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SAVINGS CONSTRAINTS AND MICROENTERPRISE DEVELOPMENT: EVIDENCE FROM A FIELD EXPERIMENT IN KENYA

Pascaline Dupas
Jonathan Robinson

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Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya

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ABSTRACT

This paper presents results from a field experiment designed to test whether savings constraints prevent the self-employed from increasing the size of their businesses. We opened interest-free savings accounts in a local village bank in rural Kenya for a randomly selected sample of poor daily income earners (such as market vendors), and collected a unique dataset constructed from self-reported logbooks that respondents filled on a daily basis. Despite the fact that the savings accounts paid no interest and featured substantial withdrawal fees, take-up and usage was high among women. In addition, we find that the savings accounts had substantial, positive impacts on productive investment levels and expenditures for women, but had no effect for men. These results imply that a substantial fraction of daily income earners face important savings constraints and have a demand for formal saving devices (even for those that offer negative de facto interest rates). We also find some suggestive evidence that female entrepreneurs draw down their working capital in response to health shocks, and that the accounts enabled the treatment group to cope with these shocks without having to liquidate their inventories.

Pascaline Dupas
Department of Economics
UCLA
8283 Bunche Hall
Los Angeles, CA 90095
and NBER
pdupas@econ.ucla.edu

Jonathan Robinson
Department of Economics
University of California, Santa Cruz
457 Engineering 2
Santa Cruz, CA 95064
jmrtwo@ucsc.edu

1 Introduction

Hundreds of millions of people in developing countries earn their living through small-scale businesses (World Bank, 2004; Hernando de Soto, 1989). For instance, recent evidence that combine 13 World Bank Living Standards Measurement Surveys finds that, on average (across countries), 21.9% of households living on less than US $1 per person per day and 24.1% of households living on less than US $2 per day have at least one self-employed household member (Abhijit Banerjee and Esther Duflo, 2007). In Kenya, employment in small and medium enterprises has been estimated to account for more than 20% of adult employment and for 12-14% of national GDP (Lisa Daniels and Donald Mead, 1998). Worldwide, these businesses are typically extremely small-scale: the majority starts with no employees other than the owner and very low levels of working capital (Carl Liedholm and Donald Mead, 1987, 1993 and 1998).

Enabling small-scale entrepreneurship of this sort has long been identified as a mechanism to alleviate poverty. Substantial attention has been paid to relieving credit market constraints among small entrepreneurs, particularly through microcredit (see Armendáriz and Morduch, 2005, for a review). However, the impact of microcredit schemes on business outcomes, especially for the very poor, is still largely unknown, and many banks that target the poor realize low or negative profits.[1] Consequently, microfinance has been moving increasingly towards for-profit ventures that focus on relatively richer clientele (i.e. Elisabeth Malkin, 2008).

In this context, some have argued that the focus should be put on enabling savings instead of credit[2], particularly since the vast majority of the poor still lack access to formal banking services of any kind (i.e. Banerjee and Duflo, 2007). Emphasizing savings has strong theoretical and empirical underpinnings. First, standard theory suggests that individuals should be able to save their way out of credit constraints (Kaushik Basu, 1997; Truman Bewley, 1977), though building up such savings will take longer than getting credit up-front. Second, a wealth of (largely anecdotal) evidence suggests that poor people face sizeable savings constraints and that many are in fact willing to pay a premium to be able to save securely. For example, many women in West Africa receive a *negative* interest on money they deposit with the local "susu",

[1] For instance, Jonathan Morduch (1999) shows that banks that target the "rich poor" are more profitable than those that target the poorest.
[2] See, for example, Marguerite Robinson (2001).

or informal banker (Timothy Besley, 1995) and people throughout the developing world participate in rotating savings and credit associations (ROSCAs), despite the fact that ROSCA savings are quite illiquid and so cannot easily be accessed in times of need. The fact that people take up these costly strategies suggest that the private returns to holding cash at home are even lower, possibly because of the risk of theft, appropriation by one's spouse or other relatives, or because individuals or households have present-biased preferences and over-consume cash on hand. Consistent with these observations, recent research has suggested that there exists significant demand for formal saving services, and that the provision of these services can have substantial impacts. For instance, Don Johnston and Jonathan Morduch (2007) show that over 90% of Bank Rakyat Indonesia clients save but do not borrow, and Joseph Kaboski and Robert Townsend (2005) find that pledged savings accounts have a significant impact on long-term asset growth in Thailand. Similarly, Michal Bauer, Julie Chytilová, and Jonathan Morduch (2008) argue that some women take up microcredit schemes as a way of forcing themselves to save through required installment payments.

In this paper, we study the importance of savings constraints for self-employed individuals in rural Kenya, using a field experiment which provided a random sample of market vendors, bicycle taxi drivers, and self-employed artisans with formal savings accounts in a village bank. The savings accounts were interest-free, and included substantial withdrawal fees, so the de facto interest rate on deposits was negative (even before accounting for inflation).[3] In the absence of savings constraints, the demand for such accounts should be zero, and we would expect to find no effect of getting access to an account on either business or individual outcomes. To test this hypothesis, we make use of a unique dataset collected from 185 self-reported, daily logbooks kept by individuals in both the treatment and control groups. These logbooks include detailed information on market investment, expenditures, and health shocks, and so make it possible to examine the impact of the accounts along a variety of dimensions that typically are not easily measured. We supplement this information with administrative data on savings from the bank itself.

Our analysis generates three main findings. First, formal savings accounts had substantial positive impacts on business investment for women, but no effect for men. Our preferred estimate of the treatment-control difference in daily productive investment is about 108 Kenyan

[3] Inflation in Kenya was about 10% in 2006 and 12% in 2007 (IMF, 2008).

shillings (US $1.6), which is equivalent to roughly a 40% increase in average investment, four to six months after the opening of the account. This result is inconsistent with a model where women can save informally at a non-negative interest rate or can invest all of their extra cash into their business or into some other investment. Rather, it suggests that they face large, negative private returns on the money they save informally. These constraints are important for the businesses that these women run, since investment is lumpy, and can usually only be made in discrete, relatively large increments (compared to daily profits). With negative private rates of return to savings at home, women without bank accounts have difficulty saving up enough to afford another unit of investment. While relieving these constraints has large average impacts, the effects are quite heterogeneous: only about 60% of women in our treatment group made at least one transaction in the account within the first 6 months of opening it.

Second, we find that, about 6 months after having gained access to the account, the daily private expenditures of women sampled for the account were, on average, 37 to 44% higher than those of women in the comparison group. Their average daily food expenditures were 14 to 29% higher, suggesting that the higher investment levels led to higher income levels.

Third, we find some suggestive evidence that the accounts had some effect in making women less vulnerable to illness shocks. In accord with the previous risk-coping literature, we find that individuals are not fully protected from income risk (for instance, Robert Townsend, 1994; Christina Paxson, 1992). In particular, our logbooks show that, over the period of study, women in the control group were forced to draw down their working capital in response to health shocks. Women sampled for the savings account, however, were less likely to reduce their business investment levels when dealing with a health shock, and were better able to smooth their labor supply over illness. In particular, women in the treatment group were more likely to be able to afford medical expenses for more serious illness episodes.

Overall, these results suggest that the informal savings mechanisms that are available in rural Kenya are ineffective in allowing at least some women to save as much as they would like. In this part of Kenya, as in much of rural Sub-Saharan Africa, the principal alternatives to saving at home are investments in animals or durable goods or participation in ROSCAs. Each of these strategies has its own difficulties in facilitating asset accumulation. Animals must be tended after, may get sick or die, and the resale price may fluctuate greatly over time. ROSCAs have been shown to be a popular way to save in Western Kenya, particularly among women

(Mary Kay Gugerty, 2007). However, since ROSCA payouts are typically determined by a fixed rather than random order in this part of Kenya, it is difficult to access ROSCA savings in a timely manner.

An important question is why the private return to savings is so negative for so many women. There are two likely explanations. One possibility is that women may have present-biased preferences (i.e. David Laibson, 1997; Faruk Gul and Wolfgang Pesendorfer, 2001; Gul and Pesendorfer, 2004), and so may be tempted to spend any cash money that they hold. Alternatively, many women in developing countries face constant demands on their income (from relatives or neighbors), and it may be difficult to refuse requests for money if the cash is readily available in the house (Jean-Philippe Platteau, 2000). We find some evidence suggesting that both factors may be at work. We find that consumption levels of women offered the savings accounts are less sensitive to current profit levels than women in the control group. In particular, women in the treatment group spend less of their current profits on private consumption (suggesting that women in the treatment group were less likely to spend current income on immediate consumption), and they transfer less of their profits outside of the household (suggesting that women in the treatment group were better able to protect their income from others).

This last finding in particular suggests that the increases in investment and in expenditures we find in this paper come at some cost to others. While the private return on savings at home is evidently negative, the social return is likely zero – every dollar given out to a family member who asks for it is ultimately spent. This implies that the welfare implications of this program are ultimately unclear – while the program clearly benefited women in the treatment group, the impact on other household members, or on relatives, is uncertain.

The results of this paper are generally consistent with those of other studies. While the account that was offered in this program was not literally a commitment savings account, it did provide some form of illiquidity to households, given the large withdrawal fees, and the rather limited bank business hours (the bank is opened only 5 days per week from 9am to 3pm). The demand for this product is generally in keeping with experimental studies in the Philippines (Nava Ashraf, Dean Karlan, and Wesley Yin, 2006) and in the United States (Richard Thaler and Shlomo Benartzi, 2004), both of which have shown that commitment savings products can be effective in increasing savings.

Our findings also fit into a larger, mostly non-experimental, literature which studies the impact of financial services on the poor. Fernando Aportela (1999) shows that the expansion of a Mexican savings institute targeted to low-income people increased the average savings rate of households by five percentage points. However, Aportela is not able to estimate the impact of the program on business investment or other outcomes. Similarly, Robin Burgess and Rohini Pande (2005) find that the rapid expansion of a rural banking program in India (which offered access to both savings and credit products) in the 1980s caused a significant decrease in rural poverty.

The remainder of the paper is as follows. We first present a simple theoretical framework in Section 2. We then describe the experiment and the data in Section 3, before presenting the results in Section 4. Section 5 discusses the implications of our findings on the likely rate of return to capital for women in our sample, and Section 6 concludes.

2 Conceptual framework

To frame our empirical analysis, we present a simple dynamic model of consumption and production decisions by micro-entrepreneurs. The key elements of the model are:

(1) the agent's firm output requires financial capital and the agent's own labor

(2) the production function requires lumps of financial capital

(3) agents cannot borrow

The agent (a micro-entrepreneur) is assumed to maximize the present value of expected lifetime utility over a finite horizon. Utility at any time t, $u(c_t)$, depends on the consumption of a single nonstorable aggregate good, c_t, and is such that $u'(c_t) > 0$ and $u''(c_t) < 0$. Consumption has to be above the minimum needed to subsist, denoted c_{min}. The interest rate on savings is r.

The agent gets income y from operating a small business that requires labor l and cash-on-hand k to stock the business: $y_t = f(k_t, l_t)$. Because leisure does not enter the utility function, the agent will always choose to work the maximum hours possible. We assume that $\frac{\partial f(k_t,l_t)}{\partial k_t} > 0$ and $\frac{\partial^2 f(k_t,l_t]}{\partial k_t^2} < 0$.

At the end of period $t-1$, the agent's stock has depleted and she must decide how to allocate her total wealth (savings and business income) between cash-on-hand for next period's consumption c_t, cash-on-hand for next period's business investment k_t, and next period's savings s_t.

Setting the price of consumption to 1, the household's problem can be written:

$$\underset{c,k}{Max} \ \sum_{t=\tau}^{T} \delta^{\tau-t} U(c_t)$$

subject to:

$$k_t = f(k_{t-1}, l_{t-1}) + (1+r)s_{t-1} - c_t - s_t \quad (1)$$

$$c_t \geq c_{min} \quad (2)$$

$$s_t \geq 0 \quad (3)$$

where δ is the discount rate.

At the optimum, the agent will set k_t such that $\frac{\partial f(k_t, l_t)}{\partial k_t} = 1 + r$. If marginal returns are non-zero over the entire range, and if $r \leq 0$, then the agent will never save, but will instead reinvest all her profits in her business.

We now add an assumption on the production function. For an investment amount *i*, we assume that $\frac{\Delta k}{\Delta i} = 0 \text{ for } \Delta i \leq \underline{\Delta}$. This assumption means that investment is "bulky": units of financial capital need to be lumped up in order to be invested. For example, a used clothes retailer can only purchase used clothes in bales. Therefore if a bale costs \$10, and an entrepreneur has \$15, she can only invest \$10 and needs to save or consume \$5. This property of the production function suggests that at the optimum, the amount k invested in the business will be such that: $\frac{k}{\underline{\Delta}} \in \mathbb{N}$

In this context, if the profits realized in the business at time t are lower than $\underline{\Delta}$, the agent cannot reinvest in the business but must save over multiple periods before she is able to increase her working capital. As soon as the agent has accumulated $\underline{\Delta}$ in savings, she will invest it in the business, as long as the rate of return of the business is greater than the interest rate on informal savings. The number of periods needed before the agent can increase the size of her working capital by an increment will thus depend on the interest rate on savings r. The lower the rate of return to saving, the longer the agent will have to save the profits instead of reinvesting them.

