) treatment in this regression is large in magnitude and is statistically significantly different from zero at the 5% level. The increase in total value of crop output (MK 33,968) amounts to 21.8% of mean crop value in the control group. The coefficient on the ordinary (no raffle) treatment in this column is also positive but its magnitude is much smaller than the coefficient on the commitment treatment, and it is not statistically significantly different from zero. The difference between the ordinary (no raffle) and commitment (no raffle) coefficients in this column is statistically different from zero at the 10% level (p-value 0.081).

Column 4 shows the impact of the treatments on farm profits, defined as the difference between the total value of crop output (dependent variable of column 3) and the total value of inputs used (dependent variable of column 2).²⁷ The coefficient on the commitment treatment is large in economic terms and marginally statistically significant. The coefficient for the ordinary account is small and not statistically significant, and the difference vis-a-vis the commitment account is marginally significant (p-value 0.142).

Column 5 examines the impact of the treatments on total household expenditures in the endline (post-harvest) survey (fielded in July to September 2010). The commitment (no raffle) treatment coefficient is positive and statistically significantly different from zero at the 5% level, while the coefficient on the ordinary (no raffle) treatment is substantially smaller and not statistically significantly different from zero. The commitment (no raffle) treatment effect represents a 17.4% increase total expenditures over the last 30 days compared to the control group.

In order to examine further whether the commitment accounts treatment had a differential

²⁷ The coefficients of column 4 are not exactly (though nearly) numerically identical to the difference between the coefficients from column 3 and 2 since survey variables are winsorized (see Appendix B for details).

impact vis-a-vis the ordinary accounts across the set of outcomes in Table 5, we follow Kling, Liebman and Katz (2007) and present p-values of two F-tests at the bottom of Table 5 that are based on seemingly unrelated regression (SUR) estimation. We simultaneously estimate equation 1 with the dependent variables of columns 1, 2, 3 and 5.²⁸ The test that the coefficient on the ordinary (no raffle) treatment is jointly equal to zero across the four regressions is on the margin of statistical significance (p-value 0.115). We reject that the coefficients on the ordinary (no raffle) treatment equals the coefficients on the commitment (no raffle) treatment across the regressions of columns 1, 2, 3, and 5 (p-value 0.088).

C. Other outcomes

Table 6 presents regression results on the impacts of the treatments on household size, transfers to and from the social network, and demand for fixed deposit accounts, measured at the endline survey.

Column 1 shows that the intervention had no effect on household size. This implies that the impacts presented in Table 5 are driven by changes in agricultural decisions and outcomes rather than changes in household composition.

Transfers sent and received are of particular interest because a potential channel of the observed impact of the commitment treatment may be an increased ability to resist demands from the social network. Although net balances in the commitment accounts were small, the existence of the account may have provided an excuse to turn down requests for assistance from the social network by *claiming* that savings were inaccessible. Even though most of farmers' funds were in ordinary accounts, this could have been a credible claim because the division of an individual's funds between ordinary and commitment accounts was not directly observable to others.²⁹

In columns 2, 3 and 4 of Table 6 we examine the sums of transfers made, transfers received and net transfers over the last twelve months.³⁰ We find no evidence of reduced net transfers for the commitment (no raffle) treatment. If anything, there is a small positive, effect on net transfers

²⁸ We restrict attention to just the regressions for the four outcomes in columns 1, 2, 3, and 5 of Table 5 because the other outcome in the table (farm profit, in column 4) is simply the difference between the dependent variables in columns 2 and 3 and is therefore not separately determined.

²⁹ The public raffle treatments provided a signal of only an individual's *total* balances at OIBM, not how those savings were split between ordinary and commitment accounts.

³⁰ The coefficients of column 4 are not exactly (though nearly) numerically identical to the difference between the coefficients from column 3 and 2 since survey variables are winsorized (see Appendix B for details).

made (column 4).³¹ This result fails to support the hypothesis that the channel through which commitment accounts led to increased input use was via an increased ability to resist sharing with one's social network.

5. Benefit-cost analysis

Even a deliberately conservative analysis, which we carry out in Table 7, reveals substantial net benefits to society deriving from the commitment treatment. We take into account the costs to OIBM of setting up and servicing these accounts, the fees and time costs that customers face in using the accounts, and the benefits farmers gain from increased farm profits in the subsequent season. In our attempt to be conservative in this analysis, we do not include any additional profits to the bank from holding additional deposits (that can be lent to other customers or otherwise invested for a profit), or the dynamic benefits that farmers with higher profits in one year might reap through larger investments and consequently larger profits in subsequent years. Our calculations are most likely to be relevant for cash-crop farmers who have access to a centralized marketing system for their products, and pertain to the simultaneous offer of commitment savings accounts and direct deposit of crop proceeds into those accounts.

The bank incurs costs related to creating and servicing commitment savings accounts. We separate these costs into one-time costs that include opening new accounts for each customer, and ongoing costs for each deposit or withdrawal a customer is likely to make in the course of one growing season. Our estimated time costs are based on our experience administering commitment savings accounts for this study, and take into account salaries for OIBM bank employees and the number of transactions conducted by each farmer. We estimate that opening and maintaining a single commitment savings account with direct deposit for one growing season costs the bank MK3,384 (\$23.34), net of fees paid by the customers.

We also compute the costs incurred by customers, who attend training and incur time and transportation costs and transaction fees for visiting the bank to withdraw money. We assume a 10 percent probability of being required to pay an MK1,000 (\$6.90) penalty for early withdrawal from the commitment savings account. The total estimated cost to a customer for having a commitment savings account with direct deposit is MK1,639 (\$11.30).

³¹ This result is reminiscent of Chandrasekhar et al. (2011), who show in a lab-in-the-field experiment among Indian villagers that savings access does not crowd out transfers to others.

Estimated benefits to customers are increased farm profits of MK19,205 (\$132.45) relative to not having any direct deposit into an individual savings account (this figure comes from Table 5, column 6.). As discussed previously, this figure is likely to understate the total benefits to farmers because there may be dynamic benefits through increased investment and therefore increased profit in subsequent years. We also omit any benefits to the bank from having higher and more stable deposits. The net benefit to society is MK14,182 (\$97.81). These figures imply that an intervention offering commitment accounts would have an attractive benefit to cost ratio of 3.82. To put this net benefit estimate in perspective, commitment account offers have net benefits after one year that are more than three times larger than the estimated annual benefit of a \$100 grant to male-operated small businesses in Sri Lanka and Ghana (de Mel, et al 2008, Fafchamps, et al 2011).

6. Conclusion

We find that offering commitment savings accounts to smallholder cash crop farmers in Malawi has substantial impacts on savings prior to the next planting season, agricultural inputs applied in the next planting season, access to funds during the next lean (pre-harvest) period, crop sales at the next harvest, and total expenditures after the next harvest. While offers of “ordinary” bank accounts also lead to deposits of similar magnitudes, such accounts have smaller and statistically insignificant effects on agricultural input use and other subsequent outcomes.

Given the large impacts of the commitment treatment, it is important to ask why the treatment appears to have had such substantial effects, while the ordinary treatment did not. Several possible mechanisms exist. First, the commitment account may have helped farmers solve their self-control problems, giving them the discipline to maintain their balances until the next planting season when they could be used for agricultural inputs. Alternatively, the commitment accounts may have helped farmers to refrain from sharing with others in their social network. An additional possibility is that the commitment accounts may have increased later input use via some other psychological channel.

We provide evidence against the hypothesis that the commitment treatment helped via solving farmers’ self-control problems. The actual amounts saved in the commitment accounts offered were very low (about an order of magnitude lower than the observed increase in inputs), with ordinary accounts receiving the vast majority of deposits. This rules out that the impacts of

the commitment treatment were due to literally “tying the hands” of treated farmers by preventing them from spending their profits earlier in the year.

We also find no evidence that the commitment treatment helped solve “other-control” problems (demands for sharing of resources with one’s social network). The commitment treatment did not reduce net transfers to other households (and in fact had a small positive impact on such transfers). Relatedly, a sub-experiment testing the impact of making one’s account balances public to others also did not find that public revelation of balances reduced savings deposits. That said, the case against the importance of other-control in this context is not conclusive. The transfer variables we examined refer to *inter*-household transfers, and do not capture any changes in *intra*-household transfers. It remains possible that the commitment treatment effect operated at least in part by reducing transfers by study participants to spouses and other individuals within the same household.

