

Linking savings accounts to mobile phones: are potential users interested?

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Summary

We report on the outcome of a project offering a new mobile phone-based banking service. Working with a mobile operator and a government-owned commercial bank in Sri Lanka, we developed and offered the product to a group of 1625 individuals in 6 cities in central Sri Lanka. The project had two goals. The first was to understand how demand for the service is affected by the cost of using the service. To this end, participants were randomly divided into groups for whom the fee to use the service varied. At one extreme, the service was priced at full cost, with transactions fees of 8 percent to use the service. At the other extreme, the participants were able to use the service without charge. The initial usage data suggests little change in demand for the service when fees rise from zero percent to 2 percent, and only a modest drop when fees rise to 4 percent. However, there is a sharper drop when fees rise to the 8 percent level. We discuss usage of the service, including an analysis of characteristics of those using it on a regular basis, in the report.

A second goal of the project was to use the new savings services to generate an increase in savings at the household level, and to use that increase in savings to understand the source of new savings. Do increased opportunities for formal savings reduce savings in other forms, or reduce consumption, or lead to an increase in income? To answer these questions, we surveyed a sample of 800 households with monthly frequency and with a survey instrument which carefully tracks cash flows at the level of the respondent and the household. The survey sample focused on those able to use the service for free and the control group not offered the service. *Unfortunately, to date the product has generated only a modest increase in savings, and we are not yet able to undertake a credible analysis of the headwaters of new savings.*

The project faced a series of delays stemming from the fact that this is the first product of this kind offered by either the banking partner or the mobile operator. We describe these delays in the report. The majority of the product demonstrations were completed only in late summer 2012. Almost one-third of those carried out before September 2012 were done in August and September. Our data are currently only available through October 2012, so for these individuals, there is little time to generate increased savings. We are recently implemented an incentive program to generate initial usage of the product by a larger number of participants.

1. Introduction

The debate about the impact of microfinance on low-income households has drawn attention to the fact that microfinance is generally synonymous with microcredit. The poor lack low-cost and secure microsavings alternatives. Technological advances, particularly related to mobile telephony, raise the possibility of delivering formal savings products at low transactions costs, perhaps making accounts with smaller balances profitable to both banks and depositors. The widespread use of M-PESA in Kenya has generated considerable attention. (See Jack and Suri, 2010; Kendall et al 2012.) But the business model of M-PESA is built very much on money transfers rather than personal savings. Can a bank-linked savings product be viable as a savings alternative? Which types of households will use the product, and how will those households be affected by access to secure, low-cost savings? Those are the questions that motivate the research described here.

The need for regular savings is generated by the income and expenditure patterns of low-income households, described in intricate detail in both Rutherford (2000) and Collins et al (2009). Income comes in small amounts on a regular basis: the majority of the participants in our study receive income on a daily basis as either self-employed workers or daily-paid casual wage workers. But some expenditures – for medical or other emergencies, weddings and other festivals, and durable goods – are large but infrequent. Low-cost, secure savings may help low-income household accumulate the larger amounts they need.

While a substantial portion of households in Sri Lanka have at least one bank account – 68 percent according to the World Bank’s financial inclusion data and 73 percent of those in our sample – making transactions in the account is costly. Mobile-phone based products have the potential to lower the cost of using banking services substantially. For example, those in our sample say it takes 38 minutes, on average, to make a deposit. The mobile-phone banking product reduces the time required to make a deposit quite substantially. The theory of change behind the project is that lower transactions costs will lead to increased usage of banking services by the lower-income households like those in our sample. These lower transaction costs may lead to increased savings overall, or at least an increase in the security of savings. These increased savings may lead to different consumption and investment patterns, and a changed long-run trajectory of the households. The project was designed to measure carefully changes in savings and consumption behavior, to detect whether households changed their behavior as a result of using the product.

Two recent studies which have received considerable attention show very large impacts from either regular savings accounts (Dupas and Robinson 2010) or commitment savings products (Brune et al 2011). Dupas and Robinson conduct a randomized experiment in which they open savings accounts for a randomly selected subsample of self-employed workers in urban areas in western Kenya. While a minority of the treatment group makes even a single deposit in the account, they find very large effects of the savings account on investments in the businesses, on consumption, and on health outcomes. Brune et al (2011) conduct a randomized trial among tobacco farmers in rural Malawi. They find that regular savings accounts have no effect, but commitment savings accounts have significant effects on the use of inputs in the next planting season, in farm output, and in consumption.

This project began with two ultimate goals. First, we aimed to examine the effect of access to low-cost savings products on a variety of outcomes at the household and enterprise level. In this regard, the design offered several improvements on the existing literature. First, we worked with a larger sample than Dupas and Robinson. We also conducted much more frequent household surveys than any of the existing studies. We surveyed half the sample on a monthly basis. The more frequent surveys provide us more power to detect outcomes – an advantage highlighted by the recent review of

business training experiments by McKenzie and Woodruff (2013) .¹ The more frequent surveys also arguably provide us with higher quality data, especially with regard to expenditures. (See, for example, the discussion in Samphantharak and Townsend, 2009.) As households begin to anticipate questions about expenditures, they are likely to keep better account of spending and transfer levels.

The second aim of the project was to provide evidence on the demand for savings services at various pricing schedules. Mobile operators and banks must recover costs if they are to be induced to provide mobile banking services. The mobile operator we worked with pays about 8 percent of revenues to the distribution channel for the sales of top-up cards. When top-ups are used for mobile calls or texts, this 8 percent represents a cost of service. But if the funds were instead deposited into a bank account, then the costs of the distribution channel would need to be recovered in some manner either from the client or the bank. Many participants in the mobile money product space feel that clients are unlikely to be willing to pay 8 percent for the privilege of depositing money into bank accounts through the mobile agent network.²

Our project was designed to test this assertion by varying the cost of using the service. Those offered the product are divided into groups which pay the full 8 percent, pay a subsidized rate of 4 percent or 2 percent, or are able to use the service without incurring any transaction fee. In other words, for each 100 LKR (just under \$0.90 at exchange rates at the time) deposited through their phone, those paying the 8 percent fee will see 92 LKR show up in the savings account, while those paying no fee will see the entire 100 LKR show up in their account.

In this paper, we focus on the second question related to usage of the service under the different pricing schemes. Because the aggregate usage of the product was very low – much lower than we had anticipated – we did not generate sufficient levels of incremental savings to answer questions about the source of those savings. We view this as unfortunate from the perspective of the ‘headwaters’ question, but we believe there are lessons to draw from this.

We begin in the next section by describing the product and the timeline as it actually occurred. Compared with the initial plan, we faced a series of delays which cumulated to a period of more than one year. Our initial baseline survey was conducted in November and December 2010. At that point, we expected to launch the product in March 2011. But delays caused by the need to fine tune the technological platform and by the time needed to approve various procedures within the bank and mobile operator meant that we were able to begin the process of opening bank accounts only in December 2011. The account openings for the core participants in the project were completed in February 2012.³ There were then further delays after the accounts were opened which mean that the majority of the treatment group was able to begin using the product only during the summer of 2012.

After describing the product and the timeline, we describe the sample and the survey instrument. We then examine initial usage of the savings service, examining usage patterns by the month of product demonstration, the city of residence and characteristics of the participant and his/her household. In the final section, we discuss ongoing work with the partners and the participants. Though even now there are a small number of participants who have not been brought online with the product, we now have a sample of individuals with a savings product which has not yet been rolled out

¹ See McKenzie 2011 for a discussion of the benefits of multiple baseline and follow-up surveys for variables which are stochastic or noisily measured.

² See, for example, Mas and Kumar, 2008; Mas and Radcliffe, 2011; Mas and Mayer 2011.

³ A part of the project, which we leave to the side for now, examines how the savings product affects demand for informal savings services. We have oversampled members of rotating savings and credit associations (ROSCAS, known in Sri Lanka as Seetus), and varied the intensity of treatment of members of a given ROSCA. The last round of account opening, for ROSCA members who are not part of the survey, occurred in early April 2013.

commercially by the banking and mobile phone partners. Hence, there is a unique opportunity to learn about issues of technology adoption among low-income households.