In the experiment we describe below, we provided a subset of market vendors with an interest-free savings account at a local bank. Withdrawals from the account are subject to a withdrawal fee, making the *de facto* interest rate on the account negative. As such, if entrepreneurs offered the account were able to save at a positive (or even zero) rate of return at home, they should not have taken up the account. In this context, finding that account provision has a positive effect on savings or on business growth will imply that the private rate of return on informal savings is negative.

3 Experimental Design and Data Collection

3.1 Background on formal and informal savings in Western Kenya

Most self-employed individuals in rural Kenya do not have a formal bank account. At the onset of this study, only 2.2% of individuals we surveyed had a savings account with a commercial bank. The main reasons given for not owning an account were that formal banks typically have large opening fees and have minimum balance requirements (often as high as 500 Ksh, or US $7.70). Savings account are also offered by savings cooperative, but the cooperatives are urban and employment based, and therefore rarely available for self-employed workers. Instead, individuals typically save in the form of animals or durable goods, or in cash at their homes.[4] Qualitative evidence suggests that this type of savings is not very effective: in our sample, 86% of respondents report that "it is hard to save money at home" (Table 1).

Likely the most secure way to save money is through the use of Rotating Savings and Credit Associations (ROSCAs), which are commonly referred to as merry-go-rounds. Most ROSCAs have periodic meetings, at which members make contributions to the shared saving pool. The pot money is then given to one member every period, in rotation until everyone has received the pot. ROSCA participation is high in Kenya, especially among women, and many people participate in multiple ROSCAs (Gugerty, 2007). Given the importance of ROSCAs in savings, we will later test whether our program to provide savings accounts crowded out ROSCA contributions.

3.2 The Village Bank

We worked in collaboration with a village bank (also called a Financial Services Association, or FSA) in Bumala market, a rural market center located along the main highway connecting Nairobi, Kenya, to Kampala, Uganda. The Bumala village bank is a community-owned and operated entity that receives support (in the form of initial physical assets and on-going audit and training services) from the Kenya Rural Enterprise Program Development Agency (KDA), the research and development branch of KREP, a Kenyan micro-finance organization.

Opening an account at the village bank costs 450 Ksh (US $7). The village bank does not pay any interest on the savings account. However, the bank charges a withdrawal fee (of US $0.50 for withdrawals less than US $8, $0.80 for withdrawals between $8 and $15, and $1.50

[4] Using these types of mechanisms as primary savings is common in poor countries (Stuart Rutherford, 2000).

for larger withdrawals), thus generating a *de facto* negative interest rate on savings.

The village bank opened in Bumala market in October, 2004. At the onset of this study a bit over a year later, in early 2006, only 0.5% of the daily income earners that we surveyed around Bumala market had opened an account at the village bank. The main reasons given by respondents for why they did not already have an account were lack of information about the village bank and its services and inability to pay the account opening fee.

Opening a savings account at the village bank is a first step towards access to credit. Savings account holders at the village bank are eligible to become "members" of the village bank by buying shares for 300 Ksh (USD $4.60) each. The share capital is used in part to grant loans to village bank members. Members of the village bank can apply for loans up to the lesser of four times the value of their shareholdings, or 10% of the bank's total share capital, so that those who invest more in the bank can borrow more. In our sample, only 3.3% of individuals (4 out of 122 to whom we offered accounts) accessed a loan from the village bank within 9 months after getting access to the account. A higher fraction (12.3%) purchased shares. Both of these figures could bias our estimated effect, since those women who anticipated receiving loans in the future could have immediately adjusted their expenditure and investment decisions upwards. This seems unlikely since the individuals in our sample had no other major sources of credit and so would find it difficult to borrow against future expected income until they had actually received the cash. However, we check this formally in Appendix Table 2, and find no evidence that these individuals drive our results.

3.3 Sample

Trained enumerators identified market vendors, bicycle taxi drivers, hawkers, barbers, carpenters, and other artisans operating around Bumala market, and administered a background survey to these individuals. Those that already had a savings account (either at the village bank itself or some other formal bank) were excluded from the sample, as well as those who declared that they were not interested in opening a savings account (however, all respondents were interested). These criteria excluded very few individuals: as mentioned above, only 2.2% of individuals had accounts in a commercial bank and 0.5% had accounts in the FSA.

The scale of operations for the individuals in our final sample is quite small. The mean number of items traded is just over 2, and the median is 1 (the majority of vendors sell just one item such as charcoal or a food item, particularly fish or maize). Mean daily investment is just

US $5 per day.

Sampled individuals were randomly divided into treatment and control groups, stratified by gender and occupation. Those sampled for treatment were offered the option to open an account at no cost to them in the village bank (we paid the account opening fee and provided each individual with the minimum balance of 100 Ksh (US $1.5), which they were not allowed to withdraw. Those individuals that were sampled for the control group did not receive any assistance in opening a savings account (though they were not barred from opening one on their own).[5] The sampling was done in two waves: wave 1 took place in 2006 and wave 2 took place in 2007. In wave 1, the background survey was administered in February and March, 2006, and accounts were opened for consenting individuals in the treatment group in May, 2006. In wave 2, the background survey was administered in April and May, 2007 and accounts were opened for consenting individuals in the treatment group in June, 2007. In addition, individuals assigned to the control group in wave 1 were offered an account in April 2007. For this reason, control individuals in wave 1 appear twice in the dataset: in the control group in 2006 and in the treatment group in 2007.[6]

3.4 Data

We use four sources of data. First, as mentioned above, we conducted a background survey which included information on the baseline characteristics of participants, such as marital status, household composition, assets, and health. Second, we have administrative data from the village bank on every deposit and withdrawal made in any of the treatment accounts.[7] Third, we elicited time and risk preferences from respondents approximately one year after the project ended, in November, 2008.[8] The time preferences asked respondents to decide between 40 Ksh now (US $0.61) and varying amounts in one month, and between 40 Ksh in 1 month and varying amounts in 2 months. The risk preference questions are similar to Gary Charness and Garance Genicot (2008) and ask respondents how much of 100 Ksh they would like to invest in an asset that pays off 4 times the amount invested with probability 0.5, and that pays off 0 with

[5] Within the study period, three individuals in the control group opened accounts in the village bank on their own.
[6] In total, we sampled 169 people to open accounts in the 2 Waves. Forty-seven (27.8%) of these could not be found to open the account. It is likely that these respondents moved out of the area.
[7] We obtained consent from respondents to collect these records from the bank.
[8] As these measures were collected *ex post*, it is possible that the experiment changed risk and time preferences. For this reason, we do not make any strong conclusions regarding the impact of these measures on outcomes but instead consider these measures as purely suggestive.

probability 0.5.[9] During this visit, we also collected several measures of cognitive ability (many of these measures are similar to those collected in de Mel, McKenzie, and Woodruff, 2007, 2008a). In particular, respondents completed a "Raven's Matrix" in which they had to recognize patterns in a series of images and were asked to complete several simple math questions. In addition, we measured the ability of respondents to recall numbers. Enumerators started by reading respondents 2 digit numbers and asked respondents to read them back. If they repeated them correctly, the enumerator would then go to a 3 digit number, and so on.[10]

Fourth, and most importantly, we collected detailed daily data on respondents through daily, self-reported logbooks. These logbooks included detailed income, expenditure, and health modules, as well as information on investment, labor supply, and on all transfers given and received (including between spouses). The logbooks also included questions on adverse income shocks (such as illness or the death of a friend or family member).

As these logbooks were long and complicated to keep, trained enumerators met with the respondents twice per week to verify that the logbooks were being filled correctly. One substantial problem was that many respondents could neither read nor write (24% of women and 8% of men that kept the logbooks could not read or write Swahili). To keep these individuals in the sample, enumerators visited illiterate respondents every day to help them fill the logbook.

Wave 1 individuals filled logbooks between October and December 2006, and Wave 2 individuals filled logbooks between August and December 2007. Individuals assigned to the control group in Wave 1 filled logbooks twice: once as controls in 2006 and once as treatment in 2007. To encourage participation, the logbooks were collected every four weeks, and respondents were paid 50 Ksh ($0.76) for each week the logbook was properly filled (as determined by the enumerator).[11] Though respondents were asked to fill the logbooks for up to 3 months, some were only willing to keep the logbooks for a shorter period and so we do not have 3 full months' worth of data for them.

The logbook data makes up the bulk of the analysis. First, for each respondent, we compute the average daily business and household expenditures across all the days that the respondent filled the logbook, and then compare these averages between the treatment and control groups.

[9] To encourage truth-telling, one of the risk and time preference questions was randomly selected for payment.
[10] In one module ("digits forward"), respondents read back the numbers in the order in which they were given; in another ("digits backward"), respondents read back the numbers in reverse order. Since the correlation between these measures is high, we only report results for digits forward.
[11] This figure is equivalent to about 1/3 of daily total expenditures for respondents in this sample.

Second, we use the panel structure of the logbook data to measure the effect of health shocks on labor supply and expenditures, and the differential impact of shocks between the treatment and control groups. Though we have daily data on each respondent, the daily figures are generally too noisy to use on their own. Instead, we aggregate the daily data by week, and examine week-to-week variations in outcomes in response to weekly health shocks.

The logbooks also included a module designed to estimate respondents' investment, sales, and profits. The data on business investments (mostly wholesale purchases) is quite noisy but relatively reliable. However, the quality of the data on revenues from the business (mostly retail sales) is very poor. Many respondents did not keep good records of their sales during the day, in part because they did not have time to record each small retail transaction that they had. For this reason, we cannot compute reliable profit figures.[12] Instead, we focus on investment data.[13]

As might be imagined from the length of the logbooks and the relatively small compensation given to participants, many individuals refused to keep the books. However, the probability of refusal was similar between the treatment and control groups. In Wave 1, 82% of those that opened accounts kept logbooks. This amounts to 56.4% of the originally sampled treatment group (as mentioned above, 25% of the original treatment group was never traced again after the first interview). Attrition was very similar in the Wave 1 control group: overall, 54.5% of the control group kept logbooks (52.7% of these individuals kept logbooks the following year, after they had been offered accounts). In Wave 2, the figures were 74.5% for the treatment group and 83.6% for the control group.[14]

Table 1 presents baseline characteristics of men and women that filled the logbooks by treatment status. We have 185 logbooks in total, 88 which were filled by men and 97 which were filled by women.[15] Though the background variables are mostly self-explanatory, some of the risk preference, time preference, and cognitive ability measures require some explanation.

[12] It is notoriously difficult to measure profits for such small-scale entrepreneurs, especially since most do not keep records (Carl Liedholm, 1991; Lisa Daniels, 2001; Suresh de Mel, David McKenzie, and Christopher Woodruff, 2008b).

[13] We compute investment for bicycle taxi drivers as small improvements and repairs to their bicycles. Though this type of investment is fundamentally different than that of vendors or other business people, we do not find differential impacts between men that work as bicycle taxi drivers and other men, so all of our regressions pool bicycle taxi drivers with other entrepreneurs. Disaggregated results by occupation are available on request.

[14] The difference in take-up between the two years might be a result of respondents learning about the monthly payments made by the research team to those who correctly filled the logbooks.

[15] We have fewer observations for the time preference, risk preference, and cognitive ability module. In total, we have 154 observations for these variables.

First, we standardize scores on the digits forward and Raven's Matrix modules so that they have mean 0 and standard deviation 1. Second, we define as "somewhat patient" any respondent who preferred 55 Ksh in 1 month to 40 Ksh today. Similarly, we define as "impatient" any individual who needed an amount larger than 55 Ksh but no greater than 200 Ksh to induce them to wait 1 month for payment, and we define as "very impatient" an individual who required more than 200 Ksh to induce them to wait 1 month.[16] For measures of time consistency, we define people in one of four categories: (1) "present-biased" individuals who exhibit a higher discount rate in the present than in the future; (2) "time-consistent" individuals who exhibit the same discount rate in the present and in the future; (3) "patient now, impatient later" individuals who exhibit higher discount rates in the future than in the present, and (4) respondents who exhibit maximum possible discount rates in both the present and future (these individuals preferred 40 Ksh to 500 Ksh in 1 month, and 40 Ksh in 1 month to 500 Ksh in 2 months).

For both men and women, the treatment and control groups are balanced along most baseline characteristics.[17] In fact, of the 23 baseline characteristics presented in Table 1, the p-value of the difference between treatment and control is below 0.15 for only two variables for men (education and ROSCA contributions in the past year), and two for women (ROSCA contributions, and the likelihood of being "patient now but impatient later"). Overall, Table 1 suggests that attrition during the logbook exercise was not differential, and performing the analysis on the restricted sample for which we have data will not bias our estimates of the treatment effect (though it may compromise the external validity of the results). To deal with any pre-treatment differences in the treatment and control groups, we control for gender, years of education, marital status, occupation, age, literacy, and ROSCA contributions in the last year in all of our regression specifications.[18]

It should be noted, however, that 53 of the 88 logbooks that were kept by men were in the treatment group (60.2%), compared to 51 of the 97 logbooks kept by women (52.5%).[19] Though

[16] As can be seen in the table, respondents in this sample were quite impatient compared to the samples in Ashraf, Karlan, and Yin (2006) and Bauer, Chytilová, and Morduch (2008). This does not appear to be because respondents did not understand the games or solely because they did not trust enumerators to follow up to pay out the chosen questions: in general, respondents showed similar levels of impatience in the future as in the present.