Another caveat regarding the other-control results is that though we do not find evidence that commitment savings accounts reduced transfers to other members of the social network, the accounts may have helped farmers increase their input use by mitigating another possible consequence of social pressure to share. Individuals who know they will be subject to demands from others in their social network can prevent others from claiming their money by spending it preemptively. Rapidly consuming income makes it unavailable to others; it is consistent with signaling a high marginal utility of consumption in a model where income is taxed and redistributed from those with low marginal utility of consumption to high marginal utility of consumption. Goldberg (2010) found support for such a model in an experiment that demonstrated that Malawian cash crop farmers who received money in public settings spent significantly more of that money immediately than farmers who received money in private settings. In this project, we do not have the high-frequency consumption data necessary to test whether farmers with commitment savings accounts were less likely to engage in hasty consumption than farmers without such accounts. However, a reduction in sub-optimally timed consumption is a channel through which offers of commitment accounts could have led to increased use of inputs and improvements in output, profits, and household expenditures. In future related work we will examine whether commitment savings offers affect such “anticipatory consumption” by examining the timing and composition of expenditures in the post-harvest months. Future research should continue to seek to shed light on other-control problems as a potential hindrance to savings.

We can provide no empirical evidence as to whether mental accounting or some other psychological phenomenon may be behind the impact of the commitment treatment. Investigating this possible channel for the effects of the commitment treatment is also an important area for future research.

While the well-being of farmers offered commitment accounts is likely to have improved, we do not shed light directly on impacts on others in the community. An initial worry was that the commitment accounts led farmers to make fewer transfers to others in the community in the context of informal insurance arrangements (for example, to help others cope with shocks). As it turns out, we do not find any negative impacts of the commitment treatment on net transfers to other households. That said, reduced “anticipatory consumption” in the months immediately after the intervention may have had negative impacts via reduced demand for goods and services produced by others in the community. We view investigation of longer-term impacts on study participants and on others in the community as an important area for future research.

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Figure 1: Project timing

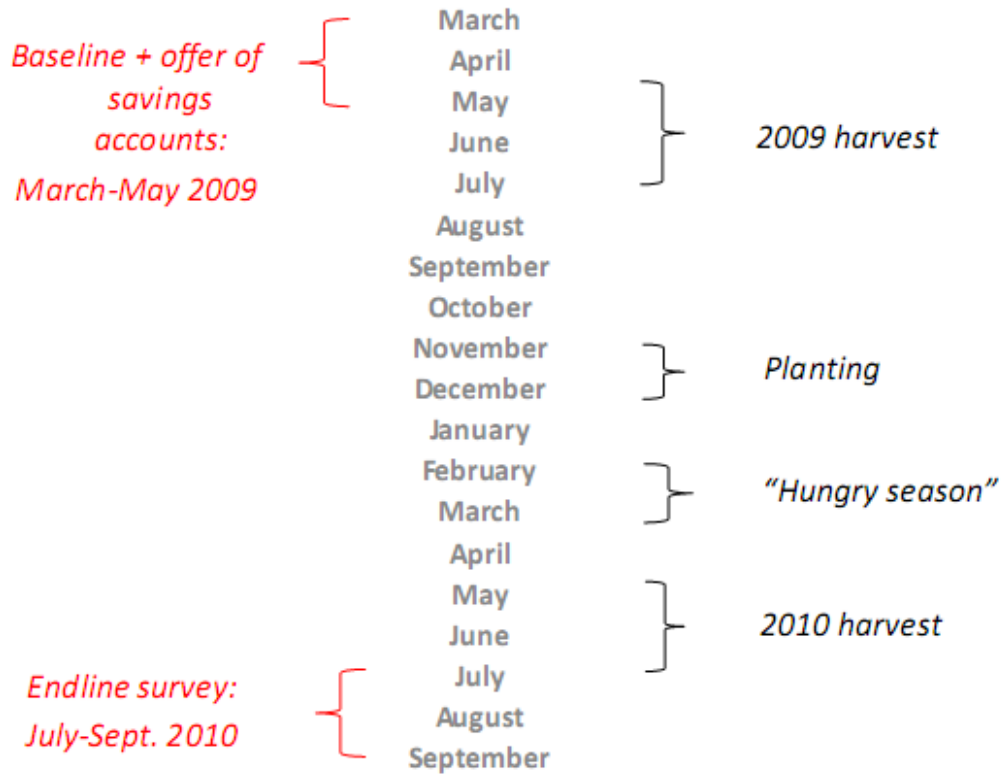
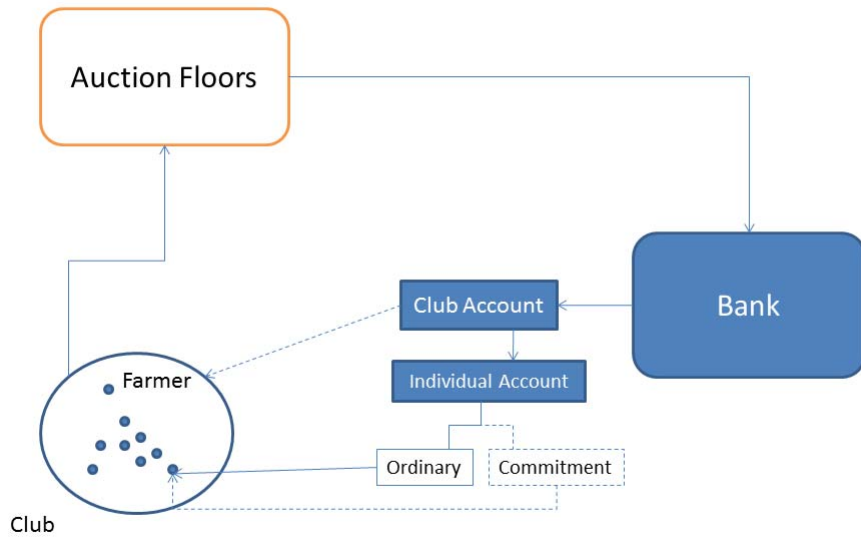


Figure 2: Tobacco Sales and Bank Transactions



Appendix A: Account details and full text of training script

Savings account details

In this experiment we offered farmers training and account opening assistance for two types of accounts depending on the treatment status (control, ordinary savings or commitment savings). The “ordinary” account referred to in the main text is OIBM’s Kasupe account. Kasupe accounts had an account opening of MK500, no monthly fee, three free withdrawals transactions via ATM per month, and a MK25 fee per ATM withdrawal thereafter (all withdrawals at the teller were free). The minimum balance for Kasupe accounts was MK1,000 and there was an account closing fee of MK1,000. Kasupe accounts paid an interest rate of 2.5% p.a. with interest accruing quarterly. Deposit transactions into Kasupe accounts were free.

Farmers were given the option to have their proceeds directly deposited into an existing account if they already had a savings account with OIBM. Another type of savings account not actively marketed in this experiment but part of OIBM’s product portfolio was standard savings accounts with the following fee structure: an opening fee of MK500; a monthly fee of MK75; no withdrawal fees; minimum balance of MK1,000; a closing fee of MK1,000; an interest rate of 6.5% p.a. with quarterly accrual. This less common account type is included in the category “ordinary” accounts together with Kasupe accounts.

The “commitment” account referred to in the main text was an account newly developed for the project called “SavePlan.” SavePlan accounts paid the same interest rate as Kasupe accounts, but had no minimum balance requirement. SavePlan accounts also had no account opening or closing fees. Deposit transactions into SavePlan accounts were free. The only withdrawals permitted for SavePlan accounts were transfers to ordinary (Kasupe or other) savings accounts, for which no fee was charged.

Scripts for savings training, account offers, and raffle training

(Scripts were administered in club meeting immediately following administration of baseline survey. Malawian research project staff played the roles of Persons 1 and 2.)

Section 1: Savings Accounts (All Clubs)

Person 1: Saving money in an individual bank account is a very smart way to protect your money and improve your wellbeing. As you know, OIBM has Kasupe accounts that are easy and affordable to use.

Person 2: But I already have a savings account with my club. What is better about this Kasupe account?