2. The Technology

In 2009, we began working with a large mobile operator and a small software company in Sri Lanka to develop a savings product allowing deposits to be made directly through the mobile network to a savings account in a large, government-owned bank. The basics of the system called for users to be able to purchase regular mobile phone top-up scratch cards, follow a procedure much like the one they would use to top-up their phone, but instead add the funds to a formal savings account at a bank. The product allowed a user to dial a number, enter the scratch card serial number, and deposit the card into an *m-purse* account. The *m-purse* account is linked to a savings account, and by entering a PIN, the user is able to move the money from the *m-purse* to the savings account.⁴ This is the first product of this type offered in Sri Lanka. The mobile operator agreed not to market the product in the region where we are conducting research for a period of at least one year. That provided us an unusual level of control of access to the savings product.

The level of financial penetration in Sri Lanka is quite high in comparison with other countries of a similar income level. According to the most recent financial inclusion data from the World Bank, 68 percent of adults in Sri Lanka have a bank account, a higher percentage than any other South Asian country.⁵ Our own sample reflects this, with almost 74 percent of our (mostly urban) sample reporting having a bank account. However, households report very infrequent use of the accounts. One reason is that transactions costs are high, even for those living in urban areas not so far from bank branches. On average, those in our sample report that a bank transaction takes 39 minutes, summing the travel time and the transaction time. On the other hand, most (58 percent) top up their phones at least weekly. Thus, mobile-phone based banking potentially reduces transaction costs of making deposits quite significantly. Reflecting this, in the baseline survey over 80 percent of respondents expressed interest in using mobile phone banking services.

The mobile phone-based savings product on which our study is based was not commercially available at the time of our intervention. This provided one major advantage relative to other studies of mobile banking products: we had an unusual degree of control over access to the product. We were able to offer to the product to the treatment group, and exclude the control group from any access to the product. As a part of the project, the mobile operator agreed not to launch the project in the study area for at least one year. We are unaware of any other experiment with a mobile savings product that was granted a similar level of control over product access.

However, the fact that the product was not being offered commercially came with disadvantages as well. There was no advertising for the product, and so those selected for the sample were rightfully suspicious. We took a series of steps to offset this and stimulate a high level of usage. First, working with the mobile operator, we informed enough customer service representatives about the experiment, and trained them on how to use the product, so that there was always someone available at the call center to answer questions if those in the experiment called in. Second, we offered participants a free – very basic – phone, and helped them open the savings account that would link to the phone. Third, we arranged a demonstration of how to use the product, which included making two deposits of 50 LKR each. We did this because we felt that learning to use the product was likely to be made difficult by the fact there was not community of

⁴ The PIN offers protection for the account in the event the phone is lost or stolen. It also means that other members of the household could use the phone for calls without having access to the account, a feature which may be important in some households.

⁵ Data from the World Bank Financial Inclusion Website: <http://datatopics.worldbank.org/financialinclusion/>, accessed 17 December 2013.

users. These incentives were planned from the beginning of the project and discussed extensively with the project partners. We view them as offsetting the fact that the product was not commercially available during the experiment.

The development of the product was subject to numerous delays. We discuss the nature of the delays in more detail in Appendix F, because we see this as one of the lessons of the project. A timeline for the project, incorporating the delays we experienced, is shown in Figure 1. Although we had very good relationships with all of the partners individually, in retrospect, the complexity of working with multiple large private sector partners made some delay, if not inevitable, then at least very likely. Some of the delays in our project occurred during the rollout phase and affected the initial user experience with the product. Our initial discussions with the mobile partner occurred in 2009, and during 2010, the mobile partner selected a government-owned commercial bank as a partner. The first delay occurred in obtaining approval from the Board of Directors at the bank, a requirement for the bank to sign the MOU between the parties. We anticipated the bank would obtain Board approval in the fall of 2010. But approval was not obtained until late 2011, so that the MOU was finally approved by the bank board and signed by all parties on 28th September 2011.

The product was initially designed to work on a screen menu and SMS messages. However, our target population does not speak English, and testing during surveys confirmed that they also struggled to read phonetic Sinhala texts written in a Latin alphabet. (There is not yet a Sinhala text for SMS messages.) So the software firm agreed early on to develop an interactive voice recognition (IVR) option for the product. That system was developed, but due to a communication error, the initial testing and certification of the system by the bank was based on the menu / SMS system. There were some further delays in early 2012 in getting approval from the bank to use the IVR system. This delayed the initial product demonstrations from January to February 2012.

In February 2012, project RAs began the one-on-one product demonstrations by in Kandy. During February and March the demonstrations were limited to one of the six cities in which the project was carried out so that we could closely monitor the initial use of the product. Glitches in the software underlying the system lead to a outage of the service – meaning deposits could not be made – for a period of about two weeks in March 2012. After this was resolved we began demonstrations in four of the other five cities (excepting Kegalle).

At the end of 2012, we had nearly completed the rollout of the product to the sample of participants. The system was functioning very well, and we had a situation in which we had nearly complete control over access to a mobile phone-based savings product. However, the cost of this was a series of delays that accumulated to a substantial amount of time. The delays also imply a large cost, both financial and in terms of effort invested in making the product function. We believe, to a large extent, that these delays are very likely if not inevitable in a project that involves a new product and multiple partners. There is perhaps a broader lesson here – or at least a data point – for similar projects in other places.

3. Sample selection

The service is targeted to workers who receive income with high frequency – the self employed and workers paid on a daily or weekly basis. These groups are targeted for two reasons. First, frequent payments imply that these workers may benefit from the ability to make many small deposits into their savings accounts. The advantage of making these frequent, small deposits may interact with challenges to savings in cash, either because of difficulty resisting temptations to spend cash themselves, or because of difficulty resisting pressures for cash from other household members. Second, these two groups represent a large share of the urban / semi-urban households in Sri Lanka. According to the 2006 Sri Lankan Labor Force Survey, 24% of non-agricultural households in Sri

Lanka (29% of all households) have at least one member who is self employed. The labor force survey does not indicate the frequency of payment for wage workers. But a survey in urban / semi-urban areas in three districts in southern Sri Lanka described in de Mel et al (2010) found that 31% of wage workers are paid daily and an additional 3% paid weekly. If wage workers represent three-quarters of the labor force, this implies that almost another quarter of the workforce is paid at daily or weekly frequency. That is, around half of the urban / semi-urban households have members receiving income on a daily basis. Moreover, daily paid workers and the self employed have earnings which are lower, on average, than monthly paid wage workers.⁶ We conjecture - though we presently lack data which shows this - that they are likely to make less frequent use of banking services, both because their earnings are lower and because they work during normal banking hours. The sample selection and assignment to treatment are described in more detail in Appendix A. We provide a summary here, but refer the reader to the appendix for more detail.

We constructed a sample by first conducting a listing exercise (census) of households in selected areas of six municipalities in central Sri Lanka: Kandy (KN), Katugastota (KT), Pelimathalawa (PL), Matale (MT), Kurunegala (KR), and Kegalle (KG). The six towns were selected on agreement with the banking partner, who agreed to roll the product out through branches in each of the six selected towns. Within these areas, we aimed to have a sample stratified on distance to the bank branch. We selected neighborhoods (GNs – see below) we describe as urban (within 2km of the bank branch), semi-urban (2-5 km of the bank branch) and rural (more than 5 km from the bank branch). Our aim was to gather information on every adult active in the labor market from 4400 households in urban areas, 4400 households in semi-urban areas, and 1500 households in rural areas. Sampling in urban areas was conducted in all six towns, while the rural sample was limited to Matale, Kurunegala, and Kegalle. The main purpose of the rural sample was to compare results with a parallel project collecting savings using point of service terminals in rural areas in other parts of Sri Lanka.

The smallest administrative unit is the *grama niladhari* (GN), which typically comprises 400-600 households. We selected between 15 and 25 GNs per town and, starting from a random point within each GN, conducted a short census of all households on a given block. The census gathered basic information on every economically active adult in the household – gender, age, type of job, frequency of payment, etc. The listing provides a representative sample of households in the six municipalities, and a random sample of households in rural areas around the three municipalities.

The listing survey gathered information on each adult aged 18 to 65 who was active in the labor market. After compiling the information from the listing, we screened out households in which there were no working adults, households in which all working adults received salary on a monthly basis, and households which reported not having, and not being willing to open, an interest-bearing savings account. The target sample was 2000 individuals. Of these, 50 were selected because they participated in a ROSCA (see below for a discussion), and 1950 - 825 from urban areas, 825 from semi-urban areas, and 300 from rural areas – were selected from the remaining listed sample.