[17] Standard errors of the differences are clustered at the individual level to account for the fact that Wave 1 control individuals appear twice (as controls in 2006 and treatment in 2007).

[18] In all of our regressions, we do not control for income in the week prior to the baseline as this variable was missing for several respondents. Including this control does not change the results (results not shown), though we lose power due to the reduced sample size.

[19] These figures are both above 50% because the Wave 1 control group was treated in 2007.

this difference is not significant at 10%, it does suggest that control men were proportionally more likely to refuse the logbook than were control women – on the margin, it seems that men needed some extra enticement to keep these records. To deal with this issue, all results in this paper include either an interaction term between gender and treatment, or are presented separately for men and for women.

For all results that use the logbook data, we present estimates using both the raw data and trimmed data that removes extreme values (similar to de Mel, McKenzie, and Woodruff, 2008a and McKenzie and Woodruff, 2008).

4 Results

4.1 Take-up

A total of 122 respondents had the opportunity to open a savings account through this program. A sizeable fraction of respondents (11%) refused to even open an account, while another 34% opened an account but never made a single deposit. Figure 1 shows the histogram of the number of transactions made by treatment individuals at the village bank within the first 6 months of being offered the account – as can be seen, many individuals used the account rarely or not at all, though others used the accounts regularly.

An interesting result is that take-up and usage of the account differed greatly between men and women. Figure 2 plots the cumulative distribution functions of the total amount deposited in the account in the first 6 months, separately by gender. For readability, Panel A plots the CDFs below the 75th percentile while Panel B plots the CDFs above the 75th percentile. The distribution for men is clearly dominated by the distribution for women. For instance, median deposits for men are 50 Ksh, while median deposits for women are 150 Ksh. Similarly, the 75th, and 90th percentiles of total deposits are 400 Ksh, and 1,600 Ksh for men, but 1,900 Ksh, and 11,500 Ksh for women.[20]

To study the determinants of account take-up, we consider an account "active" if the respondent opened the account and made at least one deposit on the account within the first 6 months after opening the account. We restrict the sample to those ever offered an account, and regress the binary outcome "active" on baseline characteristics. We also regress the natural log

[20] Formally, a Kolmogorov-Smirnov test returns a *p*-value of 0.063. This is not quite significant at 5% due to the small sample size.

of (1 + the sum of total deposits in the first six months) on those same characteristics. The results are presented in Table 2. In the absence of any other covariates, we find that men were less likely to actively take up the account, though only the difference in log savings is statistically significant. However, once we control for other baseline characteristics, the gender effect disappears. We find that membership in a rotating savings and credit association (ROSCA) has very strong predictive value: ROSCA members are 26 percentage points more likely to have active accounts than individuals that don't belong to any ROSCAs, and their log deposits are also significantly higher. This explains much of the gender difference: as shown in Table 1, baseline ROSCA participation is much higher among women (around 75%) than men (around 39%).

The very high correlation between participation in ROSCAs and take-up of the account can help shed some light on several of the theories which have been proposed and tested to explain why ROSCA participation is so prevalent in poor countries, particularly among women. Tim Besley, Steven Coate, and Glenn Loury (1993) argue that individuals who have no access to credit may choose to join a ROSCA to finance the purchase of indivisible durable goods, taking advantage of the gains from intertemporal trade between individuals. Siwan Anderson and Jean-Marie Baland (2002) argue that ROSCA participation is a strategy used by married women to force their household to save towards consumption of indivisible durable products that she values more than her husband. Finally, Gugerty (2007) suggests that ROSCA participation is a commitment device used by "sophisticated" present-biased individuals to compel themselves to save: once in a ROSCA, women are required to make regular contributions to the savings pot and often incur at least some social cost if they fail to make their contributions. The fact that ROSCA participation is correlated with take-up in our sample suggests that either of the last 2 theories could be relevant for the women that took up the accounts.[21] However, since the coefficient on "married" in the determinants of take-up in Table 2 cannot be distinguished from zero, it appears that a pure intra-household conflict story is unlikely (instead, it may be that women face demands on their income from their extended family, rather than just from their husband). Unfortunately, given the small size of our sample, we do not have enough power to test for treatment effect heterogeneity by marital status in the analysis that follows,

[21] ROSCA contributions are made in a group while savings in the FSA are made individually. It is possible, however, that part of the commitment that the ROSCA provides might not come directly from the social scorn of non-payment but from the regular schedule of payments.

We include controls for risk and time preferences in Columns 3 and 6 (in the Table, the omitted patience category is "very impatient" and the omitted time consistency category are those that preferred 40 Ksh now to 500 Ksh in 1 month and 40 Ksh in 1 month to 500 Ksh in 2 months). Though individuals in the sample were quite impatient on average, we do find that both men and women who are less impatient save more (though only the coefficients for men are significant). Though the time-consistency estimates are quite noisy, we find that women who exhibit present-biased preferences were slightly less likely to make use of the savings account, which at least suggests that it is not purely individual level time-inconsistency which explains high take-up rates. The results for men are a bit harder to interpret, since men with maximal discount rates in the present and the future were most likely to use the accounts. However, since the savings impacts for men are small in any case, we do not focus on these results.

Our finding that present-biased women were less likely to make use of the savings account comes in contrast to Bauer, Chytilová, and Morduch (2008), who observe that present-biased women who lack suitable saving devices tend to borrow from microcredit institutions, as a way to commit themselves to (costly) saving (by way of mandated, structured weekly repayments). This difference might be explained by the fact that the savings account offered in our program offered a commitment device to avoid spending money once it had been deposited, but was not accompanied by a commitment to make regular deposits. Present-biased women might have had a difficult time committing themselves to making regular trips to the bank.

4.2 Impact on business investment and expenditure levels

This section estimates the effect of the savings account on average investment, expenditures, transfers, and other outcomes. For each outcome, there are two level effects of interest: the intent-to-treat effect (ITT), the average effect of being assigned to the treatment group; and the average effect for those that actively used the account (which is estimated through instrumental variables).

We estimate the average effect of being assigned to the treatment group (the intent-to-treat effect) on a given outcome *Y* using the following specification:

$$Y_{it} = \alpha_1 + \beta_1 account_{it} + \gamma_1 account_{it} * male_i + X_i'\psi_1 + \phi_1 year_{it}^{2007} + \epsilon_{it} \qquad (4)$$

where $account_{it}$ is an indicator which is equal to 1 if individual *i* had been assigned to treatment

in year *t*, X_i is a vector of baseline characteristics, and $year_{it}^{2007}$ is a dummy equal to 1 in 2007. Because some individuals appear twice (the controls of 2006 received the treatment in 2007), we cluster the error term at the individual level.

In this specification, the coefficient β_1 measures the average effect of being assigned to the treatment group for women, and the sum $(\beta_1 + \gamma_1)$ measures the average effect of being assigned to the treatment group for men. Given the random assignment to the account group, $E[\epsilon_{it}|account_{it}] = 0$, and OLS estimates of β_1 and γ_1 will be unbiased.

We estimate the average effect of actively using the account using an instrumental variable approach. Specifically, we instrument "actively using the account" with being assigned to the treatment group:

$$active_{it} = a + baccount_{it} + cmale_i + X_i'd + \eta_{it} \quad (5)$$

$$Y_{it} = \alpha_1 + \beta_2 account_{it} + \gamma_2 account_{it} * male_i + X_i'\psi_2 + \phi_2 year_{it}^{2007} + \epsilon_{2it} \quad (6)$$

where $active_{it}$ is an indicator of whether individual *i* has actively used her account in year *t*. The first stage for this regression is presented in Appendix Table 1.

Productive Investment and Labor Supply

Table 3 presents estimates of the effect of accessing a village bank account on labor supply, business investment, and the amount of credit given out to customers. As will be the case in the next few Tables, Panel A presents the intent-to-treat estimates and Panel B presents the IV estimates of the effect of having an active account. All regressions include the following baseline covariates: gender, marital status, occupation, age, literacy, and the amount of ROSCA contributions in the 12 months preceding the baseline survey.

We find no effect of the account on labor supply, measured as the average number of hours worked per day. However, we find a sizable effect of the account on the average daily amount invested in the business for women (mostly in inventory, though some of these expenditures are transportation costs associated with traveling to various market centers or shipping goods). The untrimmed specification yields a very large coefficient with a very large standard error, but we obtain significant estimates with some trimming.[22] Our preferred estimate (5% trimming) indicates that the average daily investment of individuals in the treatment group is 108 Ksh

[22] Despite their insignificance, we think that the untrimmed expenditures are of interest, since the accounts seemed to have very large effects in the right tail of the distribution.

higher than that of control individuals (significant at 5%). Given the baseline average of 267 Ksh in the control group, this effect is equivalent to a 40% increase in investment.[23] As it should be, the IV estimate of the effect on active users is larger (170 Ksh, or 64%) and is also significant at the 5% level. However, the standard errors on both the ITT and IV estimates are large and the two estimates cannot be distinguished from each other.

We also find suggestive evidence that female market vendors sampled for the account are more likely to give credit to their customers, though this effect completely disappears with increased trimming. Though we cannot confidently attribute a statistically significant increase to the savings accounts themselves, the results do at least suggest that women may compete by granting additional customer credit (though it could also be the case that women need to give out more items on credit to liquidate their increased inventory.)

Overall, these results suggest that the treatment had a substantial effect on women's ability to invest in productive activities. A natural question would be whether this effect is bigger for married women, who presumably might want to protect their income from their husbands. Given the relatively small size of our sample, we do not have power to estimate the effects separately for married and unmarried women. When we add an interaction between marital status and treatment, we find that the coefficients on both the main effect and the interaction are positive and large, but none of them are significant (results not shown). This could suggest that the effect might have been larger for married women, though this is only speculative. The fact that married women were not more likely to actively use their account would tend to suggest that the impacts were similar for married and unmarried women.

While we observe an effect of the savings account on productive investments among women, we cannot say whether this effect on investment led to a change in profit levels because our data on sales levels is unreliable. We do, however, have data on various expenditure categories, which we analyze in the next section.

Expenditures

Table 4 presents the ITT (Panel A) and IV (Panel B) estimates of the impact of the savings accounts on the average expenditures reported in the logbooks. The first three columns present total expenditures, columns 4-6 present food expenditures, and columns 7-9 present private

[23] This increase in investment does not appear to come from a change in business type. We do not observe a change in the scale (retail vs. wholesale) or type of businesses of women in the treatment group.

expenditures (private expenditures include meals in restaurants, sodas, alcohol, cigarettes, own clothing, hairstyling, and other entertainment). As before, we present the estimates with the raw data, the top 1% of values trimmed, and the top 5% trimmed for each outcome.

Consistent with the investment data, we find evidence that the accounts had a significant impact on expenditures for women. The effect on total daily expenditures loses any significance with trimming, but a breakdown by expenditures categories suggests that food expenditures and private expenditures increased significantly for women (though the estimates are only statistically significant for certain specifications, due to the small sample size). The size of the effect on food expenditures is large, estimated between 14% (10/68) with the trimmed data and 29% (24/84) with the raw data. The impact on private expenditures is even larger, between 37% and 44%, significant at 5% or 10% depending on the trimming level.

In line with the savings figures, we do not find any significant impact of the account on men's expenditure levels, in any specification. The only estimate with a p-value below 0.15 is the untrimmed estimate for private expenditures, but the *p*-value jumps to 0.37 with 1% trimming, and to 0.73 with 5% trimming.

4.3 Testing for Crowding Out: The Impact on Transfers and Informal Savings

Thus far, we have shown substantial impacts of the accounts on investment, and expenditures for women. It is possible, however, that these increases crowded out other types of investments, such as investments in ROSCA or in animals (particularly given that baseline ROSCA participation was so heavily correlated with usage). It is also possible that the accounts changed the nature of informal insurance networks, either between spouses or between households. For instance, the savings accounts may have crowded out transfers as a form of insurance against risk. Also, if informal insurance is constrained by a limited commitment constraint, the accounts could change behavior by affecting the value of autarky for treatment individuals (Ethan Ligon, Jonathan Thomas, and Tim Worrall, 2000).

To check this, columns 1-3 of Table 5 present estimates of the impact of the treatment on net cash transfers to the spouse (for married respondents), and columns 4-6 present results for all transfers to individuals outside the household. Transfers include gifts and loans, and both cash and in-kind transfers. Transfers are coded as positive for outflows and negative for inflows.

For both sets of transfer results, none of the estimated coefficients is significant at the 15% level. The coefficient of the impact of the savings account on transfers to the spouse is positive

and relatively large for women, suggesting that, if anything, treated women transferred more to their spouse than did control women, but the standard error is large and the effect is not significant. On the other hand, the coefficient on transfers outside of the household is negative and large for women, but close to zero for men. Though this figure is insignificant, it does possibly suggest that the increases in investment and expenditures might come at some cost to the larger social network, a result which we will explore in a bit more detail in the next section.