First ask the group to list things that are good about the Kasupe account. When the group has come up with several suggestions, move on to the next line:

Person 1: The Kasupe account is yours alone. You don’t share it with the rest of your club members. You are the only one who can take money out of the account and the only one who knows how much money you have saved in the account.

Person 2: What are the details of the account? How much does it cost, and what is the interest?

Person 1: MK 500 for smartcard, MK 500 for initial deposit, no monthly charge, MK 25 transaction charge (ATM fee, withdrawal fee).

Person 2: But I can just keep money at home. What are some of the benefits of saving my money in a Kasupe account instead of at home?

Let the group make suggestions. After several things have been suggested, agree with the group and then move on to the next line.

Person 1: Money is safer in a bank account than at home. If you keep your money at home, it could be stolen or lost in a fire. If you keep it at the bank, it is protected. Also, if you keep money at home, you may feel obligated to give money to your family or friends if they ask for it. If your money is in the bank, you can say that you don't have any money to give.

Person 2: That is interesting, but I think my money is safe at home.

Ask the group: "Do you think money is safe at home?" Let the group come up with answers, then move on.

Person 1: There are other reasons to keep money in the bank, too. Keeping money in a bank account can help you save for the future. If you have money at home, it is easy to be tempted to spend it on food or drinks or household items. If you have money in the bank, you will think twice about taking it out to spend. Instead, you can leave it in the bank to save for important purchases like school fees or buying fertilizer or accumulating the deposit for a new loan. Also, you can be sure to put away money in case you have an emergency in the future, like someone gets sick and needs to go to the hospital.

Section 2: Saving for the future (All Clubs)

Person 2: It would be good to save for the future, but I have many needs now. How can I afford to save?

Person 1: It is important to make a plan for how to spend your money. One way to do this is to divide the money you will have after selling your tobacco and paying your loans into two amounts. One amount is to use now, and the other amount is to use in the future. Then, you can commit to keeping the future amount safe, and not touching it now.

Person 2: How can I do that?

Person 1: Think about how much money you will have after you sell your tobacco and repay your loan to OIBM. Then, think about expenses you have immediately.

Have the group list things they need to spend money on immediately. Get a list of 5-6 things, then move on.

Person 2: Yes, I will have to pay someone who has done weeding for me. Also, I need to buy some soap and other household goods. My children need new clothes, too.

Person 1: Yes, these are the kinds of things you need to spend money on right away, when you get paid. But now think of things you will need to spend money on in the future. What do you want to be absolutely sure you can afford?

Ask the group to list things they want to save for in the future. Make sure they are thinking of long-term things or expenses that will happen in a few months. Get the group to list 5-6 things, then move on.

Person 2: I can think of many things. I will need to pay school fees. Also, I want to make sure I can buy fertilizer for my maize. And I want to have money for food next year during the hungry season.

Person 1: These are important expenses. You should plan to protect some of your money so that it is available for those expenses. You can do that by committing to locking it away until a date in the future, when you will need it. What is a date that makes sense? Choose a time that is close to when you will need the money for the reasons you just described, so that you aren't tempted to spend it on other things.

Ask the group: "When do you think you want to access money you would save for the future?" Let the group discuss several dates. Make sure they consider purchasing inputs, and also food during the hunger season.

Person 2: Hmm. November 1 is probably a good time. That will be in time for me to buy fertilizer and pay my loan deposit.

Person 1: Now that you have chosen a date, you have to decide how to divide your money between things you will buy before that date, and the things you are saving for in the future. This is an important choice. You have to make sure that you have enough money for your immediate needs and things you will have to buy before the date you have chosen. You also have to estimate how much money you will need for the things you want to buy in the future. Start with money you need soon. Of the money you will have after you sell your tobacco and repay your loan, how much do you need to have available for spending before November 1, which is the date you have chosen?

Have the group suggest amounts of money they will spend on immediate expenses.

Person 2: Well, I need to pay someone for ganyu. And I need to buy clothes, and some household items right away. I will also need to spend some money after the harvest season on small things like soap. I will need to spend MK 25,000 between when I get money and November 1.

Person 1: Ok. How much do you want to make sure to have for the future, after that date you have chosen?

Person 2: I will need MK 4,500 for fertilizer, and MK 3,000 for a deposit on a new loan. Also, I want to keep MK 2,000 for food in the hungry season. That is MK 9,500 total.

Person 1: So in total, your plan is to spend at least MK 25,000 now, and MK 9,500 in the future. That is MK 34,500. Do you think you will have at least that much profit after selling your tobacco and repaying your loan?

Person 2: Yes, I think I will have about MK 40,000.

Person 1: Good. If you earn that much, then the extra money can be available immediately. Then you can commit to saving MK 9,500 for the future, and keep your other money available to spend sooner. You don't have to spend it all before your date of November 1, of course, but it will be available while you are committing to lock away MK 9,500 until then. You made three decisions: You decided how much money you needed immediately, you decided how much money to lock away for the future, and you decided when you needed to access that locked away money.

Person 2: Yes. Those weren't hard decisions. But let's demonstrate how it would work if I had chosen different options.

Section 3: Account Allocation Demonstration (All Clubs)

In this section, the two enumerators will work together to do a demonstration with bottle caps. You will need 12 bottle caps for this demonstration. Draw two big circles in the dirt, and make sure everyone can see them.

These circles represent money available for use immediately (*point at one circle*) and money committed to be saved for the future (*point at the other circle*). These bottle caps represent money. Think of each cap as MK 1,000. So, the 12 caps I have here represent MK 12,000 that someone has after selling his crop and repaying his loan.

Now, if I need MK 3,000 now and commit to saving MK 5,000 for the future, then the first MK 3,000 I earn goes in this circle, for use immediately (*put 3 bottle caps in the immediate use circle*). Then, the next MK 5,000 I earn gets locked away for the future (*put 5 bottle caps in the future circle*). Any extra money is available for use in the future, even though I don't have to spend it immediately it is not locked away (*put the remaining 8 bottle caps in the immediate use circle*).

(*Collect all of the bottle caps*). Think of this like a debt. I owe the ordinary account 3 bottle caps, and I owe the commitment account 5 bottle caps. I must pay the ordinary account first, before I pay the commitment account. Suppose I get 10 bottle caps after I sell my tobacco and repay my loans. (*Hold up 10 caps*).

First, I put 3 for immediate use. (*Put 3 caps in the immediate use circle.*) Next, I lock 5 away for use in the future. (*Put 5 caps in the future use circle.*) Then, since I've met the targets for immediate use and future use, I put all the other caps in the immediate use circle. (*Put the remaining 2 caps in the immediate use circle.*)

What if I only get 3 caps? (*Have someone come up to demonstrate. Give the person 3 caps. See where he puts them. All 3 should go in the immediate circle, and none in the future circle. If he gets this wrong, ask if anyone has a different idea. Explain if necessary.*)

(*Enumerator, if farmers don't understand the demonstration you just performed, please skip back to the start of the demonstration and explain the bottle caps idea again.*)

What if I get 6 caps? (*Have a volunteer come up and give him 6 caps. Correct answer: 3 in immediate, 3 in future.*)

What if you get 12 caps? (*Have another volunteer come up, etc. Correct answer: first put 3 in immediate, then 5 in future, then 4 more in immediate. Total is 7 immediate, 5 in future.*)

Dividing the bottle caps between the two circles is just like the spending plan you made before. You decide how much money you need to have available for immediate use. When you get money, it is first made available for immediate use, up to the goal you set. (*Point at the immediate use circle*). Then, you decide how much to save for the future. After making sure you have money for immediate use, you protect money for the future. (*Point at the future use circle*). Then, if there is money left after you meet both your immediate and future goals, that extra money remains available for use whenever you choose. (*Point at the immediate use circle*). This way, you can make a plan for how to divide your money between money you need now, and money you can commit to saving for the future, even when you don't know exactly how much you will earn.

Section 4: Offer of Kasupe (Ordinary) Accounts (All Clubs Except Group 0)

Person 1: We have talked a lot about how to make a budget that gives you enough money for immediate needs and commits you to saving money for the future. Also, we've discussed why saving at the bank is useful.

Person 2: Yes. I can make a plan about the amount of money I need for the short term, an amount I want to be sure to save for the future, and a date in the future when I will want that money. But how am I to use the bank?