The actual baseline sample was 2006 individuals, of which 1625 were assigned to treatment. Table 1 shows the designed and actual sample size by treatment cell. Because we have an interest in understanding the impact of formal savings on household behavior, the largest treatment group (683 individuals) is assigned to the group that is able to use the product without fees. The treatment groups assigned to the 2 percent fee level (316 individuals), the 4 percent fee level (310 individuals) and the 8 percent fee level (316 individuals) were each about half the size of the group assigned to the 0 percent transaction fee. All of the treated individuals were also provided with a handset and SIM card from the mobile operator, and with the 500 LKR required to open a savings account

⁶ The data from the de Mel et al (2010) survey indicates that both median and mean earnings of daily paid workers are 75% of the comparable measure of earnings of monthly paid workers.

at the bank. The variation in fees allows us to examine variation extending from a powerful but potentially non-economically viable product (cost-free deposits) to one that is commercially viable but will likely generate fewer savings (8 percent cash-in fees).

Treatment was assigned at the individual level, stratified on the quartiles of baseline savings balances as well as three values of the ease with which the core respondent was able to read a text message written in Sinhala using the English characters. These two variables thus produced twelve blocks were used in the randomization.

In addition to the 2006 individuals brought into the survey through the listing exercise, we also added 340 individuals who are members of rotating savings and credit associations (ROSCAs, know locally as SEETUs) of which one of the individuals in the original sample also participates. This sample was designed as part of a separate experiment on the effect of improving formal savings options on participation in ROSCAs. The 340 other ROSCA members are not selected in the same manner as the main sample. Moreover, we did not collect even baseline data from these individuals. So we exclude them from all of the analysis in this report.⁷

Sample characteristics and treatment balance:

Appendix D, Table D1, shows characteristics of the full sample of 2006 individuals, split by treatment and control. The treatment group is also shown by treatment level. We discuss those data here in general, but refer the reader to Appendix D for the details. On average, participants are 41 years of age, with the 4 percent treatment group a year older. About a fifth are female, 85 percent are married and 4 percent are Muslim. The 8 percent treatment group is significantly less likely (at 1 percent) to be married, and the 4 percent group is less likely (at 1 percent) to be Muslim. These are the only two differences which are significant at the 1 percent level. More than two-thirds of the sample (72 percent) is self employed, almost three quarters (73 percent) has a bank account, and 31 percent participate in at least one ROSCA. Surprisingly, 56 percent report having changes a SIM at some point (though only 52 percent in the 4 percent group, a difference significant at the .10 level), and a similar percentage (59 percent) reports topping up their phone at least weekly. Only a fifth are able to read a text message with Sinhala words written phonetically in the Latin alphabet “very easily” according to the enumerator.

The baseline survey contains a series of other questions designed to measure the technical savvy of the respondents, to measure the convenience of using the mobile phone as a savings product, and the costs of using banks. These further characteristics are discussed in the next section, where we examine differences in characteristics of the sub-sample that initially took up the product and the sub-sample that did not.

4. Product Usage:

We organize the discussion of product usage into three sections. We first discuss take-up of the product measured by coming to the bank to complete the paperwork to open an account. We note that the participants had an incentive to open an account even if they never planned to use the savings product, because they were provided a phone and the initial deposit of 500 LKR to open the account. In our sample, 89 percent of individuals report that at least one member of their household has a mobile phone, and 78 percent report that they themselves use a mobile phone with some frequency. The phone we provided as a part of the project was a very basic model, unlikely to be an upgrade to the phone owned by the home (except by being new).

⁷ Unfortunately, because the usage of the product was so low, we are not able to assess the impact of a robust new formal savings option on participation in ROSCAs.

Nevertheless, the phone and initial deposit are clearly incentives to open the account, even if there is no intention ever to use the mobile banking product. Therefore, we are also interested in use of the product. Before discussing the usage, we need to discuss the rollout of the product. While the meetings at the bank branches to open the accounts were all held in December 2011 and January 2012, the subsequent delays in product rollout discussed above meant that the rollout demonstrations continued through the summer and fall of 2012, and indeed, some participants did not receive the demonstration visit until early 2013. Presently, we have data on usage which extends through the end of October 2012. Therefore, some participants have a longer experience with the product than others.

Take-up of the account:

The product was offered to a total of 1625 individuals from the original sample of 2006 individuals. Of these, the offer was actually made to 1548 individuals. The gap of 77 (4.7 percent of the target group) comes from attrition between the time of the baseline and the delivery of the offer letters, just over one year later. Of the 1548 actually offered treatment, 1389 (89.7 percent) came to the bank and completed the paperwork to open an account. Table E-1 shows the sample by treatment group (i.e., 0% fee, 2% fee, etc.) and by town. We show the total sample in each treatment / town cell, along with the number of offers made, and the number of accounts opened.

We have baseline data on all of the 1625 individuals who came into the sample through the listing exercise and were offered treatment. In Tables E-2 and E-3, we explore which characteristics are associated with take up of the product. We first define take-up as coming to the bank to open the account, and successfully completing all of the steps required to open the account. Note that those taking up the offer also received a phone and SIM card. Overall, 85.5 percent of those eligible to receive the treatment took up the offer by this measure. Among the 236 individuals not taking up the offer, two thirds (159) received the offer and chose not to open the account; one-third (77) did not receive the offer because they had attrited from the survey.⁸ This represents an attrition rate of 4.5 percent over the year between the time of the initial baseline survey and the time the offer was made. Because the attrition rate is somewhat higher in the 8 percent treatment group, we treat attrition as equivalent to declining the offer for the purposes of this initial analysis.

Table E-2 shows differences between those taking up and not taking up the offer in the average of characteristics clustered into 4 groups. We begin by noting that the take-up rates are very similar in the 0 percent, 2 percent and 4 percent treatment groups (87.1, 86.3 and 86.2 percent, respectively), but significantly lower in the 8 percent treatment group (80.4 percent). (See Table D-1.) This suggests that interest in the product may be dampened with high transactions fees.

Looking first at the relationship between take-up and demographic characteristics, the data indicate that married respondents are more likely to have opened the account (86% of those taking up are married, vs. 79% of those not taking up), while Muslims are less likely to have done so (3.6% vs. 6.4%).⁹ Take-up rates do not differ significantly by any of the other demographic characteristics.

Panel B of Table E-2 shows the relationship between take-up and measures of the use of mobile phones. The overall impression from the data is that neither mobile phone

⁸ These include 31 individuals who had moved – 22 overseas and 9 outside the area – 20 individuals who declined to be interviewed further, 18 who could not be located, and 8 who had died.

⁹ Perhaps the more intuitive way to show this relationship would be to say that take-up was 77% among Muslims and 86% among non-Muslims. We report instead the average of each characteristic in the group of individuals opening the account and the group of individuals not opening the account because this allows us to show comparable data for both binary and continuous variables.

usage patterns nor technical savvy is strongly correlated with take-up. Those opening the account are slightly less likely to say they use the phone daily for calls or texts, with the latter difference significant at the .02 level. Those taking up the offer are more likely to say they top up their phone at least weekly (60% vs. 51%), but not more likely to say they can fix most problems with their phone themselves or to be able to read a phonetically-written text. The group opening an account is more likely to have said they would be interested in a mobile banking product if there were no transaction fees ($p=.04$), and reports an average willingness to pay which is higher than the group not taking up the offer ($p=.06$).

The next set of characteristics measures use of and trust in banks. Here we find somewhat stronger associations with opening the account. Those opening an account are more likely to have an existing account in a commercial or state-owned bank (74 vs. 70 percent, $p=.11$) and more likely to have an account with a Sanasa or Samurdhi bank (12 vs. 7 percent, $p=.03$). There is also a strong relationship between participation in Seetus and opening the account. Finally, those opening the account report an lower average travel time to their nearest bank branch (16.1 vs. 14.4 minutes, $p=.02$).

The final panel reports correlations with measures of discount rates, risk preferences, and various ability measures. We find no association between take-up and measures of risk aversion or discount rates. We do find a relationship between measures of numeracy (counting backwards from 100 by 7 and filling in missing numbers in sequences). But surprisingly, the data suggest that the more numerate are less likely to have opened the account.

Table E-3 examines some of these patterns in a regression framework, reporting the results of probits with take-up as the dependent variable and various groups of independent variable. The strongest and most robust relationship is with the transactions fee. Each percentage point increase is (in a linear relationship) associated with a .78 percent decrease in the take-up rate. Muslims are about 9 percentage points less likely to open the account. When we control for characteristics related to use of the bank and mobile phone (column 3), we find lower take-up rates among the young – those less than 40 years of age – and among the self-employed. ROSCA members are 4 percentage points more likely to take up the offer, and those topping up their phone at least weekly are 5 percentage points more likely to do so. Finally, those reporting a willingness to pay a higher transaction fee for the product are more likely to have opened the account.