Columns 7-12 regress animal purchases and ROSCA contributions on treatment. The untrimmed results (Columns 7 and 10) give large, positive, though statistically insignificant, estimates. However, the estimates become close to zero with 1% or 5% trimming. Overall, there is no evidence of crowding out in this data. However, given the noisiness of the data, the confidence intervals include quite large effects that we cannot rule out.

Given the correlation between ROSCA participation and active use of the account, the absence of crowding out of ROSCA contributions could be surprising, especially since the bank accounts appear to be a more efficient way to save. We can think of various possible explanations for why this is the case, however. First of all, ROSCA cycles can be long (up to 18 months), so our data might be too medium-run to capture changes in participation. Secondly, ROSCAs typically offer more than just savings to their participants. In particular, they offer credit: everyone but the last person in the cycle receives the lump sum earlier than if they had saved it on their own. In addition, many ROSCAs offer loans (in addition to the regular pot) to their participants. ROSCAs often also provide some emergency insurance. For example, a census of 250 ROSCAs we conducted in the area of study suggests that 50% of ROSCAs offer loans to their members, and 40% offer insurance in case of a funeral or other catastrophic event. For these reasons, the savings account is only an imperfect substitute for ROSCA participation.[24]

4.4 Robustness checks

4.4.1 Excluding those who anticipated a loan

Once people have an account with the village bank, they can become eligible for a loan, starting 3 months after they have bought a share in the bank. Clearly, if many treatment individuals had gotten loans, this would likely bias our estimated savings impacts. This is not a

[24] Likewise, animal savings can offer some advantages over savings through the bank: they are protected from inflation, they can be put to productive use, and they may carry some prestige value.

major concern, though, since only a small number of individuals in our sample actually got loans (3.2% of women in the treatment group obtained a loan within 6 months of opening the account, and 6.5% within about 1 year). However, a larger fraction of the sample purchased shares, the first step in eventually getting a loan. This may also have affected savings and investment decisions. In particular, treatment women might have been able to borrow working capital from friends and relatives in the short-run, in anticipation of a bank loan (and presumably, higher future profits) later. This is unlikely given reported access to credit, but remains a possibility.

About 16% of women in the treatment group (and 27% of those who made active use of their account) invested in shares within the first 6 months of opening the account. Among men in the treatment group, 3.0% invested in shares in that timeframe, representing about 6.5% of those who actively used their account. We formally explore the impact of these individuals on our estimated impacts in Appendix Table 2, in which we replicate the analysis presented in Table 3, after excluding from the sample those who invested in shares in the first 6 months. This reduces the sample size and increases the size of the standard errors, but all the coefficients have the same magnitude and sign as in Table 3, suggesting that the effects observed in Table 3 are not driven by the anticipation of loans.

4.4.2 Falsification Test: Is there an effect for those that never withdrew money from their account?

If the observed increase in investment and expenditures can be attributed to the accounts themselves, then we should observe that the effect is largest for women that made a withdrawal from the account. In Appendix Table 3, we check this formally. We regress outcomes on a treatment indicator and an interaction between treatment and having made a withdrawal. For all expenditure categories, we find that the effects are largest for those that made withdrawals: interactions are positive and significant in nearly all specifications.

The evidence on investment, however, is a bit more mixed. When investment is not trimmed or trimmed at 1%, we find large, positive interactions, though they are insignificant. When we trim at 5%, the interaction term remains positive but becomes much smaller – it is impossible to reject that investment is similar among women that made withdrawals and women that didn't. One possible interpretation of this result is that investment is measured with more error than

expenditures and so our estimated program effect is biased downwards.[25]

As a final piece of evidence, in the survey that was conducted in November, 2008, we asked respondents about the 2 biggest withdrawals they had made at the village bank and what they did with the money that they withdrew. On average, 44% of respondents used at least some of the money for business expenses, and on average they reported using 70% of the money that was withdrawn for business purposes.

4.4.3 Size of Deposits

As can be inferred from Figure 1, even those individuals who actively used the account did not make many transactions. For instance, the median number of deposits made in the first 6 months among active women was just 3. This means that the average deposit size was large: the median among active women was about 600 Ksh (US $9), which is equivalent to about 3.6 days of mean expenditures in the sample. For some women, the average deposit size was much larger than this.

The size of the deposits (as well as the restrictive hours at which the bank is open) make it plain that women did not build up savings balances by depositing small amounts of money every night after work, but instead saved up for some time and then deposited larger sums. Given that women were evidently saving up some money at home, why did they use the account at all? A likely answer is that it is costly (in terms of time and effort) to go to the bank every day, and the demands on female income might be stochastic: for instance, women may be socially obligated to make large transfers to extended family when somebody asks for money, but people may ask only infrequently and unexpectedly. If so, it might be rational for a woman to avoid frequent small costs and so choose to go the bank less frequently.

The median deposit size was roughly 4 times average daily income. To check whether the effect was driven by those making large deposits (who, presumably, are not as savings constrained), we also ran our main regressions while excluding those whose average deposit size was larger than the sample median (see Appendix Table 4). Although this reduces our power, we obtain even larger coefficients on the treatment effects in this specification (particularly before trimming).

[25] We also check to see whether investment and expenditures grow over time over the 3 months we follow individuals, but we do not find evidence of a trend (results not shown).

4.5 Supporting Evidence: Consumption and Current Income

So far, we have shown evidence suggesting that market women in the treatment group built up their inventory over time by saving through their accounts. However, we have shown less evidence of the pathways by which savings were accumulated. In this section, we present some suggestive evidence that the accounts might have allowed women to save more of their transitory income and made consumption less sensitive to income. In Table 6, we use a fixed effect specification and regress transfers and various types of expenditures categories in a given week on the profits made that week.[26] We find evidence that women in the control group tend to spend a larger share of their current income on consumption than women in the treatment group. For instance, while women in the control group increase their total expenditure by 5-10% of the increase in current income, the total expenditures of women in the treatment group are not affected by current income at all. Control women also spend more on private expenditures, especially meals outside of the household, than do women in the treatment group. The IV estimates in Panel B confirm these results.

4.6 Risk-coping

Estimation Strategy

We now turn to the issue of whether the account allowed treatment individuals to better cope with negative shocks. We use the panel nature of the data to test whether the treatment improved individuals' ability to smooth health shocks. As discussed previously, since our daily data is too noisy to precisely estimate impacts, and because serious illnesses last more than a day, we aggregate our data to the week level and examine the impact of week-to-week variations in health levels on outcomes. Specifically, we estimate the following equation:

$$\begin{aligned} Y_{iwt} =& \delta_0 + \delta_1 OwnSickness_{iwt} + \delta_2 HhSickness_{iwt} + \delta_3 OwnSickness_{iwt} * Account_{it} \\ &+ \delta_4 HHSickness_{iwt} * Account_{it} + \delta_5 year_{it}^{2007} + \omega_{wt} + \nu_{it} + \epsilon_{iwt} \end{aligned} \quad (7)$$

where $OwnSickness_{iwt}$ is an indicator for whether individual *i* had malaria during week *w* of year *t*, $HHSickness_{iwt}$is an indicator for whether someone else in individual's *i* household had malaria that week, ω_{wtt} is a week fixed effect, and ν_{it} is an individual fixed effect. We cluster the standard errors at the individual level since errors are likely to be correlated over time for any particular individual.

[26] The profits are extremely poorly measured and cannot be compared across individuals, but arguably can be compared for a given individual across different time periods.

We then estimate the effect of actively taking up the account by instrumenting "active" with having been assigned to the treatment group in the following equation:

$$Y_{iwt} = \theta_0 + \theta_1 OwnSickness_{iwt} + \theta_2 HhSickness_{iwt} + \theta_3 OwnSickness_{iwt} * Account_{it} + \theta_4 HHSickness_{iwt} * Account_{it} + \theta_5 year_{it}^{2007} + \omega_{wt} + \nu_{it} + \epsilon_{iwt} \quad (8)$$

Coping with a shock to own health

We estimate (7) and (8) for women in Tables 7 and 8.[27] The first row in Table 7 gives an indication of how own health shocks affect women's labor supply, investment, and expenditures, in the absence of a savings account. Women lose a significant number of hours of work in weeks when they are sick themselves (7.8 hours). Column 2 shows the impact of health shocks on investment. Since there is a mechanical relationship between hours worked and investment, the results in Column 2 are conditional on hours worked. Even conditional on hours, women invest less in their business in weeks in which they get malaria. They are also more likely to sell their products on credit to their customers, likely in order to avoid spoilage of their merchandise. Women have higher medical expenditures in weeks they are sick or someone in the household is sick, but lower food expenditures. Overall, the first row in Table 7 suggests that women smooth consumption over negative income shocks due to own illness by drawing down their working capital. Given how common malaria is (occurring on 8.7% of days, across the entire sample), the fact that working capital is drawn down due to health shocks could be a primary reason why so many microenterprises have difficulty growing in size.

Looking at the interaction between the treatment and shocks, we find some suggestive evidence that the savings account improved the ability of women to smooth consumption without having to draw on their working capital. The estimated effect of health shocks on individuals in the treatment group is the sum of the coefficients δ_1 and δ_3. The p-value for the test that $\delta_1 + \delta_3 = 0$ is provided at the bottom of the panel. We find that individuals sampled for the account were better able to shield their labor supply and their inventory from shocks to their own health than individuals in the control group. Women in the treatment group do not appear to work less in weeks in which they are sick, and they maintain their investment level as in weeks when they are not sick (the p-value of the total effect of the health shock on investment is 0.94). As it should be, the IV estimates are larger than the ITT, giving some confidence that

[27] The results for men are presented in Appendix Tables A6 and A7 but are not discussed since the use of the accounts by men was very limited.

these results are not spurious.

How did women cope with these shocks? The data suggests that women were better able to afford medical expenses, particularly for the most serious malaria episodes. Column 5 suggests that women in the treatment group can afford to spend more on medical expenditures in times of illness, although the difference is small and insignificant when looking at this aggregated measure. In Appendix Table 5, we explore this further. In Panel A, we show that the coefficient on the treatment interaction is even larger when medical expenditures are untrimmed, though still statistically insignificant. However, the size of the coefficients is suggestive. In Panel B, we find evidence that the treatment group spent significantly more on the most serious shocks (those lasting 5 or more days in a week). Treatment women also spent more on smaller health shocks, despite not withdrawing money for these shocks. This suggests that some of the differential impact of health shocks comes from a general wealth effect.

Another explanation for why women in the treatment group are able to maintain their labor supply during illness episodes could be an income effect on overall health: the "health stock" of women in the treatment group may have increased thanks to their higher income, and they would then be better able to absorb shocks (their bodies are stronger and less weakened by malaria infection). This is very speculative, however, as we have no objective health data (such as abilities to perform activities of daily living) to check that there was a health effect of the treatment.[28]

Treatment women are also less likely to give out extra customer credit in weeks in which they are sick compared to control women (presumably because they do not need to give away their stock, since they are able to work despite the illness).

Coping with a health shock in the household

The second row in Table 7 gives us an indication of how health shocks in the household affect women's labor supply, investment, and expenditures, in the absence of a savings account. Again, we observe consumption smoothing at the expense of reduced working capital: while women increase their labor supply, though insignificantly, to cope with illness in the household (as in Anjini Kochar, 1999), their investment level is significantly reduced, presumably because part of their capital is diverted towards medical expenditures. Just as we did for shocks to own

[28] Another concern is under-reporting of illness episodes by those who cannot afford treatment (i.e. the poorest). Since the treatment generated a positive income effect, it is possible that individuals in the treatment group are more likely to report minor illness episodes than those in the control group (see Strauss and Thomas, 1995).

health, we find that women in the treatment group can isolate their business investment from adverse health shocks in their household. Sickness of a household member does not decrease investment for women in the treatment group. However, the standard errors on all of these estimates (particularly the IV estimates) make clear conclusions difficult.

5 Backing out the Rate of Return

How plausible are the observed effects on expenditures? What rate of return to capital do they imply? In this section, we compute a rough back of the envelope calculation of what the rate of return has to be for our results to be plausible. We consider that investment is made in lumps of capital k. Market women in the control group invest a total of n lumps, so their working capital stock is nk. After having had the account for m months, market women in the treatment group managed to save up and get an additional lump k, so their working capital adjust upwards to $(n+1)k$ starting at month $m+1$. By the time they filled the logbook (in which we observe the effects discussed in section 4), the accounts had been open for about 5 months on average. If we call r the rate of return over one month, then the difference in profits between treatment and control women at the time the logbook was administered are given by:

$$\Pi_T - \Pi_C = (1+r)^{6-m}k - k$$

The monthly rate of return can thus be estimated as follows: $1 + r = \sqrt[6-m]{\frac{(\Pi_T - \Pi_C)}{k} + 1}$.