Person 1: Usually, when you are paid for your tobacco, money is put into your group account. Then, the club officers give you your share of the cash. You leave it in the group account if you want. Or, you can save it at the bank, but to do that, you have to take your cash to the bank and deposit it into your individual account.

Person 2: Yes. It is inconvenient to have to take the money back to the bank, and often, I am tempted to spend the money as soon as I receive it.

Person 1: This season, we are offering you a new option. You can sign up to have your money transferred directly into your own Kasupe account. That means that when your bales of tobacco clear the auction floor, OIBM would automatically put the money you have earned after repaying your loan into your own Kasupe account.

Person 2: How would OIBM know which money was mine and which money belongs to others in my club?

Person 1: You would have to agree that OIBM could get a copy of your seller sheet from Auction Holdings. OIBM would use the information on the seller sheet to figure out how much money should go into your account.

Person 2: So if I agree to this, what do I have to do?

Person 1: The first thing to do is to open a Kasupe account, if you don't already have one. We can help with filling out the forms. The next thing to do is to sign a form authorizing the direct deposit. You can do both of those things today.

Person 2: That's all I have to do?

Person 1: Yes. It is very easy. If you open an account or already have one, and fill out the form for direct deposit, then your money will be put into your individual account automatically when your tobacco is sold and your loan has been recovered.

Ask the group if there are any questions about how to sign up for direct deposit.

Person 2: What if I decide I don't want to try this system and I would rather have my money go into the club account?

Person 1: You can still open a Kasupe account. Just don't fill out the [BLUE] form. Then, you will continue to get your money from the club officers, who will withdraw it from the club account for you. But if you do choose to have the money sent directly to your individual account, then ALL of your money for tobacco this season will go to the individual account. You can't change your mind part way through the season.

Person 2: Ok. I think I want the direct deposit. If I sign up for that, how do I get my cash?

Person 1: You can withdraw cash from the bank. You can either use your smartcard, or make the withdrawal by talking to a teller. You can do this at the branch or kiosk, or when the mobile bank comes to town. The closest place to make a withdrawal is _____.

Person 2: So I can take money out whenever I want?

Person 1: Yes, you can, but you should remember the commitment you thought about to save money for a date in the future.

Section 5: Offer of SavePlan (Commitment) Accounts (Commitment Clubs Only)

Person 2: Is there a way that OIBM can help me keep that commitment?

Person 1: Yes. You can open a special "SavePlan" account in addition to your Kasupe account.

Person 2: How would that work?

Person 1: Opening a SavePlan just tells the bank to follow the plan you made before. You will fill out a form with the three decisions you made earlier: how much money you need to have available for immediate use, the amount of money you want to lock away for the future, and the date you want that money released.

Person 2: That is easy. It's just writing down decisions I've already thought about. What happens after I fill out the form?

Person 1: Once you fill out the form, OIBM will use it to put the money you are saving for the future in a special, individual, commitment account. You won't be able to take money out of that account until the date you have chosen, and you can't change your mind about the date or the amount of money.

Person 2: Do I earn interest on money in this special account?

Person 1: Yes. You earn the same interest on money in the commitment account as in the ordinary Kasupe account. The only difference is that the money in the commitment account is locked away until the date you have chosen.

Person 2: What if I earn more or less money than I thought I would have?

Person 1: It works just like the bottle caps. After the loan is recovered, money first goes into your ordinary Kasupe account, up to the amount you said you needed to have available immediately. Then, money goes to the SavePlan to be locked away for the future. When you have reached your target for saving for the future, extra money earned after that amount goes back to the ordinary Kasupe account.

Person 2: So if I don't earn as much as I thought, I will still have money available immediately?

Person 1: Yes. Money goes to the Kasupe account first, and you can withdraw from that whenever you want. It only goes to the special commitment account when you have reached your target for immediate spending.

Person 2: So this form just tells the bank to stick to the commitment I made to myself about how much to save for the future, and when I can use that money.

Person 1: That's right. You can choose any amount and date you want, and OIBM will hold it for you so that you stick to the plan. We can help you fill out the form if you would like to use this special account in addition to the regular Kasupe account.

Section 6: Raffle (All Raffle Clubs)

As an extra incentive to save money, there will be a raffle draw where some farmers in this project may have a chance to win a prize. You have to save to have a chance to win, and the more you save, the better your chance to win. There will be two prizes in each district. The first prize will be a new bicycle, and the second prize will be a 50 kg bag of D-compound.

The raffle tickets will be based on the amount of money you save in your bank account. The prizes will be awarded in November. The raffle tickets will be given out at two times before then. The first time will be in August when we will come back and give you tickets based on the money you have saved between July 1 and August 1. OIBM will calculate the average balance in your savings account for those 30 days and the number of tickets you will get will be based on this amount. The second time we hand out tickets will be in October. OIBM will calculate your average balance from September 1 to October 1, and give you additional tickets based on that balance. Each person will get individual tickets based on their account balance. The prize is for individuals and not for the club.

You can increase your chance of winning by saving more money and saving it for a longer time. You will get one ticket for every MK 1000 in your average balance. If you put MK 10000 in your account by July 1 and keep it there until at least August 1, then you will get 10 tickets. If you don't have any money in your account from July 1 to July 14, and then put MK 10000 into your account on July 15 and keep it there until at least August 1, you will only get five tickets. If anyone here has two accounts with OIBM, we will add up the balance in both accounts. Money saved with other banks will not count for the raffle, though.

Section 7A: Public Raffle (Public Raffle Clubs Only)

We will hand out the raffle tickets in August and October during group meetings like the one we are having today. We will give out the tickets in front of others, so your friends will know how many tickets you are getting.

I will demonstrate how tickets will be handed out. I am going to hand you a piece of paper with a number on it. Pretend that is your average account balance from July 1 to August 1. No one but you and OIBM knows this number, so don't tell anyone!

(Distribute the papers with fake account balances to 5 volunteers)

Now, I will give you the number of raffle tickets you get for that balance. Come up one at a time and show me your piece of paper, so I can give you your tickets.

(Have the farmers come up one at a time. Look at the paper and hand out tickets. Make sure to say out loud for every farmer how many tickets he gets. Make sure that the other farmers are paying attention to this.)

When we hand out tickets in August and October, it will work the same way. You will each be called up one at a time to receive tickets based on the amount you have saved, and your club will see how many tickets you receive.

Section 7B: Private Raffle (Private Raffle Clubs Only)

We will hand out the raffle tickets in August and October during group meetings like the one we are having today. We will give out the tickets one at a time, so no one will know how many tickets you are getting.

I will demonstrate how tickets will be handed out. I am going to hand you a piece of paper with a number on it. Pretend that is your average account balance from July 1 to August 1. No one but you and OIBM knows this number, so don't tell anyone!

(Distribute the papers with fake account balances to 5 volunteers)

Now, I will give you the number of raffle tickets you get for that balance. Come up one at a time and show me your piece of paper, so I can give you your tickets.

(Have the farmers come up one at a time. Look at the paper and hand out tickets. Make sure no one sees how many tickets you hand to each person.)

When we hand out tickets in August and October, it will work the same way. You will each be called up one at a time to receive tickets based on the amount you have saved, and no one will know how many tickets you have received.

Appendix B: Variable definitions

Data used in this paper come from two surveys as well as from administrative records of our partner financial institution (OIBM). We conducted a baseline survey from March to April 2009 and an endline survey from July to September 2010.

All variables that are created from survey data are top coded at the 99th percentile for variables with a positive range and bottom and top coded at the 1st and 99th percentile respectively for variables with a range that spans both negative and positive values. All figures in money terms are in Malawi Kwacha (MK).

Baseline characteristics (from baseline survey):

Number of members per club is the number of listed club members per information provided by the buyer companies (Alliance One and Limbe Leaf). Not all club members were interviewed.

Female equals 1 for female respondents and 0 for male respondents.

Married equals 1 for married respondents and 0 for respondents who are single, widowed, or divorced.

Age is respondent's age in years.

Years of education is the respondent's years of completed schooling.

Household size is the number of people counted as members of the respondent's household at the time of the baseline survey.