5. Rollout issues

As we discuss above, there were some further delays even after the treatment sample had come to the bank to open accounts. Table E-4 shows the rollout by city and month. In Kandy, almost all of the demonstrations were completed in February and March, with the last completed in April. The protocol for product rollout was to have a project research associate visit each participant who had opened an account. During the visit the project RA explained how to use the product and demonstrated with two 50 LKR scratch cards. The RA him/herself made a deposit in the participant's account with the first scratch card. The RA then asked the participant to use the second scratch card to make a deposit.

We delayed the start of demonstrations in other cities initially for training reasons – the responsible RAs from all six cities worked on the demonstration rollout in Kandy so that the demonstrations would be done consistently across cities – and then because of the issue discussed above that led to the system being suspended for two weeks in March. In April, we began the demonstrations in Katugastota, Pelimathalawa, Matale, and Kurunegala. The process in these cities extended through the summer mainly because the banking partner was slow to process the account applications received in January and February. But just over half of the demonstrations in these four cities were completed in April and May. In Kegalle, the branch misplaced all of the account applications and these were not found and forwarded to the head office for processing until sometime in the

summer. So in that case, the demonstrations were delayed until September, when most of them were completed.

At the end of November 2012, the bank had processed the forms for 1557 of the 1694 people who had completed the paperwork. The remaining 137 were not processed by that time because they had been lost or misplaced. In the fall of 2012, we began visiting the sample to re-fill the forms that had been lost. That process was completed before the end of 2012. Of the 1557 for whom account had been opened, we completed demonstrations for 1366 of them by end of November. We had made multiple visits to most of the 191 that had accounts but had not yet received the demonstration. Some had moved, or lost interest. Around 50 had lost the SIM card attached to the account. For those we have had to start the process of account registration again with a new SIM. In all, the 1366 completed demonstrations represents 71 percent of the treatment group. We expect this number will ultimately be larger by perhaps 200 individuals, but this already represents a very substantial take-up for a new product.

6. Take-up usage

The take-up measured by opening an account and receiving the demonstration is important because that gives us the sample with which we can work. But we are also interested in understanding the demand for the product. Because the account came with a phone and the initial 500 LKR deposit, the take-up measured by setting up the account may overstate the demand for the savings product. On the other hand, the initial, unstimulated demand may understate the true demand because of costs of learning how to use the product. As we describe below, we gave some incentives for use of the product in Kandy during the months of August and September.¹⁰ We plan to undertake similar temporary demand stimulations in the other cities in early 2013.

The top panel of Table E-4 shows the average number of deposits made by those completing the demonstration by city and month. The bottom panel of Table E-4 shows the average amount deposited for the same matrix. For Table E-4, we exclude the demonstration deposits and also any deposits made during the month of the demonstration. We do this to filter out the 'novelty' deposits of a new product, and also because the demonstrations may be very early or very late in the month, making the average for that month more difficult to interpret. So for this table, we take as the numerator deposits made by those with demonstrations completed the previous month or earlier, and as the denominator, the total number of accounts for which demonstrations were completed the prior month or earlier.

The first thing to note is that the average usage of the service is quite small. The average number of transactions is not often above one per month. The average amount deposited rarely exceeds 100 LKR (about \$1) per month. Second, there is quite a lot of variance across cities. Usage is more robust (though still small) in Kurunegala, Katugastota, and Pelimathalawa on the one hand, than in Kandy and Matale on the other. The exception is the months of August and September in Kandy, when we gave incentives for using the system. Note that usage fell back to prior levels in October in Kandy, after the incentives were removed. We discuss this further in the next section.

These averages reflect the fact that only a minority of those establishing accounts have ever made a deposit on their own. Indeed, 71 percent of the sample have never made a deposit, and 11 percent have used the system only once. Only ten percent have made at least four deposits, while one percent have made deposits 80 or more times. Usage rates are highest in Kandy – where 37 percent of participants made at least one deposit – reflecting both the longer period since the demonstrations were completed and the incentives provided in August and September. Only 13 percent of those having received the demonstration have made deposits in multiple months. That number is 20 percent in

¹⁰ We conducted a lottery among users of the service. Each usage of the account generated one chance of winning for the participant. The grand prize was a deposit of 5000 LKR.

Kandy, again reflecting the incentives. But, the low percentage also reflects the short lag between the demonstrations and the end of the administrative data we have received so far: 17 percent of those outside Kandy who received the demonstrations in July or earlier have made transactions in multiple months.¹¹

What do we learn from the usage data?

A primary question of interest is how demand for the savings product is affected by the price paid to use the service. Most mobile phone based money products charge fees on money transfers and cash out activities rather than on cash in. In the product we are testing, the fee is charged at the time of deposit, on cash in. We asked respondents in the baseline survey how much – hypothetically – they would be willing to pay for a product that allowed them to make remote bank deposits. More than three-quarters of respondents said they would be willing to pay something for the service, and the median response was 5 percent of the transaction. The fees our customers use span this range. There is a small positive correlation between the willingness to pay expressed in the baseline and the actual use of the system ($\rho=.05$, $p=.05$ for willingness to pay and total deposits).

We explore how actual fees affect whether individuals make at least one deposit, and the relationship between the fees and the total deposits made. The results are shown on Table E-4. In addition to dummies for fees of zero, two and four percent (relative to the base group of eight percent), we also include variables for the month in which the demonstration took place and whether the participant resides within two kilometers of the bank branch or more than five kilometers from the bank branch – between two and five kilometers is the base group. We find that the likelihood that a participant has ever used the product and the total deposits made are both decreasing the fees charged. Those in the zero fee group are seven percentage points more likely to have made at least one deposit than are those in the eight percent fee group. They also deposit an average of 142 LKR more than the full cost group. With regard to total deposits, the levels are actually highest in the two percent fee group, though given the small sample size the differences are not significant for this group.

In addition to price, we find that location matters. Those two to five kilometers from the bank branch are most likely to have used the service – 11 percentage points more likely than the participants located closer to branches and nine percentage points more than those located further away.¹² We also find (Columns 4 and 5) that demand is very responsive to price in the most urban areas, but not responsive to price among those two to five kilometers away from the branch. (The sample of those more than five kilometers away is much smaller, but we find no significant price effect in this group, either.) This is consistent with lower transactions cost of using the bank for those located closer to the branch. Combined, these results suggest that from the perspective of commercial viability, the area further from bank branches is more fertile ground for development of the product.

Next, we discuss analysis of characteristics of those who use the product. We find very few personal characteristics which are associated with usage of the product. There is a positive correlation between education and usage, with a substantive effect on total deposits relative to the (admittedly very small) mean level. A one standard deviation change in schooling is about 3 years. An increase in schooling of three years is

¹¹ As noted in Table 1, a part of the sample is surveyed only at baseline, and a part is surveyed monthly. The monthly surveys – focused on expenditures and savings – may be seen as a treatment in themselves. However, we find no significant effect of the monthly surveys either on take-up defined as opening the account or on usage of the product.

¹² In a parallel project in rural areas in other parts of Sri Lanka, we find very robust usage of a deposit collection service using bank agents with point-of-service terminals. The households in that project are 5 to 10 kilometers from the bank branch. This suggests there is demand for savings services in rural areas.

associated with an increased probability of having used the product once of about 2.5 percentage points (just under 10 percent of the mean) and with an increase in the amount deposited through the system of about 75 LKR, which is around a third of the sample mean. We find surprisingly little correlation with other characteristics. Men and women use the product with almost identical frequency. The baseline survey contained a series of questions about sophistication of use of mobile phones – for example, whether the individual could read a text written phonetically in the Latin alphabet, whether she/he had ever changed a SIM card, etc. None of these is correlated with usage. Being within 200 meters of a store selling top-up cards is positively associated with usage, but significant only at the 0.15 level. Measures of financial literacy and current use of banks are not related to usage, and neither are age or marital status.

7. Discussion and conclusions

We develop and test a new mobile phone-based savings product in Sri Lanka, partnered with a mobile operator and a large government-owned commercial bank. The project experience several product-related delays, but as of early 2013, product demonstrations have been completed with almost all of the treatment group. The demonstration of the product was completed by June 2012 for much of the sample, and our administrative data currently extend to the end of October 2012. We find that initial usage of the product is modest throughout the sample. However, there are some reasonable patterns with respect to the fee structure. Use is decreasing in the fees charged for the service, which a more pronounced falloff above 2 percent. Usage is highest among those between two and five kilometers from the bank branch, and this group is much less price sensitive than those located closer to the branch.