We do not observe profits in our data, but we can approximate the difference in profits by the observed difference in expenditures: $\Pi_T - \Pi_C = 43$ Ksh (without trimming). The average "lump" size is given by the observed difference in investment: $k = 253$ Ksh (Table 3, column 2). The last parameter we need to estimate in order to back-out the rate of return is m, the number of months it took market women in the treatment group to acquire the extra lump of working capital. The longer it took women in the treatment group to accumulate the extra lump of capital, the higher the returns to capital will have to be to explain the difference we observe. For example, if it took them 5 months, the rate of return would have to be: $r = \frac{(\Pi_T - \Pi_C)}{k} = \frac{43}{253} = 17.0\%$ per month to explain our results. If, on the other hand, it took only one month to accumulate the extra lump, the rate of return could be lower, at: $r = \sqrt[5]{\frac{(43)}{253} + 1} - 1 = 3.2\%$ per month to explain our results.

The true rate of return probably falls somewhere in the middle. Our data on the timing of

withdrawals suggests that, for treatment individuals who made a withdrawal within 6 months of opening the account, the average gap between opening the account and making the first withdrawal was 78 days, and the median gap was 68 days. At the median, the implied rate of return is 8% per month. This implied rate of return is line with the recent literature estimating the rates of returns to capital. Experimental results from Sri Lanka (de Mel, McKenzie and Woodruff, 2008a) and Mexico (McKenzie and Woodruff, 2008) found average rates of return of approximately 6% and 20% per month, respectively. The fact that our results are for women, however, comes in contrast to the Sri Lanka study, which estimates the marginal returns for women to be zero or negative, even after controlling for business type, investment rate and ability (de Mel, McKenzie and Woodruff, 2007). Our results, however, remain speculative, since we were unable to measure profits. Instead we use expenditures as a proxy for profits, which may be problematic since expenditures might have increased by more than profits because the accounts may have allowed women to better shield their other income from their families. However, the similarity to the existing literature is reassuring.

6 Conclusion

This paper has provided experimental evidence that micro-entrepreneurs in rural Kenya face important savings constraints. We find that access to a formal savings account in a local bank offering a negative interest rate had significant impacts on the investment decisions of women, but had no impact for men. In addition we find that female market vendors reached higher daily expenditure levels within 6 months of opening an account, suggesting that their average income had increased. We find no evidence that gaining access to a savings account crowds out other investments, such as investments in livestock or participation in ROSCAs.

These increases came via two channels. First, the accounts allowed treatment women to save up for lumpy business investments. Second, we find some evidence that the accounts made treatment women less susceptible to health shocks than control women. In particular, treatment women were less likely to liquidate their inventory to pay for health shocks.

Our findings raise a number of issues that need to be explored. First, are the savings constraints implied by our results due primarily to self-control problems, or to social pressure to share resources? More specifically, to what extent do intra-household (inter-spousal) conflicts in preferences explain our results? Another particularly important question is why men and about

half of women did not actively take up these accounts. Is it because they do not have savings problems, or is it because this particular savings program was not well suited to their needs? One clue is that 92% of those that were offered accounts but who did not actively use them report that "it is hard to save at home," which suggests that they too face savings constraints. Given the dearth of savings and credit opportunities in sub-Saharan Africa, more work is needed to understand which banking services are best suited to these individuals.

Finally, this research ultimately leaves open the fundamental question of whether the small businesses run by these women have the potential to grow. By revealed preferences, it is evidently the case that women chose to invest in their businesses when the private returns to their savings increased, and so their private return to investment must exceed their discount rate. However, we are unable to precisely estimate just how high those returns are, and whether they are high enough to move women out of poverty. This is a crucial area for future research, especially in light of recent findings which show that the marginal rate of return to female Sri Lankan entrepreneurs is close to zero (de Mel, Mckenzie, and Woodruff, 2007).

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Figure 1. Number of transactions at village bank in first 6 months

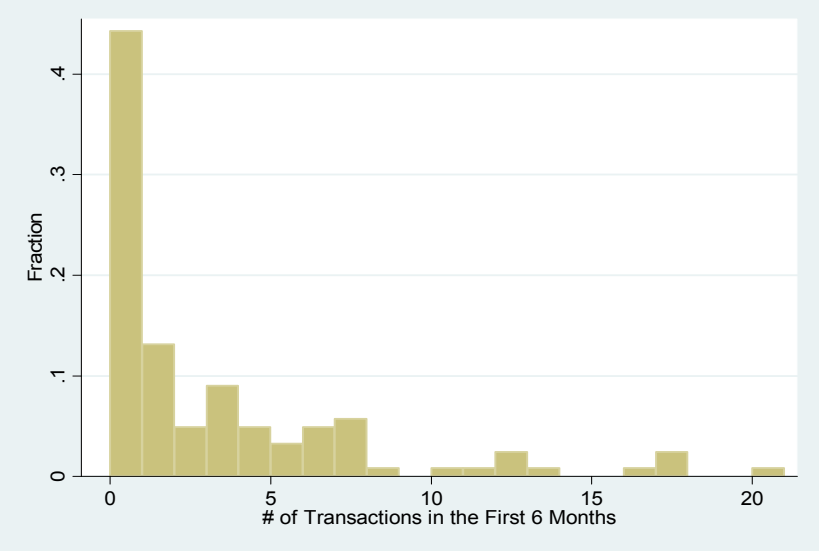
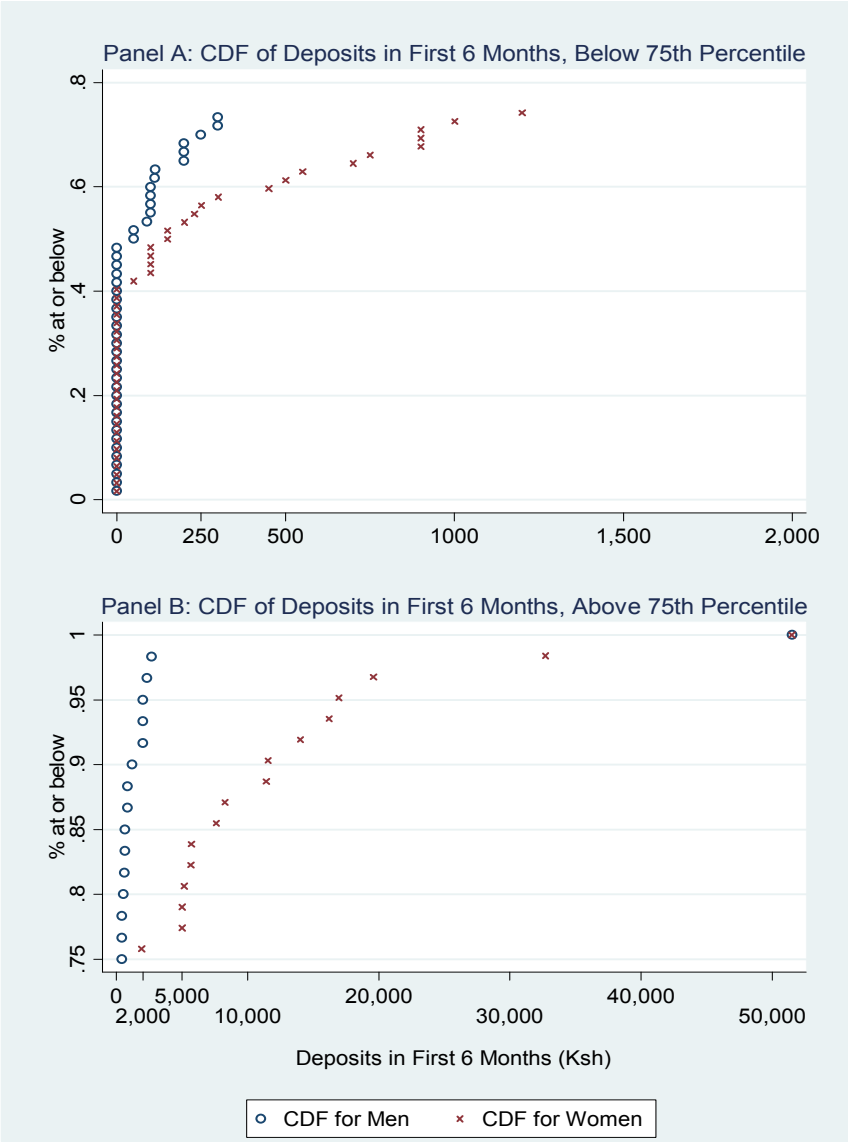


Figure 2. CDFs of Total Amount Deposited in First 6 Months



Notes: Data from 122 individuals sampled for an account. Those who refused to open an account are coded as having 0 transactions (Figure 1) and deposited 0 (Figure 2).

Table 1. Verifying Randomization

	(1)	(2)	(3)	(4)	(5)	(6)
	Men			Women		
	Treatment	Control	*p*-value Treat = Control	Treatment	Control	*p*-value Treat = Control
Age	29.42	29.09	0.83	33.80	31.61	0.19
	(8.69)	(7.01)		(9.35)	(9.34)	
Married	0.85	0.80	0.53	0.59	0.54	0.59
	(0.36)	(0.41)		(0.50)	(0.50)	
Number of Children	2.74	2.57	0.71	3.39	3.17	0.57
	(2.22)	(2.19)		(2.02)	(2.13)	
Education	7.34	6.54	0.10	7.28	6.76	0.34
	(2.75)	(2.62)		(3.13)	(2.66)	
Literate (Swahili)	0.93	0.91	0.81	0.77	0.76	0.96
	(0.27)	(0.28)		(0.43)	(0.43)	
Participates in ROSCA	0.42	0.34	0.45	0.77	0.74	0.73
	(0.50)	(0.48)		(0.43)	(0.44)	
ROSCA Contributions in Last Year (in Ksh)[1]	4630	2676	0.13	6713	4356	0.14
	(4633)	(2918)		(9462)	(5231)	
Value of Animals Owned (in Ksh)	5508	4366	0.53	4176	3070	0.48
	(11334)	(5930)		(8709)	(6963)	
Total Income in Week Prior to Survey (in Ksh)	636	564	0.50	1297	1116	0.39
	(597)	(464)		(1594)	(1285)	
Received Loan from Bank in Past Year	0.02	0.03	0.79	0.08	0.04	0.22
	(0.139)	(0.169)		(0.272)	(0.206)	
Received Loan from Friend in Past Year	0.33	0.34	0.92	0.39	0.39	0.99
	(0.48)	(0.48)		(0.49)	(0.49)	
Self-Reported Health Status[2]	3.53	3.54	0.93	3.37	3.37	0.98
	(0.85)	(0.82)		(0.87)	(0.88)	
Standardized score on digits forward memory test	0.12	0.22	0.68	-0.13	-0.28	0.38
	(1.00)	(1.11)		(0.97)	(0.85)	
Standardized score on Raven's matrix cognitive test	-0.01	0.20	0.38	0.09	-0.04	0.47
	(0.98)	(1.06)		(1.06)	(0.97)	
Amount invested (out of 100 Ksh) in Risky Asset[3]	65.61	60.74	0.31	62.00	61.22	0.83
	(20.13)	(24.33)		(18.04)	(19.65)	
At least Somewhat Patient	0.22	0.19	0.66	0.07	0.12	0.32
	(0.42)	(0.40)		(0.25)	(0.33)	
Impatient	0.32	0.41	0.42	0.38	0.34	0.67
	(0.47)	(0.50)		(0.49)	(0.48)	
Very Impatient	0.46	0.41	0.61	0.56	0.54	0.83
	(0.51)	(0.50)		(0.50)	(0.51)	
Present-biased	0.39	0.31	0.44	0.31	0.33	0.80
	(0.49)	(0.47)		(0.47)	(0.48)	
Time Consistent	0.34	0.35	0.96	0.16	0.21	0.46
	(0.48)	(0.49)		(0.37)	(0.41)	
Patient now, impatient later	0.05	0.04	0.84	0.33	0.21	0.10
	(0.22)	(0.20)		(0.48)	(0.41)	
Maximal Discount Rate in Present and in Future	0.22	0.31	0.36	0.20	0.26	0.44
	(0.42)	(0.47)		(0.41)	(0.44)	
Agrees with statement: "*It is hard to save money at home* "	0.83	0.89	0.46	0.89	0.88	0.80
	(0.39)	(0.32)		(0.32)	(0.34)	
Number of Observations (Total = 185)	53	35	88	51	46	97

Notes: Sample restricted to respondents for whom we have logbook data. Columns 1, 2, 4 and 5 report means, with standard deviations in parentheses. Columns 3 and 6 report p-values obtained when testing the hypothesis that the difference between the treatment and the control means is equal to 0. Exchange rate was roughly 65 Ksh to US $1 during the study period.

"Patient" is a dummy equal to 1 if the respondent prefers 55 Ksh (or less) in a month to 40 Ksh now, "Impatient" is a dummy equal to 1 if the respondent prefers an amount between 55 Ksh and 200 Ksh in a month to 40 Ksh now, and "Very Impatient" is a dummy equal to 1 if the respondent prefers an amount over 200 Ksh in 1 month to 40 Ksh today.