Asset index is an index based on the first principal component of the number of items owned of 14 common non-financial, non-livestock assets and indicators of presence of 4 major types of housing characteristics (iron sheet roof, glass windows, concrete floor, electricity connection).

Livestock index is an index based on the first principal component of the number of animals owned of 7 common types of livestock.

Land under cultivation is the total of area of land under cultivation, measured in acres, for the late-2008 planting season.

Proceeds from crop sales is the sum of sales from maize and tobacco in the 2008 harvest.

Cash spent on inputs is the total amount of cash spent – excluding the value of input packages that are part of a loan -- on seeds, fertilizer, pesticides, and hired labor for the 2008-2009 planting season

Has bank account is 1 if a household member has an account with a formal financial institution, and 0 if not.

Savings in accounts and cash is the sum of current savings with formal institutions and in cash at home.

Hyperbolic is 1 if the respondent exhibited strictly more patience in one month, hypothetical monetary trade-offs set 12 months in the future than in the same trade-offs set in the present, and 0 otherwise. See section 5 above for more details.

Patient now, impatient later is 1 if the respondent exhibited strictly *less* patience in one month, hypothetical monetary trade-offs set 12 months in the future than in the same trade-offs set in the presence and 0 otherwise.

Net transfers made in past 12m is the total of transfers made to the social network minus the sum of transfers received from the social network, summed across six categories (social events, health shocks, education of children, agricultural inputs, hired labor and 'other').

Missing value for formal savings and cash is 1 if the variable "*Savings in accounts and cash*" is missing and 0 if it has valid values.

Missing value for time preferences is 1 if the respondent has missing values for the time preferences variables (“*Hyperbolic*” and “*Patient now, impatient later*”) is missing, and 0 if these variables have valid values.

Transactions with Partner Institution (from internal records of OIBM):

Any transfer via direct deposit is 1 if the respondent receives any deposit from his or her tobacco club’s account to his or her individual savings account, and 0 if not.

Deposits into ordinary accounts, pre-planting is the sum of (positive) transactions into the respondent’s OIBM ordinary savings accounts during the period of March to October 2009.

Deposits into commitment accounts, pre-planting is the sum of (positive) transactions into the respondent’s OIBM commitment savings accounts during the period of March to October 2009.

Deposits into other accounts, pre-planting is the sum of (positive) transactions into the respondent’s OIBM non-ordinary, non-commitment savings accounts during the period of March to October 2009.

Total deposits into accounts, pre-planting is the sum of transactions into the respondent’s OIBM accounts (sum across all accounts) during the period of March to October 2009.

Total withdrawals from accounts, pre-planting is the sum of transactions out of the respondent’s OIBM accounts (sum across all accounts) during the period of March to October 2009.

Net deposits, pre-planting is the difference between all deposits and withdrawals in the respondent’s OIBM accounts during the period of March to October 2009.

Net deposits, Nov-Dec is the difference between all deposits and withdrawals in the respondent’s OIBM accounts during the period of November and December 2009.

Net deposits, Jan-Apr is the difference between all deposits and withdrawals in the respondent’s OIBM accounts during the period of January through April 2010.

Agricultural outcomes, household expenditure, and other variables, from endline survey (all planting and harvest variables refer to the 2009-2010 planting season):

Land under cultivation is the total area of land under cultivation, measured in acres.

Total value of inputs is the sum of cash spent on agricultural inputs plus the value of inputs included in-kind in loan packages for the 2009-2010 planting season. Input categories include seeds, pesticides, fertilizer, hired labor, transport and firewood (for curing tobacco).

Value of crop output (sold & not sold) is the sum of revenue from crop sales and the value of the unsold crop for seven main crops (maize, burley tobacco, dark fire tobacco, flue-cured tobacco, ground nuts, beans, soya). Value of harvest not sold equals the kilograms of crops not sold multiplied by the price/kilogram, summed across the seven main crops. Price/kilogram for each crop is obtained by calculating crop-specific revenue/kilogram for each observation in the sample and then taking the sample average.

Farm profit (output - input) is the difference between “Value of crop output” and “Total value of inputs” defined above.

Total expenditure in last 30 days is the sum of three categories household expenditures (food, non-food household items and transport) over the last 30 days prior to the endline survey.

Household size is the number of people counted as members of the respondent’s household at the time of the endline survey.

Total transfers made is the total of transfers made to the social network over the 12 months prior to the endline interview, summed across six categories (social events, health shocks, education of children, agricultural inputs, hired labor and ‘other’).

Total transfers received is the total of transfers received from the social network over the 12 months prior to the endline interview, summed across six categories (social events, health shocks, education of children, agricultural inputs, hired labor and ‘other’).

Total net transfers made is the difference between “Total transfers made” and “Total transfers received” defined above.

Not interviewed in endline is 1 if the respondent was not interviewed and is 0 if the respondent was interviewed during the endline survey of July to September 2010.

Table 1: Summary Statistics

	<u>Mean</u>	<u>Standard Deviation</u>	<u>10th Percentile</u>	<u>Median</u>	<u>90th Percentile</u>	<u>Observations</u>
Treatment conditions						
Control group	0.135	0.341	0	0	1	3150
Commitment Account	0.417	0.493	0	0	1	3150
Ordinary Account	0.448	0.497	0	0	1	3150
Commitment x Raffle	0.282	0.450	0	0	1	3150
Commitment x Raffle x Public	0.139	0.346	0	0	1	3150
Ordinary x Raffle	0.302	0.459	0	0	1	3150
Ordinary x Raffle x Public	0.153	0.360	0	0	1	3150
Baseline Characteristics						
Number of members per club	13.88	6.44	9.00	11.00	23.00	299
Female	0.063	0.243	0.000	0.000	0.000	3150
Married	0.955	0.208	1.000	1.000	1.000	3150
Age [years]	45.02	13.61	28.00	44.00	64.00	3150
Years of education	5.45	3.53	0.00	6.00	10.00	3150
Household size	5.79	1.99	3.00	6.00	9.00	3150
Asset index	-0.02	1.86	-1.59	-0.67	2.46	3150
Livestock index	-0.03	1.15	-1.00	-0.36	1.37	3150
Land under cultivation [acres]	4.67	2.14	2.50	4.03	7.50	3150
Proceeds from crop sales [MK]	126000.00	175000.00	7000.00	67000.00	300000.00	3150
Cash spent on inputs [MK]	25168.64	41228.45	0.00	10000.00	64500.00	3150
Has bank account	0.634	0.482	0.000	1.000	1.000	3150
Savings in cash at home [MK]	1243.79	3895.00	0.00	0.00	3000.00	3150
Savings in bank accounts [MK]	2083.16	8264.71	0.00	0.00	3000.00	2949
Hyperbolic	0.102	0.303	0.000	0.000	1.000	3117
Patient now, impatient later	0.304	0.460	0.000	0.000	1.000	3117
Net transfers made in past 12m [MK]	1753.46	7645.07	-2990.00	500.00	8100.00	3150
Missing value for formal savings and cash	0.064	0.244	0.000	0.000	0.000	3150
Missing value for time preferences	0.010	0.102	0.000	0.000	0.000	3150
Transactions with Partner Institution						
Any transfer via direct deposit	0.154	0.361	0.000	0.000	1.000	3150
Deposits into ordinary accounts, pre-planting [MK]	18472.21	82395.98	0.00	0.00	38907.23	3150
Deposits into commitment accounts, pre-planting [MK]	614.68	5366.73	0.00	0.00	0.00	3150
Deposits into other accounts, pre-planting [MK]	296.37	3804.48	0.00	0.00	0.00	3150
Total deposits into accounts, pre-planting [MK]	19383.25	84483.49	0.00	0.00	40694.26	3150
Total withdrawals from accounts, pre-planting [MK]	18600.00	82744.16	38600.00	0.00	0.00	3150
Net of all transactions, pre-planting [MK]	762.21	13857.42	0.00	0.00	649.45	3150
Net of all transactions, Nov-Dec [MK]	-848.00	6870.17	0.00	0.00	1.93	3150
Net of all transactions, Jan-Apr [MK]	-269.49	4032.43	0.00	0.00	3.83	3150
Endline Survey Outcomes						
Land under cultivation (acres)	4.52	2.66	2.00	4.00	8.00	2835
Total value of inputs [MK]	66909.52	82196.27	2200.00	43500.00	153000.00	2835
Value of crop output (sold & not sold) [MK]	178000.00	201000.00	27480.27	116000.00	387000.00	2835
Farm profit (output-intput) [MK]	111000.00	157000.00	0.00	70371.97	265000.00	2835
Total expenditure in last 30 days [MK]	11904.75	13219.35	2250.00	7500.00	26000.00	2835
Household size	5.80	2.15	3.00	6.00	9.00	2835
Total transfers made [MK]	3152.4	5098.9	0.0	1300.0	8000.0	2835
Total transfers received [MK]	2204.0	4377.3	0.0	500.0	6050.0	2835
Total net transfers made [MK]	938.7	5896.4	-3000.0	350.0	5750.0	2835
Has fixed deposit account	0.067	0.250	0.000	0.000	0.000	2835
Not interviewed in follow-up	0.100	0.300	0.000	0.000	0.500	3150

Data based on two surveys conducted in February to April 2009 (baseline) and July to September 2010 (endline), and on administrative records of our partner institution. Withdrawals presented as negative numbers. See Appendix B for variable definitions.