We designed the project to address two questions: How responsive to users of mobile banking products to changes in the price of using the services, and: How do savings and consumption patterns change when households have access to low-transactions cost savings products. We summarize what we are able to say about the first question just above. Unfortunately, due to very low levels of usage of the service, we are unable to say anything about the second question.

The conclusions we can draw come from a particular sample in Sri Lanka – individuals receiving income on a regular (daily or weekly) basis, mostly in urban and semi-urban areas. Moreover, the setting has other characteristics that are somewhat unique and affect the ability to extend conclusions to other settings. The product we tested was not commercially available during the project. While this gave us an unusual level of control over access to the product, it also meant that users had to learn both the technology and the best uses for the technology on their own. They were not able to rely on family and friends to teach them to use the systems. This may have affected usage in important ways. We think our elasticities of product usage likely have some validity in other settings, but the overall low level of usage may have been affected by the lack of network effects on the learning side. Moreover, delays and initial outages of the systems may have reduced the ultimate demand for the product. Given that the systems were operating smoothly for several months during which we have data, and that we do not see robust usage during this period, we think we can conclude that, in Sri Lanka, at least, gains individuals realize in using mobile-phone based savings products are fairly modest.

In spite of the delays in rolling out the product, we now have the rather unique situation of having a workable remote savings product with a very high degree of control over the sample of individuals who are able to use the product. We have obtained additional funding to continue the surveys with at least a quarterly frequency for another year. We expect to continue to work to understand demand for mobile savings among participants in the study, and how access to formal savings products affects demand for other types of financial services.

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Table 1: Treatment Design

Treatment cell	Sample size - Design	Sample Size - Actual	Monthly Survey Sample
0% deposit cost treatment	700 individuals	683 individuals	456 individuals
2% deposit cost treatment	300 individuals	316 individuals	
4% deposit cost treatment	300 individuals	310 individuals	
8% deposit cost treatment	300 individuals	316 individuals	
Control	400 individuals	381 individuals	381 individuals

Figure 1: Timeline of Project



Annex A: Sample Design

The final sample for the project is one of 2006 individuals located in and around the Central Province cities of Kandy, Katugastota, Pelimathalawa, Matale, Kurunegala, and Kegalle.¹³ The sample was drawn from a household listing in selected parts of each of those cities. For the listing exercise, we picked random locations within selected Grama Nilidhari divisions (the smallest administrative unit in Sri Lanka – see below) and conducted a short census of around 100 households. We asked a series of questions related to work, use of banking services, and use of mobile phones about each member of the household aged 18-65 who was economically active. Because we expected that demand for the mobile savings product would depend on the transactions cost of using regular banking services, we stratified the listing according to distance from the nearest partner bank branch location: We sought a listing sample of 4,400 households located within two KM of the bank branch, 4,400 households two to five KM from the branch, and 1,500 households more than 5 KM from the nearest branch.

The listing yielded a potential sample of 13,435 economically active adults in the 10,300 listed households. It is important to note that we did not attempt to select a random sample of the population counted in the listing exercise. Rather, we selected a sample based on characteristics which we expected would be associated with higher demand for the mobile banking product. We had three reasons for following this strategy. First, when the product is offered commercially by our partners, they will certainly not expect 100 percent penetration rates. We therefore wanted to obtain a sample which would more closely reflect likely end users of the product. Second, we expected the product to increase household savings rates, and an important part of the project was to measure the source of those increased savings. To give ourselves as much more as possible, we wanted a sample which was likely to be robust users of the product. Third, we were also interested in the interaction between access to formal savings (represented by the mobile-phone based product) and informal savings – particularly participation in ROSCAs. We therefore purposely selected a sample of ROSCA members, and then snowballed that to other participants in their ROSCAs. Unfortunately, as we discuss in detail in the report, the product did not generate enough savings to undertake either the second or third analyses. However, these questions were nevertheless factors in the sample design.

With these issues in mind, we began by limiting the sample to those paid on a daily or weekly basis. The product is well designed for those with frequent inflows of cash, because the mobile phone technology reduces the cost of making deposits into account. Limiting the sample to daily- and weekly-paid individuals eliminated about three-quarters of the sample, leaving a sample of 4,175 individuals.¹⁴ Next we dropped those reporting that they would not be willing to open an interest-bearing account. Just over 1000 individuals expressed an unwillingness to do this. We included this question because those practicing Islam may be unwilling to take interest, and the bank was unable to link the mobile phone to a non-interest bearing account. However, the numbers of individuals saying they were unwilling to open an interest bearing account far exceeded the expected number of Muslims in the sample – we did not ask a question on religion – and hence, we interpret this question as indicating a general lack of interest in formal financial accounts. (There was no mention of the project during the listing exercise.) We note that the likelihood of expressing an unwillingness to open an account is increasing in age, but not significantly associated with gender or distance of the household from the bank branch. We were then left with a sample of 3102 individuals in 2372 households.

¹³ In a part of the project not discussed here, we sampled a further 341 individuals who participated in ROSCAs with individuals selected into the main sample. These 341 individuals were not randomly selected in the manner of the remainder of the survey.

¹⁴ Almost half (46%) of the listed sample is paid monthly. Another almost 23% reported being paid “irregularly.” We chose to eliminate these as well, especially because the majority of them are wage workers.

From this sample of 3,102 individuals in 2,372 household, we selected a sample of 2,006 individuals, each from a unique household. We oversample according to several criteria, most of which can be grouped around either the likely demand for the product or technological savyness.¹⁵ Thus, those with a bank account and those located within .5 km of the nearest mobile phone agent were oversampled, as were those who used their phones to send SMS messages regularly, those who had previously changed a SIM card, and those under 50 years of age. However, given that we select an individual from around 85 percent of the households with an eligible participant (2006 out of 2372) – and more when we consider survey refusal rates of around 5 percent – these oversample criteria should be viewed as much as selecting which individual in the household we selected rather than which households were selected. We also oversampled females, since only about 15 percent of the listing sample were women.

Among the 2006 individual selected were 56 who were members of a ROSCA in which all of the ROSCA members lived within 1 km of the original respondent. We include these 56 in the analysis in this report. Half of these were drawn from Kandy, and a quarter each from Katugastota and Pelimathalawa. Just under one-fifth of the relevant sample (931) qualified for this selection. We asked each of these 56 to introduce us to their ROSCA organizer, and then offered the treatment to a randomly determined number of other members of the ROSCA. Because these additional members (340 in all) were selected in a very different manner, we do not include them in the analysis here.

Treatment

We then allocated the selected sample into one of four treatment groups or the control group. The assigned to treatment were either assigned to pay the full transaction cost fee of 8 percent, reduced fees of 4 percent or 2 percent, or no fee at all. In the latter case, we fully subsidized the transactions costs. We re-randomized to obtain balance on initial savings balances, education levels, gender, and whether the individual was able to read a simple text in Sinhala, but written phonetically using the Latin alphabet.

Once the because we worry that frequent surveys might themselves have an effect on savings behavior, we offer treatment to some individuals with only a baseline survey.

Survey sample

The final dimension of the sample that we need to discuss is the division between those individuals surveyed at high frequency and those not surveyed at all. The high-frequency survey is a key part of the project, because we need those data to determine the source of savings added to new formal savings accounts. However, asking an individual each month about savings may itself be a treatment. It serves as a reminder, perhaps adds some social pressure to save, and so forth. We therefore selected a sample of 1,100 individuals to survey monthly, with the remaining sample treated but not surveyed beyond the baseline. For those not surveyed, we use only the administrative data to measure usage of the product.

The sample of 1100 individuals surveyed monthly is divided into those selected for treatment in the 0 percent fee group (500 individuals), those in the control group (400 individuals), and 200 of those who entered the sample because they participated in ROSCAs with members of the 0 percent fee group (100), and 100

¹⁵ The oversampling was carried out by first assigning a random number between 0 and 1 to each individual, and then adding an additional 0.1 to the random number for each of the “desired” characteristics. Thus, we retain representation from all parts of the listed population, but oversample on females and individuals who we expect will use the product more frequently.

Annex B: Survey Instrument

The project was designed to understand the sources of savings added to the new mobile-linked formal accounts, and that was the main focus of the surveys.

We made the decision that we had the best chance of identifying the source of savings if we focused on the cash flow from an individual's perspective. While we ask the participating individuals for data on full household expenditures, there is ample evidence in the literature to indicate that individuals do not always know the full expenditure patterns of other members of the household. So the core of our monthly survey instrument asks the individual in a detailed manner for their sources and uses of cash.