"Present-Biased" is a dummy equal to 1 if the respondent exhibits a higher discount rate between today and one month from today than between 1 month from today and two months from today, "Time Consistent" is a dummy equal to 1 if the respondent exhibits the same discount rate between today and 1 month from today, "Patient now, impatient later" is a dummy equal to 1 if the respondent exhibits a lower discount rate between today and one month from today than between two months in the future, and "Maximum Discount Rate in the Present and in the Future" is a dummy equal to 1 if a respondent prefers 40 Ksh today to 500 Ksh in 1 month and 40 Ksh in 1 month to 500 Ksh in 2 months. There are 91 total observations for all risk and time preference questions, the digits forward and Raven's Matrix measures, and for the question "It is hard to save money at home."

[1]ROSCA contributions are conditional on ROSCA membership.

[2]Health Status is coded as: 1-very poor, 2-poor, 3-just OK, 4-good, 5-very good.

[3]The risky asset paid off 4 times the amount invested with probability 0.5, and 0 with probability 0.5.

Table 2. Determinants of Active Use of Savings Account

	Account is Active			Ln (Total Deposits + 1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	-0.080	0.076	0.122	-1.208	-0.098	0.308
	(0.090)	(0.209)	(0.326)	(0.646)*	(1.487)	(2.348)
Education		0.016	0.018		0.039	0.034
		(0.019)	(0.023)		(0.133)	(0.166)
Literate (Can read and write Swahili)		-0.325	-0.121		-1.673	-0.785
		(0.141)**	(0.173)		(1.000)*	(1.242)
Age		0.006	0.011		0.046	0.091
		(0.006)	(0.007)*		(0.040)	(0.048)*
Female * Married		-0.012	-0.092		-0.361	-1.139
		(0.121)	(0.152)		(0.860)	(1.097)
Male * Married		-0.001	0.060		-0.498	-0.277
		(0.190)	(0.229)		(1.350)	(1.648)
Participates in a ROSCA		0.259	0.252		1.261	1.343
		(0.102)**	(0.122)**		(0.723)*	(0.876)
Value of ROSCA contributions in		0.008	0.007		0.113	0.084
Year Prior to Baseline Survey		(0.008)	(0.008)		(0.053)**	(0.060)
Value of Income in Week Prior		0.011	0.007		0.053	0.037
Prior to Baseline Survey		(0.037)	(0.040)		(0.262)	(0.290)
Value of Animals Owned		0.016	0.012		0.094	0.051
		(0.006)**	(0.007)		(0.044)**	(0.053)
Standardized score on digit memory test			-0.026			-0.165
			(0.056)			(0.402)
Percentage of 100 Ksh			0.005			1.416
Invested in Risky Asset[1]			(0.248)			(1.788)
Female * At least Somewhat Patient			0.075			-0.722
			(0.313)			(2.251)
Female * Impatient			0.162			0.101
			(0.171)			(1.234)
Male * At least Somewhat Patient			0.796			5.181
			(0.328)**			(2.362)**
Male * Impatient			0.528			2.753
			(0.232)**			(1.668)
Female * Present-Biased			-0.358			-1.650
			(0.203)*			(1.463)
Female * Time Consistent			-0.133			1.495
			(0.278)			(2.003)
Female * Patient Now, Impatient Later			-0.158			-0.056
			(0.238)			(1.710)
Male * Present-Biased			-0.533			-2.994
			(0.242)**			(1.739)*
Male * Time Consistent			-1.050			-6.255
			(0.348)***			(2.507)**
Male * Patient Now, Impatient Later			-0.932			-4.211
			(0.455)**			(3.278)
Observations	122	117	91	122	117	91
R-squared	0.01	0.26	0.42	0.03	0.26	0.41
Mean of Dependent Variable (Women)	0.597	0.597	0.597	4.319	4.319	4.319
Mean of Dependent Variable (Men)	0.517	0.517	0.517	3.112	3.112	3.112

Notes: Sample restricted to respondents sampled for the accounts, and for whom we have logbook data. Active is defined as having opened the account and made at least 1 transaction in the bank within the first 6 months. See the notes to Table 1 for definitions of "Somewhat Patient," "Impatient," "Present-Biased," "Time Consistent," and "Patient Now, Impatient Later." The excluded patience category is "Very Impatient" and the excluded time consistency category is "Maximal Discount Rate in Present and in Future." All monetary values are expressed in 1,000s of Kenyan shillings. Exchange rate was approximately 65 Ksh to US $1 during the study period. See Figure 1 for a histogram of total transactions. Clustered standard errors in parentheses.

[1]The risky asset paid off 4 times the amount invested with probability 0.5, and 0 with probability 0.5.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3. Level Effects on Business Investment and Labor Supply

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. ITT	Total Hours Worked	Investment in Business			Credit to Customers		
Sampled for Savings Account	0.020	252.89	178.37	107.78	5.00	5.79	1.99
	(0.550)	(185.64)	(110.30)	(47.42)**	(5.87)	(3.69)	(2.21)
Sampled for Savings Account * Male	-0.610	-152.83	-64.48	-51.63	49.14	-6.49	-0.86
	(0.840)	(214.78)	(126.98)	(58.33)	(64.21)	(7.36)	(2.46)
Observations	183	179	179	179	115	115	115
Trimming	None	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p-value for effect for women = 0	0.970	0.175	0.108	0.024**	0.396	0.120	0.369
p-value for effect for men = 0	0.387	0.236	0.110	0.121	0.378	0.913	0.376
Panel B. Instrumental Variables							
Account is Active	0.010	397.74	281.41	169.79	10.50	9.29	3.26
	(0.870)	(292.02)	(173.72)	(76.18)**	(8.36)	(6.03)	(3.51)
Account is Active * Male	-1.050	-220.78	-81.79	-71.04	125.49	-11.03	-0.40
	(1.390)	(341.84)	(203.94)	(96.20)	(131.29)	(17.42)	(4.43)
Observations	183	179	179	179	115	115	115
Trimming	None	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p-value for effect for women = 0	0.989	0.175	0.107	0.027**	0.212	0.126	0.356
p-value for effect for men = 0	0.380	0.217	0.101	0.120	0.297	0.917	0.350
Mean of Dep. Var. in Control Group (Women)	6.97	426.3	365.4	267.0	1.18	1.31	2.05
Mean of Dep. Var. in Control Group (Men)	7.07	37.2	37.2	31.3	-1.29	-0.50	-1.21

Notes: Dependent variables in columns 2 to 10 expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education. Dependent variables are daily averages.
Exchange rate was roughly 65 Ksh to US $1 during the study period.
Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Level Effects on Expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. ITT	Daily Total Expenditures			Daily Food Expenditures			Daily Private Expenditures		
Sampled for Savings Account	42.86	30.32	19.52	24.13	17.21	9.76	8.90	6.08	4.84
	(24.78)*	(19.72)	(13.15)	(10.64)**	(8.33)**	(5.97)	(4.54)*	(3.52)*	(2.78)*
Sampled for Savings Account * Male	-28.48	-16.21	-12.83	-16.24	-10.10	-4.92	0.02	-1.56	-3.47
	(35.04)	(27.01)	(19.12)	(13.39)	(10.72)	(8.27)	(7.76)	(6.16)	(4.76)
Observations	185	185	185	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p -value for effect for women = 0	0.086*	0.126	0.140	0.025**	0.04**	0.104	0.051*	0.086*	0.083*
p -value for effect for men = 0	0.540	0.440	0.632	0.335	0.326	0.424	0.146	0.366	0.730
Panel B. Instrumental Variables									
Account is Active	68.74	48.79	31.31	38.70	27.65	15.71	14.52	9.86	7.76
	(40.29)*	(32.06)	(21.37)	(17.71)**	(13.75)**	(9.73)	(7.38)*	(5.68)*	(4.51)*
Account is Active * Male	-42.04	-22.63	-18.88	-24.04	-14.48	-6.76	1.98	-1.48	-5.20
	(59.77)	(45.85)	(32.71)	(22.78)	(18.20)	(14.07)	(13.53)	(10.63)	(8.31)
Observations	185	185	185	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p -value for effect for females = 0	0.09*	0.130	0.145	0.03**	0.046**	0.108	0.051*	0.085*	0.087*
p -value for effect for males = 0	0.535	0.433	0.627	0.321	0.311	0.414	0.146	0.358	0.727
Mean of Dep. Var. in Control Group (Women)	165.7	149.8	123.6	84.0	76.0	68.0	20.0	18.0	13.0
Mean of Dep. Var. in Control Group (Men)	132.3	119.9	108.3	61.3	59.1	55.8	27.5	27.3	24.0

Notes: Dependent variables expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education. Dependent variables are daily averages.

Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Level Effects on Transfers and Other Savings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A. ITT	Transfers to Spouse[1]			Transfers Outside Household[1]			Animal Purchases			ROSCA Contributions		
Sampled for Savings Account	8.83	3.59	4.27	-46.55	-24.12	3.45	32.41	0.63	1.18	18.33	2.98	3.77
	(8.72)	(7.20)	(6.50)	(48.06)	(28.04)	(4.90)	(29.78)	(2.54)	(1.41)	(13.41)	(5.07)	(3.87)
Sampled for Savings Account * Male	-8.96	-7.62	-9.80	43.85	18.75	-7.90	-23.38	1.32	1.12	-17.94	-3.40	-4.40
	(10.77)	(8.74)	(7.88)	(49.85)	(29.07)	(5.37)	(24.38)	(4.07)	(3.15)	(11.85)	(5.36)	(3.88)
Observations	128	128	128	184	184	184	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p-value for effect for women = 0	0.313	0.619	0.512	0.334	0.391	0.483	0.278	0.804	0.405	0.173	0.558	0.332
p-value for effect for men = 0	0.984	0.458	0.289	0.676	0.189	0.103	0.269	0.519	0.393	0.923	0.833	0.683
Panel B. Instrumental Variables												
Account is Active	15.43	6.24	7.40	-74.14	-38.59	5.30	51.91	1.08	1.97	29.17	4.72	5.97
	(15.08)	(12.55)	(11.36)	(76.68)	(44.68)	(7.97)	(47.21)	(4.04)	(2.27)	(21.36)	(8.10)	(6.19)
Account is Active * Male	-15.46	-13.61	-17.54	68.85	28.64	-13.36	-35.11	2.52	2.27	-28.37	-5.49	-7.12
	(18.93)	(15.54)	(14.14)	(79.58)	(46.38)	(8.87)	(37.54)	(6.99)	(5.57)	(18.64)	(8.68)	(6.28)
Observations	128	128	128	184	184	184	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p-value for effect for females = 0	0.309	0.620	0.516	0.335	0.389	0.507	0.273	0.789	0.386	0.174	0.561	0.337
p-value for effect for males = 0	0.998	0.472	0.307	0.643	0.181	0.110	0.264	0.519	0.395	0.913	0.835	0.687
Mean of Dep. Var. in Control Group (Women)	-31.89	-24.79	-16.60	32.49	15.12	-5.92	3.81	3.81	2.12	6.36	9.85	14.18
Mean of Dep. Var. in Control Group (Men)	29.93	29.50	27.62	-7.36	-3.99	-2.33	4.22	4.22	2.98	2.23	3.03	3.81

Notes: Dependent variables expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education. Dependent variables are daily averages.

Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[1]Transfers are coded as positive for outflows and negative for inflows.

Table 6. Expenditures and Current Income (Women)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Panel A. OLS	Transfers to Spouse			Transfers out of HH			Total Expend.			Private Expend.			Meals Out		
Profits (δ_1)	0.041	0.006	0.005	2.070	0.839	0.002	0.079	0.106	0.052	0.019	0.013	0.005	0.005	0.005	0.004
	(0.054)	(0.032)	(0.016)	(1.491)	(0.592)	(0.011)	(0.044)*	(0.037)***	(0.027)*	(0.009)*	(0.008)*	(0.005)	(0.002)**	(0.002)**	(0.002)*
Profits * Sampled for Account (δ_2)	-0.004	0.035	0.016	-2.088	-0.865	-0.027	-0.282	-0.133	-0.015	-0.084	-0.028	-0.016	-0.010	-0.008	-0.007
	(0.059)	(0.039)	(0.022)	(1.472)	(0.585)	(0.017)	(0.106)***	(0.090)	(0.044)	(0.044)*	(0.014)**	(0.010)	(0.005)*	(0.004)**	(0.003)**
p-value for $\delta_1 + \delta_2 = 0$	0.112	0.075*	0.148	0.782	0.473	0.068*	0.044**	0.728	0.332	0.163	0.169	0.204	0.229	0.233	0.234
Observations	544	544	544	951	954	954	954	954	951	954	954	953	954	954	953
# of Logbooks	54	54	54	96	96	96	96	96	96	96	96	96	96	96	96
Panel B. IV															
Profits (θ_1)	0.041	0.005	0.004	2.117	0.858	0.003	0.085	0.109	0.052	0.021	0.013	0.005	0.005	0.005	0.004
	(0.057)	(0.034)	(0.017)	(1.582)	(0.627)	(0.012)	(0.048)*	(0.040)***	(0.029)*	(0.010)**	(0.008)	(0.005)	(0.002)**	(0.002)**	(0.003)*
Profits * Active (θ_2)	-0.006	0.056	0.026	-3.075	-1.267	-0.040	-0.413	-0.195	-0.022	-0.124	-0.040	-0.024	-0.014	-0.012	-0.010
	(0.101)	(0.070)	(0.039)	(2.271)	(0.898)	(0.026)	(0.173)**	(0.147)	(0.068)	(0.070)*	(0.023)*	(0.017)	(0.008)*	(0.007)*	(0.005)*
p-value for $\theta_1 + \theta_2 = 0$	0.516	0.202	0.289	0.221	0.193	0.088*	0.041**	0.508	0.601	0.146	0.152	0.216	0.191	0.160	0.131
Observations	544	544	544	951	954	954	954	954	951	954	954	953	954	954	953
# of Logbooks	54	54	54	96	96	96	96	96	96	96	96	96	96	96	96
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
Mean of Dependent Variable	-186.91	-147.21	-88.01	107.77	27.94	-23.38	1325.72	1124.86	853.96	168.39	138.00	95.90	23.68	22.52	18.05

Notes: All variables are weekly averages, in Kenyan shillings. Exchange rate was roughly 65 Ksh to US $1 during the study period. Regressions estimated by fixed effects with controls for the week.