Table 2: Assignment of clubs to treatment conditions

	No savings intervention	Savings intervention: ordinary accounts offered	Savings intervention: ordinary and commitment accounts offered
No raffle	Group 0: 42 clubs	Group 1: 43 clubs	Group 4: 42 clubs
Public distribution of raffle tickets	N/A	Group 2: 44 clubs	Group 5: 43 clubs
Private distribution of raffle tickets	N/A	Group 3: 43 clubs	Group 6: 42 clubs

Table 3: Test of Balance in Baseline Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Dependent variable:	Female	Married	Age [years]	Years of education	Household Size	Asset index	Livestock index	Land under cultivation [acres]	Proceeds from crop sales [MK]	Cash spent on inputs [MK]	Has bank account	Savings in accounts and cash [MK]	Hyperbolic	Patient now, impatient later	Net transfers made in past 12m [MK]	Missing value for formal savings and cash	Missing value for time preferences
Commitment Account	0.03* (0.02)	-0.02 (0.01)	-1.17 (1.09)	0.38 (0.24)	-0.08 (0.16)	0.13 (0.15)	-0.02 (0.12)	-0.01 (0.18)	11,741.81 (13,191.49)	2,232.79 (3,414.65)	-0.04 (0.04)	769.73 (885.36)	0.03 (0.03)	-0.06 (0.05)	-313.63 (541.27)	-0.01 (0.02)	0.01 (0.01)
Ordinary Account	0.05*** (0.02)	-0.03** (0.01)	-0.93 (1.25)	0.03 (0.28)	-0.11 (0.16)	0.24 (0.16)	-0.04 (0.10)	0.11 (0.20)	7,888.38 (12,765.47)	2,316.48 (2,625.86)	0.01 (0.04)	200.15 (730.59)	0.00 (0.02)	-0.08* (0.05)	81.78 (547.16)	-0.01 (0.02)	0.00 (0.01)
Commitment x Raffle	0.00 (0.02)	0.01 (0.02)	0.11 (0.95)	-0.39 (0.26)	0.28* (0.15)	0.04 (0.18)	-0.03 (0.12)	0.25 (0.19)	-2,093.43 (13,686.32)	3,052.18 (3,917.08)	0.05 (0.05)	-309.33 (1,009.58)	0.01 (0.03)	-0.04 (0.04)	151.71 (496.27)	0.02 (0.02)	-0.01 (0.01)
Commitment x Raffle x Public	0.03 (0.02)	-0.02 (0.02)	-0.88 (1.11)	-0.08 (0.29)	-0.45*** (0.15)	-0.26 (0.16)	-0.08 (0.11)	-0.60*** (0.18)	-14,051.63 (13,121.34)	-2,925.17 (3,750.31)	-0.09** (0.05)	-535.10 (857.36)	-0.03 (0.03)	0.02 (0.04)	48.57 (560.04)	-0.04* (0.02)	-0.00 (0.01)
Ordinary x Raffle	-0.00 (0.02)	0.03** (0.01)	-0.57 (1.22)	0.14 (0.28)	0.18 (0.16)	-0.08 (0.17)	-0.01 (0.09)	-0.14 (0.18)	3,623.95 (12,806.36)	6,474.56* (3,594.99)	-0.02 (0.05)	-1.61 (737.33)	0.00 (0.02)	0.07 (0.05)	185.57 (535.56)	0.01 (0.02)	0.00 (0.01)
Ordinary x Raffle x Public	-0.02 (0.02)	-0.02 (0.01)	-0.40 (1.02)	0.19 (0.25)	-0.09 (0.15)	-0.27* (0.15)	-0.05 (0.08)	-0.02 (0.16)	-5,823.24 (12,340.76)	-6,525.43* (3,594.52)	-0.02 (0.05)	515.36 (727.54)	-0.01 (0.02)	0.01 (0.04)	336.31 (528.38)	0.01 (0.02)	-0.01 (0.01)
<u>Mean Dep Var in Control</u>	0.02	0.97	46.23	5.31	5.81	-0.11	0.03	4.67	117,494.92	21,798.46	0.66	3,235.37	0.10	0.35	1,655.33	0.07	0.01
<u>Number of observations</u>	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	2,949	3,117	3,117	3,150	3,150	3,150
<u>P-values of F-tests for regressions in columns 1 - 17:</u>																	
Commitment, No Raffle = Ordinary, No Raffle	0.519	0.360	0.832	0.169	0.824	0.532	0.826	0.530	0.791	0.981	0.265	0.531	0.293	0.592	0.409	0.947	0.302
<u>P-values of F-tests for joint significance of baseline variables:</u>																	
Commitment Account			0.637														
Ordinary Account			0.896														
Commitment x Raffle			0.473														
Commitment x Raffle x Public			0.140														
Ordinary x Raffle			0.158														
Ordinary x Raffle x Public			0.122														

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects. F-tests for column regressions: "Ordinary, No Raffle = Commitment, No Raffle" tests the equality of means in ordinary and commitment treatment groups each without additional raffle treatments. F-tests of joint significance: test of joint significance in regression of respective treatment dummies on all 17 baseline variables.

Table 4: Impact of Treatments on Deposits and Withdrawals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Dependent variable:</u>	Any Transfer via Direct Deposit (Take-Up Indicator)	Total deposits into accounts [MK]	Total withdrawals from accounts [MK]	Deposits into ordinary accounts [MK]	Deposits into commitment accounts [MK]	Deposits into other accounts [MK]	Net deposits [MK]	Net deposits [MK]	Net deposits [MK]
<u>Time period:</u>	Mar 2009 - Apr 2010	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Nov-Dec 2009	Jan-Apr 2010
Commitment Account	0.21*** (0.05)	21,829.20*** (6,884.03)	20,707.85*** (6,828.63)	19,431.76*** (6,281.25)	1,994.26** (788.77)	403.18 (348.01)	1,121.35* (670.15)	-1,065.54*** (397.70)	-255.61 (351.51)
Ordinary Account	0.16*** (0.05)	21,574.40*** (7,071.27)	20,946.16*** (6,748.68)	21,345.45*** (6,960.03)	-100.19 (235.00)	329.14 (278.41)	628.24 (1,027.27)	-941.67* (481.11)	56.17 (298.18)
Commitment x Raffle	0.03 (0.06)	-5,323.61 (7,847.63)	-5,377.32 (7,546.66)	-4,445.14 (7,191.84)	-698.03 (910.53)	-180.44 (366.94)	53.70 (972.69)	-130.66 (655.39)	80.06 (357.64)
Commitment x Raffle x Public	-0.08 (0.06)	1,726.65 (6,901.19)	1,326.04 (6,512.33)	1,792.64 (6,717.47)	-94.85 (549.04)	28.86 (249.67)	400.61 (928.59)	-254.58 (617.48)	39.32 (201.25)
Ordinary x Raffle	0.01 (0.05)	-14,590.93** (7,365.91)	-14,941.27** (7,032.66)	-14,107.76* (7,274.96)	2.69 (253.25)	-485.86* (271.13)	350.34 (1,114.66)	434.73 (544.91)	-352.23 (327.45)
Ordinary x Raffle x Public	0.04 (0.06)	13,891.57* (7,829.06)	15,129.40* (7,890.66)	13,886.37* (7,778.00)	44.52 (219.51)	-39.32 (120.18)	-1,237.83 (1,172.20)	-110.77 (401.48)	361.32 (224.86)
<u>Mean Dep Var in Control</u>	0.00	3,281.13	3,256.44	3,107.05	0.00	174.09	24.69	-9.835	-147.938
<u>Number of observations</u>	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
<u>P-value of F-test:</u>									
Commitment, No Raffle = Ordinary, No Raffle	0.333	0.978	0.978	0.825	0.009	0.847	0.678	0.817	0.440

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects and the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For complete variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments. Planting season is Nov-Apr. Fertilizer application occurs in Nov-Dec. Fertilizer purchases occur in both pre-planting period (Oct and before) and start of planting season (Nov-Dec). Net deposits are deposits minus withdrawals.