The questions from the core module are shown on Table B-1. After first asking standard household-level consumption in income questions (11.1 and 11.2), we focus on the individual respondent. We first ask (11.3) for income they earned from economic activities, transfers from within the household and transfers from outside the household. This gives the total cash available for spending by the individual. We subtract from this transfers to other members of the household or those outside the household (question 11.4). The enumerator then calculates the net of total cash flow in and transfers out, and asks how much of this was saved in banks, in SEETUs, in cash (changes in balances) and in other informal forms. The remainder is then calculated again by the enumerator as the total amount spent by the individual. Question 11.8 then asks for individual expenditures by category. The enumerator is instructed to sum the individual expenditure categories and re-ask questions as necessary if the total expenditure differs from the amount calculated in question 11.7 by an amount exceeding a threshold.

The baseline survey served the additional purpose of allowing an analysis of which individuals decided to use the savings product. Key questions from this section are shown in Table B-2. These include a test to read a simple SMS message, in Sinhala, but transmitted phonetically using the Latin alphabet, since there is not SMS script in Sinhala available. The mobile banking product has an interactive voice recognition (IVR) system as well as a text-based system; nevertheless, the transactions can be made more quickly using the text system. We also asked whether individuals had a dual-SIM phone, whether they had ever changed a SIM, where they turned when they needed technical assistance for using or repairing their phones, etc.

On the banking side, we asked whether they had an account, had used an ATM, and whether they had received wire transfers. We also asked for the travel and transaction time to make a deposit, and how much, as a percentage of the deposit, they would be willing to pay to make the deposit through a mobile phone.

Table B-1: Core module from household survey instrument

SECTION 11: HOUSEHOLD EXPENDITURE

Interviewer: Ask this Section from all respondents.

11.1. In the past month of December 2010, how much in total did your household (including yourself) spend on each of the following? **Interviewer:** Include only the household expenses. Business expenses are not included)

Expenditure Category	Expense (Rs)
1. Food consumed at home	
2. Food consumed outside the home (eg. restaurants, tea-shops, bought on street)	
3. Non-durable household goods (eg. personal care products, soaps)	
4. Recreation and entertainment (eg. movies, CD/VCD/DVD, trips)	
5. Housing (rent, taxes, maintenance)	
6. Fuel, water and light (eg. electricity, gas, firewood, kerosene, candles, matches)	
7. Telephone (including land line and mobile)	
8. Other household services (laundry, grinding, domestic servants)	
9. Transport (including fuel for car/motor cycle, bus fares)	
10. Schooling (include fees, books and other materials, uniforms, etc.)	
11. Health expenditures (medicine, doctor/consultant fees)	
12. Clothing (including clothes, footwear)	
13. Jewelry and watches (eg. beads, bangles, bracelets and necklaces)	
14. Household furnishings (eg. furniture, curtains)	
15. Electronic goods and household appliances	
16. Repairs to house and land (including garden related)	
17. Travel to visit friends or family	
18. Expenses on cigarette, beedi	
19. Consumption of alcoholic drinks (eg. liquor, beer)	
20. Hair Cuts / Hair dressing	
21. Religious activities	
22. Horse race betting	
23. Ceremonies related to family members and relatives (eg. weddings, funerals)	
24. Social activities	
25. Repayment of loans/interests	
26. Consumption of betel	
27. Card playing for money	
28. Expenses on lotteries	
29. Expenses on books, newspapers and magazines	
30. Other expenses (Specify).....	
31. Total expenses of last month	

Can you tell me about the total income earned by your household including yourself in the past month (December 2010)

11.2. Can you please tell me how much money you and your family members received from each of the following sources in December 2010?

Source	Income (Rs)
1. In the past month of December 2010, how much income did your house hold earn from economic activity? (eg. wages from work, earnings from business, income earned from sales of agricultural crops)	
2. In the past month of December 2010, how much money did you receive as remittances from your relatives living in other areas of Sri Lanka(eg. children/siblings) and from your friends?	
3. In the past month of December 2010, how much money did you receive as remittances from your relatives (eg. children/siblings) and from your friends residing in abroad countries	
4. In the past month of December 2010, how much money did you and your house hold members receive from other sources (eg. government payment schemes such as Samurdhi, seetus/loans, etc.)	
5. Total	

Now I want to ask you about income earned/money received and expenditure incurred by you personally in the past month of December 2010. Do not consider the income earned or expenses made by other members of the family

11.3. Can you tell me about income you received during the month of December 2010 from each of the following sources?

Source	Amount (Rs)
1. In the past month of December 2010, how much income did you earn from economic activity? (eg. wages from work, earnings from your business, money withdrawn from your own bank account etc)	
2. In the past month of December 2010, how much money did you receive from your spouse or other household members? (eg. money given by HH members to purchase things for the household, loans given by HH members, other remittances from foreign countries)	
3. In the past month of December` 2010, how much money did you receive from persons living outside the household or institutions? (eg. gifts or loans given by family members outside the home, money received from seetus, other transfers etc)	
4. Total	

11.3a This means that you received a total amount of Rs. (**mention total amount in 11.3.4**) during the past month of December 2010. Does this sound correct?

1. Yes **Go to Qn. 11.4**
2. No **Go to Qn. 11.3b**

11.3b If not, then what might be the correct amount of money received after including any other sources as well?

Rs _____

Now I would like to ask you about money given to other people in the past month of December 2010.

11.4. Can you tell me how much money you gave to each of the following in the past month of December 2010?

Recipient	Amount (Rs)
1. Money given to spouse (for expenditures, savings etc)	
2. Money given to children (for transport to school, food etc)	
3. Money given to other members of the household	
4. Money given to members outside the household (e.g. as gifts etc)	
5. Other (specify) _____	
6. Total	

11.4a. This means that you gave a total amount of Rs (mention total amount in 11.4.6) during the past month of October 2010. Does this sound correct?

1. Yes **Go to Qn. 11.5**
2. No **Go to Qn. 11.4b**

11.4b If not, then what might be the correct amount of money given after including any other recipients as well?

Rs _____

11.5 **Interviewer: Subtract the total in 11.4.6 (if incorrect, then 11.4b) from the total in 11.3.4 (if incorrect, 11.3b) and write the answer here.**

Rs _____

11.6 Then after deducting the total amount of money given to others from the total amount of money received, you had Rs (**mention total amount in 11.5**) remaining for saving or spending in the past month of December 2010. Can you tell me how much money you saved using the following methods?

Saving Method	Amount (Rs)
1. Saving in an institution such as a bank	
2. Retain as cash in hand	
3. Deposit in a seetu	
4. Savings in another form (specify) _____	
5. Total	

11.7. **Interviewer: Subtract the total in 11.6.5 from 11.5 and write the answer here.** Rs _____

11.8 Then, after deducting the total amount of money saved by you, you personally had Rs (*mention total amount in 11.7*) remaining for spending in the past month of December 2010. Can you tell me how much money you personally spent on each of the following?

Expenditure Category	Expense (Rs)
----------------------	--------------

1.	Food consumed at home	
2.	Light food items consumed outside the home (e.g. short eats, snacks, tea etc.)	
3.	Other food consumed outside the home (at restaurants, hotels etc)	
4.	Non-alcoholic beverages consumed outside the home (e.g. soft drinks such as sprite, coca cola etc)	
5.	Bus fares	
6.	Three wheelers / taxi fares	
7.	Clothing (including clothes, footwear)	
8.	Jewelry and watches (e.g. beads, bangles, bracelets and necklaces)	
9.	Telephone (including land line and mobile)	
10.	Cigarettes and Tobacco (including Beedi)	
11.	Beer and other alcoholic beverages	
12.	Hair Cuts / Hair dressing	
13.	Personal care products (e.g. perfumes, creams, shampoo etc.)	
14.	Religious activities (e.g. visits to temple)	
15.	Parties and other celebrations	
16.	Betting at Horse Races / Turf Accountants	
17.	Travel to visit friends and family	
18.	Expenditure on weddings / funerals and other such family events	
19.	Social activities / festivals / ceremonies	
20.	Housing (rent, taxes, maintenance)	
21.	Fuel, water and light (eg. electricity, gas, firewood, kerosene, candles, matches)	
22.	Other household services (laundry, grinding, domestic servants)	
23.	Schooling (include fees, books and other materials, uniforms, etc.)	
24.	Health expenditures (medicine, doctor/consultant fees)	
25.	Household furnishings (eg. furniture, curtains)	
26.	Electronic goods and household appliances	
27.	Repairs to house and land (including garden related)	
28.	Repayment of loans/interests	
29.	Consumption of betel	
30.	Card playing for money	
31.	Expenses on lotteries	
32.	Expenses on books, newspapers and magazines	
33.	Other (Specify) _____	
34.	Total expenses of last months	