Profits are trimmed at 5%.

Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7. The Impact of Shocks on Labor Supply, Investment, and Expenditures (Women)

Panel A. ITT	(1) Total Hours	(2) Investment[2]	(3) Credit to Customers	(4) Medical Expenditures	(5) Total Expenditures	(6) Food Expenditures	(7) Private Expenditures
Respondent had Malaria (δ_1)	-7.84	-330.94	26.14	21.17	-13.82	-18.33	4.42
	(3.35)**	(150.76)**	(15.41)*	(14.18)	(57.81)	(27.20)	(9.37)
Somebody in Household had Malaria[1] (δ_2)	1.79	-160.81	1.64	29.02	67.57	-3.97	-4.70
	(2.68)	(207.01)	(12.03)	(15.07)*	(52.34)	(26.73)	(8.56)
Respondent had Malaria * Sampled for Account (δ_3)	9.53	343.59	-41.68	8.36	43.17	-0.54	3.47
	(4.61)**	(234.54)	(19.97)**	(16.94)	(85.47)	(35.52)	(15.28)
Somebody in Household had Malaria	1.40	414.17	16.99	20.07	42.47	52.20	22.23
* Sampled for Account (δ_4)	(3.60)	(275.81)	(13.82)	(23.43)	(67.88)	(35.29)	(13.74)
Observations	960	946	846	961	961	963	961
Number of Logbooks	97	96	95	97	97	97	97
p-value for test that $\delta_1+\delta_3=0$	0.500	0.944	0.133	0.01***	0.569	0.413	0.541
p-value for test that $\delta_2+\delta_4=0$	0.167	0.138	0.036**	0.002***	0.02**	0.047**	0.127
Panel B. IV							
Respondent had Malaria (θ_1)	-7.99	-338.93	25.92	20.73	-14.92	-19.36	4.00
	(3.72)**	(169.52)**	(16.46)	(15.98)	(62.15)	(29.04)	(9.88)
Somebody in Household had Malaria (θ_2)	1.93	-162.61	0.49	28.78	67.59	-4.56	-5.05
	(2.82)	(227.54)	(12.33)	(16.81)*	(56.34)	(27.76)	(8.72)
Respondent had Malaria * Account is Active (θ_3)	16.71	613.44	-74.90	16.13	78.58	3.20	7.73
	(9.63)*	(438.67)	(42.86)*	(33.73)	(157.93)	(64.94)	(27.48)
Somebody in Household had Malaria	1.49	625.48	31.36	31.94	65.24	84.13	35.79
* Account is Active (θ_4)	(6.35)	(498.57)	(25.04)	(42.87)	(118.21)	(59.17)	(23.48)
Observations	960	946	846	961	961	963	961
Number of Logbooks	97	96	95	97	97	97	97
p-value for test that $\theta_1+\theta_3=0$	0.200	0.440	0.115	0.118	0.571	0.726	0.619
p-value for test that $\theta_2+\theta_4=0$	0.463	0.178	0.089*	0.055*	0.122	0.071*	0.127
Mean of Dependent Variable	43.55	1994.86	0.27	53.19	831.07	433.66	96.55

Notes: All variables are weekly averages. Dependent variables in Columns 2-7 are trimmed at the 5% level. Regressions estimated by fixed effects with controls for the week. Exchange rate was roughly 65 Ksh to US $1 during the study period.

Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[1]Dummy for somebody other than respondent is sick.

[2]The investment regression includes a control for hours worked.

Table 8. The Impact of Shocks on Transfers and Savings (Women)

	(1) Transfers to Spouse	(2) Transfers outside HH	(3) Animal Savings	(4) ROSCA Savings	(5) Withdrawals from Village Bank[1]
Panel A. ITT					
Respondent had Malaria (δ_1)	-21.52	-26.91	0.74	19.48	167.99
	(26.53)	(19.89)	(9.10)	(18.24)	(152.65)
Somebody in Household had Malaria[1] (δ_2)	-18.72	-26.55	3.37	-20.84	0.22
	(32.20)	(20.81)	(8.71)	(23.57)	(81.02)
Respondent had Malaria * Sampled for Account (δ_3)	11.87	3.51	11.07	-23.37	
	(36.00)	(29.72)	(17.24)	(32.17)	
Somebody in Household had Malaria	33.42	81.49	11.00	18.88	
* Sampled for Account (δ_4)	(48.42)	(28.64)***	(11.94)	(28.97)	
Observations	554	964	962	962	514
Number of Logbooks	55	97	97	97	51
Sample	Full Sample	Full Sample	Full Sample	Full Sample	Treatment Only
p-value for test that $\delta_1+\delta_3=0$	0.643	0.270	0.347	0.880	
p-value for test that $\delta_2+\delta_4=0$	0.556	0.013**	0.146	0.911	
Panel B. IV					
Respondent had Malaria (θ_1)	-21.61	-28.64	0.37	19.42	316.58
	(27.57)	(21.02)	(10.10)	(19.08)	(291.40)
Somebody in Household had Malaria (θ_2)	-19.51	-27.54	3.40	-21.49	-54.88
	(37.57)	(24.69)	(9.63)	(25.18)	(156.85)
Respondent had Malaria * Account is Active (θ_3)	23.96	12.69	20.30	-39.49	
	(75.26)	(57.87)	(33.18)	(57.39)	
Somebody in Household had Malaria	64.70	131.44	16.97	32.26	
* Account is Active (θ_4)	(109.82)	(58.76)**	(21.17)	(49.60)	
Observations	554	964	962	962	342
Number of Logbooks	55	97	97	97	33
Sample	Full Sample	Full Sample	Full Sample	Full Sample	Active Only
p-value for test that $\theta_1+\theta_3=0$	0.966	0.722	0.439	0.678	
p-value for test that $\theta_2+\theta_4=0$	0.564	0.022**	0.228	0.745	
Mean of Dependent Variable[2]	-86.83	-22.89	20.62	95.54	212.30

Notes: All variables are weekly averages in Kenyan shillings. Exchange rate was roughly 65 Ksh to US $1 during the study period. Dependent variables are trimmed at the 5% level. Regressions estimated by fixed effects with controls for the week. Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[1]The regression for withdrawals is presented only for the treatment group (only 3 control individuals opened an account on their own). In Panel A, the regression for withdrawals is restricted to all treatment individuals; in Panel B, it is restricted to treatment individuals that were active (had at least 1 transaction within the first 6 months of opening the account).

[2]Mean withdrawals are 212 Kenyan shillings in the treatment group due to a small number of very large withdrawals.

Table A1. First Stage for Instrumental Variables Regression

	(1)	(2)	(3)
	Account	Account	Account
Panel A. Full Sample	is Active	is Active	is Active
Sampled for Savings Account	0.557	0.597	0.517
	(0.045)***	(0.063)***	(0.065)***
Gender	Men and Women	Women Only	Men Only
Observations	234	116	118
Panel B. Sample of Individuals who Agreed to Keep Logbooks			
Sampled for Savings Account	0.606	0.647	0.566
	(0.048)***	(0.067)***	(0.069)***
Gender	Men and Women	Women Only	Men Only
Observations	185	97	88

Note: Active is defined as having opened and account and made at least 1 transaction in the bank within 6 months of opening the account.
Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A2. Excluding Those Individuals that Were Saving for a Loan

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A. ITT	Total Investment			Total Expenditures			Food Expenditures			Private Expenditures		
Sampled for Savings Account	277.84	174.34	111.43	36.15	30.52	20.06	19.71	15.61	9.18	6.83	4.90	4.08
	(209.22)	(120.21)	(53.30)**	(25.82)	(22.22)	(14.80)	(10.79)*	(9.32)*	(6.60)	(4.86)	(3.96)	(3.13)
Sampled for Savings Account * Male	-195.57	-72.22	-57.86	-28.55	-22.48	-17.12	-14.39	-10.46	-5.68	0.67	-1.90	-3.66
	(243.34)	(137.84)	(65.10)	(35.30)	(28.65)	(20.16)	(13.11)	(11.47)	(8.76)	(7.77)	(6.13)	(4.89)
Observations	165	165	165	171	171	171	171	171	171	171	171	171
p -value for effect for females = 0	0.186	0.149	0.038**	0.164	0.172	0.177	0.07*	0.096*	0.166	0.162	0.219	0.194
p -value for effect for males = 0	0.363	0.175	0.172	0.738	0.651	0.831	0.491	0.467	0.560	0.209	0.524	0.913
Panel B. Instrumental Variables												
Account is Active	492.05	310.38	198.01	65.28	55.22	36.15	35.66	28.30	16.67	12.66	8.95	7.35
	(371.71)	(214.86)	(97.72)**	(47.44)	(40.85)	(27.21)	(20.40)*	(17.44)	(12.17)	(9.01)	(7.22)	(5.72)
Account is Active * Male	-346.16	-126.28	-101.78	-51.64	-40.52	-31.07	-25.93	-18.76	-10.13	1.74	-3.27	-6.65
	(437.77)	(249.59)	(120.83)	(66.25)	(53.71)	(37.88)	(24.94)	(21.70)	(16.41)	(14.77)	(11.48)	(9.21)
Observations	165	165	165	171	171	171	171	171	171	171	171	171
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p -value for effect for females = 0	0.188	0.151	0.045	0.171	0.179	0.186	0.083	0.107	0.173	0.162	0.217	0.201
p -value for effect for males = 0	0.371	0.175	0.187	0.757	0.669	0.850	0.508	0.481	0.571	0.220	0.533	0.927
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
Mean of Dep. Var. in Control Group (females)	426.34	365.43	266.97	165.67	149.77	123.61	83.99	75.95	68.03	20.03	18.00	6.97
Mean of Dep. Var. in Control Group (males)	37.23	37.23	37.23	132.33	119.95	108.26	61.35	59.13	55.75	27.51	27.27	24.01

Notes: Dependent variables expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education. Dependent variables are daily averages.
Exchange rate was roughly 65 Ksh to US $1 during the study period.
Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A3. Program Effects and Withdrawals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Investment			Total Expenditures			Food Expenditures			Private Expenditures		
Sampled for Savings Account	68.62	73.99	97.96	-4.81	0.41	2.66	4.70	4.09	-0.30	2.24	-1.07	0.10
	(129.41)	(95.75)	(59.83)	(25.45)	(23.11)	(16.89)	(11.34)	(10.15)	(7.09)	(5.89)	(4.49)	(3.47)
Sampled for Savings Account * Male	-34.33	-37.31	-66.18	11.31	7.72	-3.21	2.97	1.08	4.09	6.06	2.94	-0.53
	(142.42)	(101.78)	(67.39)	(39.77)	(33.10)	(23.83)	(15.10)	(13.08)	(9.69)	(10.39)	(7.42)	(5.53)
Sampled * Made Withdrawal(s)	412.06	230.18	20.28	109.14	68.42	38.34	44.67	30.04	23.07	15.28	16.30	10.80
	(301.28)	(168.29)	(79.10)	(45.09)**	(32.62)**	(22.79)*	(18.65)**	(13.67)**	(10.34)**	(8.87)*	(6.02)***	(4.57)**
Sampled * Made Withdrawal(s) * Male	-251.89	-41.88	39.21	-89.96	-53.67	-19.92	-44.66	-25.37	-20.63	-13.85	-9.56	-6.23
	(380.37)	(260.13)	(114.21)	(59.36)	(44.66)	(30.20)	(23.45)*	(18.11)	(13.61)	(13.91)	(9.92)	(6.90)
Observations	179	179	179	185	185	185	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
P-values for:												
effect for females who withdrew = 0	0.145	0.089*	0.067*	0.015**	0.018**	0.027**	0.005***	0.004***	0.013**	0.012**	0.002***	0.005***
effect for males who withdrew = 0	0.296	0.201	0.221	0.377	0.305	0.294	0.461	0.305	0.421	0.189	0.204	0.409
Mean of Dep. Var. in Control Group												
for Females	426.3	365.4	267.0	165.7	149.8	123.6	84.0	76.0	68.0	20.0	18.0	13.0
for Males	37.2	37.2	31.3	132.3	119.9	108.3	61.3	59.1	55.8	27.5	27.3	24.0

Notes: Dependent variables in columns 2 to 10 expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education. Dependent variables are daily averages.