Table 5: Impact of Treatments on Agricultural Outcomes in 2009-2010 Season and Household Expenditure after 2010 Harvest

	(1)	(2)	(3)	(4)	(5)
<u>Dependent variable:</u>	Land under cultivation [acres]	Total value of inputs [MK]	Value of crop output (sold & not sold) [MK]	Farm profit (output-input) [MK]	Total expenditure in last 30 days (survey in July-Sep 2010) [MK]
Commitment Account	0.42** (0.20)	16,533.52** (6,394.38)	33,967.76** (15,115.21)	19,205.08 (12,398.64)	1,859.77** (856.78)
Ordinary Account	0.05 (0.19)	8,521.34 (6,272.71)	7,844.33 (14,805.72)	1,888.26 (11,194.60)	412.76 (876.40)
Commitment x Raffle	-0.13 (0.19)	-8,507.97 (7,214.78)	-936.87 (15,941.24)	3,046.85 (13,481.03)	-532.12 (888.51)
Commitment x Raffle x Public	-0.01 (0.19)	-1,381.03 (6,224.95)	-6,340.87 (15,460.54)	184.16 (12,941.66)	-177.14 (968.76)
Ordinary x Raffle	0.25 (0.21)	-7,337.26 (6,571.42)	9,486.35 (15,159.76)	15,371.41 (11,737.00)	277.95 (979.02)
Ordinary x Raffle x Public	0.16 (0.20)	7,223.72 (5,865.43)	9,197.65 (15,750.11)	2,063.48 (12,985.04)	876.83 (873.19)
<u>Mean Dep Var in Control</u>	4.28	60371.80	155684.93	95209.65	10678.42
<u>Number of observations</u>	2,835	2,835	2,835	2,835	2,835
<u>P-value of F-test:</u>					
Commitment, No Raffle = Ordinary, No Raffle	0.057	0.276	0.081	0.142	0.141
<u>P-value of F-test of Ordinary=0 across regressions of columns 1, 2, 3, 5:</u>			0.115		
<u>P-value of F-test of Ordinary=Commitment across regressions of columns 1, 2, 3, 5:</u>			0.088		

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects and the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments. F-tests of "Ordinary=0" and "Ordinary=Commitment" are based on Seemingly Unrelated Regressions (SUR) estimation and test if the coefficient on Ordinary is jointly significantly different from zero and if the coefficient on Ordinary equals the coefficient on Commitment across regressions with independent variables from column 1, 2, 3 and 5.

Table 6: Impact of treatments on household size, transfers and fixed deposit demand

	(1)	(2)	(3)	(4)
<u>Dependent variable:</u>	Household size	Total transfers made [MK]	Total transfers received [MK]	Total net transfers made [MK]
Commitment Account	0.06 (0.11)	79.47 (83.72)	-272.32*** (104.66)	358.65*** (128.14)
Ordinary Account	0.05 (0.11)	23.65 (88.18)	-73.97 (124.25)	114.09 (139.93)
Commitment x Raffle	0.13 (0.12)	14.46 (94.88)	54.34 (97.73)	-48.80 (120.26)
Commitment x Raffle x Public	-0.05 (0.12)	29.66 (109.66)	28.77 (112.82)	13.04 (149.32)
Ordinary x Raffle	0.13 (0.11)	61.94 (86.25)	-54.88 (126.50)	133.00 (120.59)
Ordinary x Raffle x Public	0.03 (0.11)	61.77 (90.68)	-42.37 (109.04)	72.43 (95.72)
<u>Mean Dep Var in Control</u>	5.72	2,871.70	2,492.13	417.89
<u>Number of observations</u>	2,835	2,835	2,835	2,835
<u>P-value of F-test:</u>				
Commitment, No Raffle = Ordinary, No Raffle	0.952	0.553	0.299	0.846

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects and the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments.

Table 7. Benefit-cost analysis

	Malawi kwacha	US Dollars (\$1 = MK 145)
<u>Costs</u>		
OIBM		
<i>One time per customer costs</i>		
a) Account opening	1056.25	7.28
b) Staff time for training of farmer groups	287.50	1.98
c) Transportation to farmer groups (vehicle)	328.77	2.27
d) Transportation to farmer groups (fuel)	543.75	3.75
e) Management cost (risk assessment, reporting, audit)	333.33	2.30
<i>Transaction costs</i>		
f) Withdrawal costs	-103.13	-0.71
g) Deposit costs	937.50	6.47
Customers		
<i>One time costs</i>		
h) Time and transportation cost of training	333.00	2.30
i) Account opening	7.33	0.05
<i>Transaction costs</i>		
j) Withdrawal costs	150.00	1.03
k) Time and transport cost of going to the bank	1048.50	7.23
<i>Other</i>		
l) Early withdrawal	100.00	0.69
<u>Benefits</u>		
Customers		
m) Increased farm profits	19205.08	132.45
n) Net benefits to OIBM $-[a+b+c+d+e+f+g]$	-3383.98	-23.34
o) Net benefits to Customers $[m-(h+i+j+k+l)]$	17566.25	121.15
p) Net benefits to society $[n+o]$	14182.27	97.81
q) Benefit-to-cost ratio $[m/(a+b+c+d+e+f+g+h+i+j+k+l)]$	3.82	3.82
Assumptions		
Exchange rate	145 MK/US\$1	
OIBM staff salary	MK 75,000/month	
Time for opening an account	20 minutes	
Cost of OIBM smart card (to OIBM)	MK 900	
Time for conducting a group training	1.5 hours	
Group size	20 members	
OIBM transportation time to training	2.5 hours	
OIBM cost of transportation (vehicle)	MK 12 million, depreciated over 5 years	
OIBM cost of transportation (fuel)	300 KM round trip, 8 KM/liter, MK 290/liter	
Time for withdrawal	2 minutes	
Number of withdrawals/season	3	
OIBM processing time for deposit	30 minutes	
Number of deposits (tobacco sales)/season	4	
OIBM management cost	MK 500,000/season	
Cost of OIBM smart card (to customer)	MK 1200	
Customer transportation cost to bank	MK 300	
Customer waiting time at bank	15 minutes	
Customer opportunity cost of time	MK 110/day (5 hours)	
Probability of early withdrawal	10%	

Appendix Table 1: Attrition from Baseline to Endline Survey

<u>Dependent variable:</u>	(A)	(B)
	<i><u>Including Baseline Controls</u></i>	<i><u>No Baseline controls</u></i>
	Not interviewed during endline survey	Not interviewed during endline survey
Commitment Account	0.00 (0.02)	0.01 (0.03)
Ordinary Account	-0.00 (0.03)	0.00 (0.03)
Commitment x Raffle	-0.01 (0.02)	-0.02 (0.02)
Commitment x Raffle x Public	-0.00 (0.02)	0.01 (0.02)
Ordinary x Raffle	-0.03 (0.02)	-0.04 (0.02)
Ordinary x Raffle x Public	0.05** (0.02)	0.05** (0.02)
<u>Mean Dep Var in Control</u>	0.10	0.10
<u>Number of observations</u>	3,150	3,150
<u>P-value of F-test:</u>		
Commitment, No Raffle = Ordinary, No Raffle	0.802	0.790

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. Regressions include stratification cell fixed effects. Column A includes the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments.