Interviewer: Include only the expenses the respondent personally spent. Do not include day-to-day business expenses

Table B-2: Use of mobile phones and banking services

Mobile Phone Usage

- 9.11. How often do you use a mobile phone to receive or make calls?
1. Daily
 2. Weekly
 3. Occasionally, but less than once per week
 4. Never
- 9.12. How often do you use a mobile phone to send or receive text messages?
1. Daily **Go to Qn. 9.12a**
 2. Weekly **Go to Qn. 9.13**
 3. Occasionally, but less than once per week **Go to Qn. 9.13**
 4. Never **Go to Qn. 9.13**
- 9.12a How many text messages (SMS) would you estimate you send on average in a day?
- No of texts _____
- 9.13. Have you ever added or changed a SIM card in a phone?
1. Yes
 2. No
- 9.14. How many SIM cards do you have in your current phone?
- No. of SIMs _____
- 9.15. What is your assessment of the quality of cellular reception (signals) in the place you live? (On any network)
1. Excellent
 2. Good
 3. Somewhat ok
 4. Poor
 5. Not at all
- Interviewer: If the place of work is the same as the home, skip to Qn. 9.17**
- 9.16 If the place you live is different than the place you work, what is your assessment of the quality of cellular reception (signals) in the place that you work? (On any network)
1. Excellent
 2. Good
 3. Somewhat ok
 4. Poor
 5. Not at all
- 9.17 How often do you add money to your phone network? (eg. using Reload, topup cards, paying bills etc)?
1. Daily
 2. Weekly
 3. Occasionally, but less than once per week
 4. Paying off monthly bill
 5. Never
- 9.18. What is the approximate distance from your home to the nearest mobile phone topup card / reload agent?

1. less than 100 m
2. 100 – 200 m
3. 200 – 500 m
4. 500 m – 1000 m (1 km)
5. 1 – 3 km
6. 3 – 5 km
7. more than 5 km

- 9.19. Assume that you needed to purchase topup card or reload for your mobile phone. How much time would it take for you to go from your home to the agent, complete the transaction, and return back to your home?

Minutes _____

- 9.20. If you had a technical problem with your cell phone, who would you mainly ask for help?

1. I can fix most technical problems myself
2. A relative
3. A neighbour or friend
4. A local cell phone retailer/repair workshop
5. A local reload/topup card agent
6. I would purchase a new phone
7. Other (specify) _____
8. Not applicable

- 9.21. How often do you change your ringtone?

1. Weekly
2. Monthly
3. Occasionally, but less than once per month
4. I have changed my ringtone only once
5. I have never changed my ringtone
6. Not applicable

- 9.22. What are the other services that you, yourself, obtain via your mobile phone? (MA)

1. Phone Camera
2. Internet access
3. Phone Games
4. Phone Video
5. Listen to Phone Radio
6. Phone TV
7. Phone MP3/MP4/3Gp (songs)
8. Phone calculator
9. Phone Alarm / Reminder
10. Multimedia Message Services (MMS)
11. Data exchange services (eg. Bluetooth)
12. Phone Torch
13. Phone Dictionary
14. Phone Clock
15. Phone Calendar
16. Other (specify) _____
17. Not applicable

Use of Bank Services

- 9.23. How often do you use an ATM card to withdraw money from a bank?

1. Weekly

2. Monthly
 3. Less than monthly, but at least once per year
 4. Less often than once per year
 5. Have never used these services
- 9.24. How often do you use internet banking services?
1. Weekly
 2. Monthly
 3. Less than monthly, but at least once per year
 4. Less often than once per year
 5. Have never used these services
- 9.25. How often do you send or receive money by electronic methods (eg. wire transfer services operated by banks, international networks such as Western Union)?
1. Weekly
 2. Monthly
 3. Less than monthly, but at least once per year
 4. Less often than once per year
 5. Have never used these services
- 9.26. In the past year, have you sent or received remittances to/from family members living elsewhere in Sri Lanka or abroad? (Not as loans but as transfers from income earning family members to dependent family members for home consumption or investment purposes)
1. Have sent money
 2. Have received money
 3. Have sent and received money
 4. Have neither sent nor received money
- 9.27. Think about the bank located nearest to you. How much time would it take you to travel to this bank?
- Minutes _____
- 9.28. How much time would you spend at this bank making a deposit?
- Minutes _____
- 9.29. How much would it cost you to travel to the bank? (If you would walk, then say 0)
- Rs _____
- 9.30. Would you feel safe travelling to the bank with Rs 10,000 to deposit?
1. Yes
 2. No
- 9.31. Many people say that the difficulty of doing regular cash deposits at a bank is due to the time and cost (such as travel cost) involved and the inconvenience. In order to make this task easier some countries operate a system where savings can be done through the mobile phone network. For example, using top up cards to deposit money into a bank account via the mobile phone instead of mobile phone time. This method is particularly useful when making small value deposits. If such a service was available without any additional fee involved, would you be willing to use such a service?
1. Yes
 2. No

Go to next section

9.32. In many countries a fee is charged for the use of this service. So in order to deposit Rs 100, one might have to incur a fee of about Rs 5-20. Despite the fee, customers are still willing to use this service due to saving in time and cost and the convenience of being able to deposit money at any time. If you were being charged a fee for this service, what is the maximum fee that you would be willing to bear in order to deposit Rs 100?

Rs _____

Annex C: Power Calculations

There are two key outcomes of interest in the study. The first relates to usage of the mobile phone-based savings product, and particularly on the effect of transactions fees on usage levels. The second relates to the source of money deposited into the savings account, and in particular, whether these deposits are diverted from one of various informal savings mechanisms.

Given the levels of usage of the service shown on Table E-3, it is immediately apparent that we lack sufficient power to answer the second question. The average deposit among those assigned to treatment is a bit less than 100 LKR (\$0.90) per month. The mean total monthly expenditure among those in the 1st to 99th percentile of expenditures is just over 15,000 LKR, with a standard deviation of almost 19,000 LKR. Addressing this question relies on our ability to increase usage of the service substantially going forward.

On the other hand, with regard to the effect of transactions costs on service usage, we have substantially more power. There are 683 individuals in the 0 percent transaction cost group, and at least 310 in the other treatment groups. In a 0/1/ measure of usage, we can detect the difference between usage of 10 percent and 17 percent with power of $>.80$ and 95 percent confidence. In terms of usage, and given the differences in the usage that we observe, we also have sufficient power to detect modest sized effects. Thus, we can detect a difference in average usage of 100 LKR per months and 140 LKR per month assuming a coefficient of variation of 1.5 for both samples (higher than the actual level of around 1.35) when comparing the 0 percent sample to any of the other samples. The power for the same difference in means between, for example, the 2 percent fee sample and the 4 percent fee sample falls just short of 0.80 (0.77), but we can detect a difference of 100 and 145 in a single month even when comparing those two samples.

So, while the low usage hampers our ability to say anything about the source of additional savings deposits, we are able to estimate the effect of transactions costs on usage.

The initial power calculations were based on take-up of the technology, defined as some usage level after the initial demonstrations. The samples of 300 per treatment group were sufficient to detect a 7.5 percentage point different in usage, assuming a baseline (8% fee group) usage of 25 percent, with power of 0.83. The power was higher with less than 25 percent, and lower with baseline usage between 25 and 75 percent.

Annex D: Descriptive Statistics

Table D-1 shows a balance table which reports means for numerous characteristics of the individuals in the sample, divided by treatment group. The sample is generally balanced across treatment groups, with differences in most characteristics very slight. It is apparent, then, that about 20 percent of the sample is female, and the average age is 41 years. Education levels – 10 years on average – are high relative to the average per capita income, but not atypical for Sri Lanka. Four percent of the individuals are Muslim, and 85 percent are married.

With respect to use of mobile phones, almost 90 percent have a mobile phone in the household, and the phones are used quite regularly – almost 60 percent top up the phones at least weekly. On the other hand, only one in five could read the phonetic Sinhala text “very easily.” Use of bank accounts and financial literacy (measured by standard questions on compound interest and inflation) are also very high. Finally, almost a third of the sample is a member of a SEETU.