Exchange rate was roughly 65 Ksh to US $1 during the study period.

Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A4. Excluding Those Making Large Deposits

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A. ITT	Total Investment			Total Expenditures			Food Expenditures			Private Expenditures		
Sampled for Savings Account	731.26	314.92	-25.45	61.20	44.62	20.99	31.18	28.64	18.81	-0.32	5.89	11.74
	(529.40)	(254.96)	(75.20)	(60.64)	(45.46)	(29.23)	(22.58)	(18.82)	(14.88)	(11.61)	(8.71)	(5.842)**
Sampled for Savings Account * Male	-398.71	-98.22	65.96	-62.60	-34.65	-26.96	-20.00	-17.37	-10.72	3.83	-4.41	-10.32
	(398.79)	(194.65)	(88.49)	(67.72)	(46.67)	(35.04)	(19.96)	(17.72)	(14.84)	(13.86)	(11.37)	(8.35)
Observations	97	97	97	102	102	102	102	102	102	102	102	102
p-value for effect for females = 0	0.171	0.220	0.736	0.316	0.329	0.475	0.171	0.132	0.210	0.978	0.501	0.048**
p-value for effect for males = 0	0.153	0.162	0.377	0.976	0.759	0.809	0.459	0.397	0.453	0.699	0.871	0.851
Panel B. Instrumental Variables												
Account is Active	397.74	281.41	169.79	68.74	48.79	31.31	38.70	27.65	15.71	14.52	9.86	7.76
	(292.02)	(173.73)	(76.181)**	(40.287)*	(32.07)	(21.37)	(17.706)**	(13.753)**	(9.73)	(7.383)*	(5.682)*	(4.506)*
Account is Active * Male	-220.78	-81.79	-71.04	-42.04	-22.63	-18.88	-24.04	-14.48	-6.76	1.98	-1.48	-5.20
	(341.84)	(203.94)	(96.20)	(59.77)	(45.85)	(32.71)	(22.78)	(18.20)	(14.07)	(13.53)	(10.63)	(8.32)
Observations	179	179	179	185	185	185	185	185	185	185	185	185
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
p-value for effect for females = 0	0.175	0.107	0.027	0.090	0.130	0.145	0.030	0.046	0.108	0.051	0.085	0.087
p-value for effect for males = 0	0.217	0.101	0.120	0.535	0.433	0.627	0.321	0.311	0.414	0.146	0.358	0.727
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	Top 1%	Top 5%
Mean of Dep. Var. in Control Group (females)	426.34	365.43	266.97	165.67	149.77	123.61	83.99	75.95	68.03	20.03	18.00	6.97
Mean of Dep. Var. in Control Group (males)	37.23	37.23	37.23	132.33	119.95	108.26	61.35	59.13	55.75	27.51	27.27	24.01

Notes: Dependent variables in columns 2 to 10 expressed in Kenyan shillings. Regressions control for gender, the year of the diary, occupation, ROSCA contributions in year before baseline, marital status, literacy, age, and education.
Regressions exclude those whose average deposit size is larger than the sample median.
Exchange rate was roughly 65 Ksh to US $1 during the study period.
Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A5. The Impact of Shocks on Medical Expenditures for Women

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Indicator for		---------- Medical Expenditures ----------					Withdrawals	
Having Malaria		OLS			IV		OLS	
Respondent had Malaria	30.91	33.08	21.17	29.21	32.19	20.73	167.99	316.58
	(22.12)	(16.93)*	(14.18)	(24.89)	(17.31)*	(15.98)	(152.65)	(291.40)
Somebody in HH had Malaria	31.04	54.86	29.02	31.09	54.98	28.78		
	(45.72)	(25.98)**	(15.07)*	(51.12)	(29.00)*	(16.81)*		
Respondent had Malaria	46.72	28.50	8.36					
* Sampled for Account	(39.33)	(25.80)	(16.94)					
Somebody in HH had Malaria				86.23	52.02	16.13		
* Active Account				(78.78)	(45.85)	(33.73)		
Respondent had Malaria	53.37	25.37	20.07					
* Sampled for Account	(58.59)	(34.14)	(23.43)					
Somebody in HH had Malaria				82.81	38.90	31.94	0.22	-54.88
* Active Account				(107.43)	(61.95)	(42.87)	(81.02)	(156.85)
Observations	962	962	961	962	962	961	514	342
Number of Logbooks	97	97	97	97	97	97	51	33
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 5%	None	None
Sample	All	All	All	All	All	All	Basic	Active
Panel B. # of Days with Malaria								
Respondent had Malaria	16.58	41.91	26.00	16.08	42.05	26.12	-0.88	-38.66
for 1 Day	(28.34)	(24.11)*	(20.48)	(29.96)	(25.00)*	(21.46)	(123.56)	(212.34)
Respondent had Malaria	16.92	7.20	0.89	17.39	7.46	0.98	254.90	494.28
for 2-4 Days	(33.04)	(18.91)	(17.32)	(37.26)	(19.92)	(18.40)	(198.34)	(374.53)
Respondent had Malaria	61.32	91.89	77.77	55.31	89.37	76.98	303.12	441.26
for 5-7 Days	(52.91)	(41.97)**	(45.04)*	(58.50)	(44.91)*	(48.89)	(343.08)	(513.56)
Respondent had Malaria	69.25	48.90	18.25					
for 1 Day * Account	(53.10)	(45.78)	(31.21)					
Respondent had Malaria				134.03	93.98	34.94		
for 1 Day * Active				(108.55)	(91.31)	(64.63)		
Respondent had Malaria	24.25	25.20	13.18					
for 2-4 Days * Account	(51.57)	(26.27)	(20.47)					
Respondent had Malaria				43.66	42.20	21.57		
for 2-4 Days * Active				(92.14)	(44.91)	(36.59)		
Respondent had Malaria	200.71	34.37	-3.50					
for 5-7 Days * Account	(117.22)*	(58.25)	(51.82)					
Respondent had Malaria				305.95	58.27	-1.97		
for 5-7 Days * Active				(218.03)	(91.24)	(81.90)		
Somebody in HH had Malaria	64.28	70.45	40.90	64.58	70.65	40.91	-7.86	-92.08
	(24.74)**	(17.57)***	(9.82)***	(25.55)**	(18.18)***	(10.14)***	(81.19)	(170.79)
Observations	962	962	962	962	961	961	514	342
Number of Logbooks	97	97	97	97	97	97	97	33
Trimming	None	Top 1%	Top 5%	None	Top 1%	Top 1%	None	None
Sample	All	All	All	All	All	All	Basic	Active
Mean of Dependent Variable	95.34	76.40	53.19	95.34	76.40	53.19	212.30	318.15

Notes: All variables are weekly averages, in Kenyan shillings. Exchange rate was roughly 65 Ksh to US $1 during the study period. Regressions estimated by fixed effects with controls for the week.

Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A6. The Impact of Shocks on Labor Supply, Investment, and Expenditures (Men)

Panel A. ITT	(1) Total Hours	(2) Investment[2]	(3) Credit to Customers	(4) Medical Expenditures	(5) Total Expenditures	(6) Food Expenditures	(7) Private Expenditures
Respondent had Malaria (δ_1)	-4.36	209.28	17.66	51.91	96.60	37.79	5.75
	(2.53)*	(228.93)	(41.01)	(17.89)***	(51.43)*	(24.34)	(21.33)
Somebody in Household had Malaria[1] (δ_2)	-0.07	-41.33	34.39	24.88	58.16	16.07	20.79
	(2.17)	(59.24)	(31.06)	(9.21)***	(41.62)	(23.19)	(10.76)*
Respondent had Malaria * Sampled for Account (δ_3)	4.95	-171.78	-7.09	-28.57	-28.35	-20.64	0.77
	(3.21)	(209.97)	(49.00)	(21.62)	(79.04)	(31.57)	(27.19)
Somebody in Household had Malaria	-5.53	40.39	-18.14	19.15	54.66	6.29	-20.38
* Sampled for Account (δ_4)	(3.34)	(92.85)	(27.97)	(18.04)	(52.78)	(29.15)	(16.10)
Observations	837	720	190	902	901	905	901
Number of Logbooks	86	83	20	88	88	88	88
p-value for test that $\delta_1+\delta_3=0$	0.783	0.373	0.346	0.063*	0.234	0.463	0.641
p-value for test that $\delta_2+\delta_4=0$	0.039**	0.987	0.189	0.005***	0.021**	0.267	0.977
Panel B. IV							
Respondent had Malaria (θ_1)	-3.99	206.88	17.27	50.78	92.79	37.54	7.28
	(2.68)	(239.25)	(43.15)	(19.33)**	(53.61)*	(25.58)	(22.78)
Somebody in Household had Malaria (θ_2)	-0.08	-38.62	33.91	24.91	58.12	16.11	20.83
	(2.27)	(61.49)	(33.63)	(9.66)**	(43.42)	(24.41)	(11.49)*
Respondent had Malaria * Account is Active (θ_3)	8.77	-302.15	-24.88	-52.23	-51.54	-37.78	1.51
	(5.76)	(394.17)	(121.07)	(41.69)	(150.90)	(61.12)	(51.13)
Somebody in Household had Malaria	-10.23	79.16	-55.45	37.10	102.55	12.87	-37.69
* Account is Active (θ_4)	(6.22)	(188.30)	(83.76)	(34.56)	(108.21)	(57.16)	(31.54)
Observations	837	720	190	902	901	905	901
Number of Logbooks	86	83	20	88	88	88	88
p-value for test that $\theta_1+\theta_3=0$	0.255	0.581	0.926	0.960	0.732	0.996	0.795
p-value for test that $\theta_2+\theta_4=0$	0.048**	0.779	0.728	0.045**	0.094*	0.502	0.545
Mean of Dependent Variable	37.66	356.91	-6.05	53.87	738.71	371.17	153.71

Notes: All variables are weekly averages. Dependent variables in Columns 2-7 are trimmed at the 5% level. Regressions estimated by fixed effects with controls for the week. Exchange rate was roughly 65 Ksh to US $1 during the study period.

Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[1]Dummy for somebody other than respondent is sick.

[2]The investment regression includes a control for hours worked.

Table A7. The Impact of Shocks on Transfers and Savings (Men)

	(1) Transfers to Spouse	(2) Transfers outside HH	(3) Animal Savings	(4) ROSCA Savings	(5) Withdrawals from Village Bank[1]
Panel A. ITT					
Respondent had Malaria (δ_1)	-31.29	-26.59	20.28	36.72	11.18
	(22.52)	(22.93)	(17.58)	(15.04)**	(14.22)
Somebody in Household had Malaria[1] (δ_2)	1.40	5.29	9.67	3.66	21.13
	(14.52)	(13.94)	(9.93)	(11.57)	(17.79)
Respondent had Malaria * Sampled for Account (δ_3)	28.34	5.12	-25.67	-27.20	
	(26.41)	(30.06)	(20.97)	(17.15)	
Somebody in Household had Malaria	13.77	-24.68	11.70	0.73	
* Sampled for Account (δ_4)	(22.31)	(25.99)	(15.40)	(13.12)	
Observations	741	905	903	902	552
Number of Logbooks	73	88	88	88	53
Sample	Full Sample	Full Sample	Full Sample	Full Sample	Treatment Only
p-value for test that $\delta_1+\delta_3=0$	0.857	0.311	0.682	0.388	
p-value for test that $\delta_2+\delta_4=0$	0.375	0.396	0.129	0.663	
Panel B. IV					
Respondent had Malaria (θ_1)	-32.41	-24.78	19.67	36.93	8.14
	(23.25)	(24.20)	(18.98)	(16.06)**	(17.86)
Somebody in Household had Malaria (θ_2)	1.78	5.34	9.70	3.73	18.19
	(15.04)	(14.55)	(10.48)	(12.29)	(14.78)
Respondent had Malaria * Account is Active (θ_3)	45.12	9.38	-46.89	-49.44	
	(46.75)	(56.72)	(40.99)	(32.89)	
Somebody in Household had Malaria	20.46	-45.89	23.18	3.07	
* Account is Active (θ_4)	(42.11)	(49.60)	(29.24)	(26.05)	
Observations	741	905	903	902	337
Number of Logbooks	73	88	88	88	30
Sample	Full Sample	Full Sample	Full Sample	Full Sample	Active Only
p-value for test that $\theta_1+\theta_3=0$	0.703	0.723	0.351	0.585	
p-value for test that $\theta_2+\theta_4=0$	0.521	0.362	0.210	0.733	
Mean of Dependent Variable[2]	145.44	-25.10	26.02	24.54	30.23

Notes: All variables are weekly averages in Kenyan shillings. Exchange rate was roughly 65 Ksh to US $1 during the study period. Dependent variables are trimmed at the 5% level. Regressions estimated by fixed effects with controls for the week. Clustered standard errors (at the individual level) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[1]The regression for withdrawals is presented only for the treatment group (only 3 control individuals opened an account on their own). In Panel A, the regression for withdrawals is restricted to all treatment individuals; in Panel B, it is restricted to treatment individuals that were active (had at least 1 transaction within the first 6 months of opening the account).

[2]Mean withdrawals are 212 Kenyan shillings in the treatment group due to a small number of very large withdrawals.