Appendix Table 2: Impact of Treatments on Deposits and Withdrawals

Regressions with stratification cell fixed effects but without additional baseline controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Dependent variable:</u>	Any Transfer via Direct Deposit (Take-Up Indicator)	Total deposits into accounts [MK]	Total withdrawals from accounts [MK]	Deposits into ordinary accounts [MK]	Deposits into commitment accounts [MK]	Deposits into other accounts [MK]	Net deposits [MK]	Net deposits [MK]	Net deposits [MK]
<u>Time period:</u>	Mar 2009 - Apr 2010	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Mar-Oct 2009	Nov-Dec 2009	Jan-Apr 2010
Commitment Account	0.22*** (0.05)	23,454.54*** (7,191.44)	22,350.21*** (7,097.81)	21,061.32*** (6,544.53)	1,981.98** (792.99)	411.24 (351.68)	1,104.33 (674.72)	-1,090.51*** (411.08)	-276.00 (355.86)
Ordinary Account	0.17*** (0.05)	23,180.20*** (7,845.12)	22,507.50*** (7,525.24)	22,927.66*** (7,744.01)	-77.07 (229.74)	329.61 (263.08)	672.70 (1,033.92)	-966.40* (491.51)	50.70 (295.59)
Commitment x Raffle	0.03 (0.06)	-4,118.37 (7,950.51)	-4,295.93 (7,664.60)	-3,317.70 (7,265.29)	-660.97 (907.34)	-139.70 (384.74)	177.56 (966.01)	-201.21 (644.27)	48.24 (355.71)
Commitment x Raffle x Public	-0.09 (0.06)	-2,516.49 (7,079.88)	-2,756.50 (6,699.59)	-2,264.35 (6,886.74)	-168.93 (558.89)	-83.21 (290.73)	240.01 (944.96)	-51.06 (621.41)	83.42 (201.39)
Ordinary x Raffle	0.00 (0.05)	-13,795.20* (8,051.13)	-14,103.27* (7,732.94)	-13,265.82* (7,956.91)	-26.93 (248.51)	-502.45** (249.12)	308.07 (1,099.16)	377.09 (533.49)	-426.26 (320.09)
Ordinary x Raffle x Public	0.04 (0.06)	12,764.69 (8,291.97)	14,049.83* (8,375.91)	12,712.39 (8,230.31)	78.64 (214.49)	-26.34 (117.53)	-1,285.14 (1,072.73)	-42.25 (397.27)	411.61* (230.70)
<u>Mean Dep Var in Control</u>	0.00	3281.13	3256.44	3107.05	0.00	174.09	24.69	-9.84	-147.94
<u>Number of observations</u>	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
<u>P-value of F-test:</u>									
Commitment, No Raffle = Ordinary, No Raffle	0.361	0.978	0.987	0.844	0.010	0.829	0.721	0.824	0.430

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects. F-tests: "Ordinary, No Raffle = Commitment, No Raffle" tests the equality of means in ordinary and commitment treatment groups without additional raffle treatments. Planting season is Nov-Apr. Fertilizer application occurs in Nov-Dec. Fertilizer purchases occur in both pre-planting period (Oct and before) and start of planting season (Nov-Dec). Net deposits are deposits minus withdrawals.

Appendix Table 3: Impact of Treatments on Agricultural Outcomes in 2009-2010 Season and Household Expenditure after 2010 Harvest
Regressions with stratification cell fixed effects but without additional baseline controls

	(1)	(2)	(3)	(4)	(5)
<u>Dependent variable:</u>	Land under cultivation [acres]	Total value of inputs [MK]	Value of crop output (sold & not sold) [MK]	Farm profit (output-input) [MK]	Total expenditure in last 30 days (survey in July-Sep 2010) [MK]
Commitment Account	0.46** (0.23)	18,560.76** (7,551.69)	41,143.38** (17,982.76)	24,495.51* (13,772.67)	2,260.29** (1,006.45)
Ordinary Account	0.11 (0.22)	10,922.89 (7,049.34)	15,223.08 (15,827.62)	7,219.16 (11,710.71)	831.83 (955.61)
Commitment x Raffle	-0.07 (0.23)	-7,451.19 (8,679.48)	-1,002.69 (19,841.45)	2,230.97 (15,148.96)	-378.69 (1,038.19)
Commitment x Raffle x Public	-0.29 (0.22)	-6,391.76 (7,125.71)	-21,033.26 (18,494.18)	-9,902.10 (14,733.64)	-1,022.16 (1,062.25)
Ordinary x Raffle	0.25 (0.24)	-5,402.06 (7,647.77)	11,251.43 (17,862.93)	15,159.52 (13,212.61)	398.97 (1,042.70)
Ordinary x Raffle x Public	0.10 (0.23)	4,771.61 (6,659.53)	3,992.97 (17,745.21)	-857.43 (14,078.16)	524.17 (883.06)
<u>Mean Dep Var in Control</u>	4.28	60371.80	155684.93	95209.65	10678.42
<u>Number of observations</u>	2,835	2,835	2,835	2,835	2,835
<u>P-value of F-test:</u>					
Commitment, No Raffle = Ordinary, No Raffle	0.145	0.394	0.180	0.219	0.210
<u>P-value of F-test of Ordinary=0 across regressions of columns 1, 2, 3, 5:</u>			0.124		
<u>P-value of F-test of Ordinary=Commitment across regressions of columns 1, 2, 3, 5:</u>			0.211		

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects and the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For complete variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments. F-tests of "Ordinary=0" and "Ordinary=Commitment" are based on Seemingly Unrelated Regressions (SUR) estimation and test if the coefficient on Ordinary is jointly significantly different from zero and if the coefficient on Ordinary equals the coefficient on Commitment across regressions with independent variables from column 1, 2, 3 and 5.

**Appendix Table 4: Impact of treatments on household size, transfers and fixed deposit
Regressions with stratification cell fixed effects but without additional baseline controls**

	(1)	(2)	(3)	(4)	(5)
<u>Dependent variable:</u>	Household size	Total transfers made [MK]	Total transfers received [MK]	Total net transfers made [MK]	Has fixed deposit account
Commitment Account	-0.01 (0.16)	470.16 (335.84)	-459.24 (283.53)	875.05** (419.60)	0.06** (0.02)
Ordinary Account	-0.04 (0.19)	650.96* (344.48)	-193.97 (320.99)	778.80* (418.47)	0.03** (0.02)
Commitment x Raffle	0.34** (0.17)	120.40 (416.42)	-5.04 (241.61)	156.38 (459.38)	-0.02 (0.03)
Commitment x Raffle x Public	-0.45** (0.19)	-370.87 (426.51)	429.88* (255.57)	-889.61* (467.84)	0.01 (0.02)
Ordinary x Raffle	0.23 (0.19)	-460.58 (334.95)	-33.77 (320.88)	-370.38 (438.87)	-0.04** (0.02)
Ordinary x Raffle x Public	0.00 (0.18)	-84.06 (311.28)	-176.91 (301.94)	47.37 (390.29)	0.02 (0.02)
<u>Mean Dep Var in Control</u>	5.717	2871.702	2492.134	417.893	0.039
<u>Number of observations</u>	2,835	2,835	2,835	2,835	2,835
<u>P-value of F-test:</u>					
Commitment, No Raffle = Ordinary, No Raffle	0.849	0.631	0.340	0.830	0.292

Notes: Stars indicate significance at 10% (*), 5% (**), and 1% (***) levels. Standard errors are clustered at the club level. USD 1 is ca. MK 145. All regressions include stratification cell fixed effects and the following baseline variables: Dummy for male respondent; dummy for married; age in years; years of completed education; number of household members; asset index; livestock index; land under cultivation; proceeds from tobacco and maize sales during the 2008 season; cash spent on inputs for the 2009 season; dummy for ownership of any formal bank account; amount of savings in bank or cash (with missing values replaced with zeros); dummy for hyperbolic (missing values replaced with zeros); dummy for "patient now, impatient later" (missing values replaced with zeros); net transfers made to social network over 12 months; dummy for missing value in savings amount; dummy for missing value in hyperbolic and "patient now, impatient later". For variable definitions, see Appendix B. F-tests: "Commitment, No Raffle = Ordinary, No Raffle" tests the equality of means in commitment and ordinary treatment groups each without additional raffle treatments.