With regard to imbalance in the sample, the bold and italics on the table compare the 0 percent group with the other treatment groups. Differences in characteristics are shown in italics (indicating a difference significant at the 10 percent level), bold (indicating a difference significant at the 5 percent level), or bold and italics (indicating a difference significant at the 1 percent level). Because the sample sizes in the 0 percent treatment group is largest, almost all of the significant differences are with this group.

Table D1: Balance Tests
Treatment Group

	All Treated	0%	2%	4%	8%	Control
Observations	1625	683	316	310	316	381
Take-up rate (1)	85.5%	87.1%	86.4%	86.1%	80.7%	NA
Take-up rate w/o attritors (1)	89.8%	91.1%	89.8%	89.6%	87.0%	NA
Attrition rate (Offer not Given)	4.7%	4.4%	3.8%	3.9%	7.3%	NA
Age	40.9	40.3	<i>41.5</i>	42.0	40.6	41.1
Female	19.1%	18.2%	19.0%	19.7%	20.9%	21.0%
Married	85.0%	85.7%	86.1%	88.7%	78.8%	81.6%
Muslim	4.0%	5.0%	4.7%	1.6%	3.5%	2.6%
Years of Schooling	10.1	10.2	9.9	10.1	10.1	10.3
Household Head	61.5%	64.0%	61.7%	60.6%	57.0%	60.1%
Household owns mobile phone	89.0%	89.5%	90.2%	87.1%	88.9%	90.3%
Member Seetu	31.1%	31.8%	29.1%	31.3%	31.3%	33.9%
Has bank account	73.7%	75.0%	74.7%	73.5%	70.3%	71.7%
Financial Literacy	75.6%	75.5%	76.9%	76.8%	73.1%	79.3%
Self Employed	71.9%	70.7%	73.7%	77.3%	77.7%	71.4%
Has changed SIM	56.0%	58.1%	54.4%	51.9%	57.0%	58.5%
Tops up at least weekly	58.5%	60.6%	59.8%	52.6%	58.2%	58.5%
Reads text "Very easily"	19.2%	19.0%	19.6%	19.0%	19.3%	19.7%

Bold and Italics: Significantly different from 0% group at the 1% level

Bold: Significantly different from 0% group at the 5% level

Italics: Significantly different from 0% group at the 10% level

(1): There are 77 individuals who did not receive the offer because they attrited. The first take-up number assigned take-up=0 for these 77, and the second assigns these 77 as missing.

Table E-1: Number of participants, treatment offers made, and accounts opened
By treatment condition and town.

To	Treatment Summary														
	0%			2%			4%			8%			Total		
	Treatment Qualified	Offer made	Offer Accepted	Treatment Qualified	Offer made	Offer Accepted	Treatment Qualified	Offer made	Offer Accepted	Treatment Qualified	Offer made	Offer Accepted	Treatment Qualified	Offer made	Offer Accepted
KN	107	98	89	36	34	30	32	32	26	38	33	28	213	197	173
MT	131	127	110	58	56	52	64	61	54	61	60	53	314	304	269
PL	93	88	85	58	56	51	53	53	51	40	40	39	244	237	226
KT	118	112	107	49	48	42	49	43	39	68	61	50	284	264	238
KR	132	128	114	64	61	50	57	55	47	54	49	38	307	293	249
KG	102	100	90	51	49	48	55	54	50	55	50	47	263	253	235
Total	683	653	595	316	304	273	310	298	267	316	293	255	1625	1548	1390

Table E2: Comparison of means by take-up (Baseline Data)

Characteristic	Mean in sample	Mean among those opening an account (Take-up=1)	Mean among those not opening account (Take-up = 0)	p-value Take-up = 1 vs. Take-up=0
	1625	1389	236	
Panel A				
Respondent is female	19.1%	19.5%	16.9%	0.36
Age of respondent	40.9	41.0	40.5	0.53
Respondent is married	85.0%	86.0%	79.2%	0.01
Respondent is Muslim	4.0%	3.6%	6.4%	0.05
Household head	61.5%	61.9%	59.3%	0.45
Self employed	71.9%	71.3%	75.0%	0.25
Panel B				
Use mobile daily: calls	62.5%	62.2%	64.0%	0.60
Use mobile daily: texts	6.9%	6.3%	10.6%	0.02
Have changed a SIM	56.0%	56.7%	51.7%	0.15

Call quality at home Excellent or Good	93.8%	93.6%	94.9%	0.44
Tops up at least weekly	58.5%	59.7%	51.3%	0.02
Closest top-up point w/in 200M	71.8%	71.0%	76.3%	0.10
Can fix phone problems yourself	18.6%	18.3%	20.3%	0.45
Number of 13 other uses for phone	1.5	1.5	1.8	0.14
Use phone for at least one of the 13 other uses	48.1%	47.9%	49.2%	0.72
Interested in mobile banking if fee is 0%	81.4%	82.2%	76.7%	0.04
Average % fee would be willing to pay	4.2	4.2	3.8	0.06
Can read phonetic text Excellently	19.2%	18.6%	22.9%	0.12
Panel C				
Have account at bank	73.7%	74.4%	69.5%	0.11
Have account at Samurdhi / Sanasa bank	11.4%	12.1%	7.2%	0.03
Member of at least one Seetu	31.1%	32.3%	24.2%	0.01
Use ATM at least yearly	19.8%	19.9%	19.5%	0.89
Travel time to nearest bank (minutes)	15.8	16.1	14.4	0.02
Time needed to make deposit (minutes)	23.2	22.9	25.2	0.59
Cost to travel to banks (LKR)	9.0	9.0	8.9	0.94
Most people can be trusted	10.2%	10.1%	10.6%	0.81
Have "A great deal" of trust in banks	60.9%	61.6%	56.8%	0.16
Panel D				
1 Month discount rate	8.58%	8.61%	8.42%	0.82
Answers 2 financial literacy question correctly	75.6%	75.4%	76.7%	0.66
Years of schooling	10.1	10.1	10.2	0.51
Numeracy test: sequences	41.5%	40.3%	48.7%	0.02
Numeracy test: counting backward by 7	34.0%	32.8%	41.1%	0.01
Raven test (out of 12)	4.2	4.2	4.4	0.20
Digitspan: Longest sequence recalled	6.1	6.1	6.3	0.22
Willing to take risks (scale 1 to 10)	5.6	5.6	5.7	0.71

Table E3: Dependent Variable: Opened Bank Account

VARIABLES	(1) Probit	(2) Probit	(3) Probit	(4) Probit
Fee: 0 percent	0.0628*** (0.022)	0.0631*** (0.022)	0.0588*** (0.021)	0.0586*** (0.021)
Fee: 2 percent	0.0504** (0.023)	0.0503** (0.023)	0.0488** (0.022)	0.0478** (0.022)
Fee: 4 percent	0.0465** (0.023)	0.0489** (0.023)	0.0481** (0.023)	0.0494** (0.022)
Younger than 40 years of age	-0.0180 (0.018)	-0.0164 (0.018)	-0.0556*** (0.019)	-0.0571*** (0.019)
Female	0.0194 (0.021)	0.0134 (0.022)	0.0365* (0.021)	0.0361* (0.021)
Muslim	-0.0894* (0.053)	-0.0879* (0.053)	-0.0836 (0.051)	-0.0842* (0.051)
Self Employed			-0.0254 (0.019)	-0.0251 (0.019)
Member of Seetu			0.0518*** (0.019)	0.0512*** (0.019)
Has bank account			0.0347 (0.022)	0.0344 (0.022)
Tops up at least weekly			0.0539** (0.022)	0.0539** (0.022)
Have changed a SIM			0.0351 (0.022)	0.0305 (0.022)
Years of schooling		0.0011 (0.004)		
Numeracy (First PC)		-0.0162** (0.008)		
Raven test (out of 12)		-0.0011 (0.004)		
Can read phonetic text Excellently		-0.0174 (0.038)		
Average % fee would be willing to pay				0.0046* (0.002)
Observations	1624	1617	1624	1624

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Coefficients show marginal effects from a Probit regression. All regressions include the treatment stratification variables (quartile of formal savings and ability to read text)

Table E4: Account Usage Statistics

Panel A: Average number of transactions per account active at end of previous month

Month	Kegalle	Kandy	Kurunegala	Katugastota	Matale	Pelimathalawa	Total
February	0	0	0	0	0	0	0
March	0	0.65	0	0	0	0	0.65
April	0	0.45	0	0	0.00	0	0.44
May	0	0.65	0.14	1.35	0.45	1.12	0.84
June	0	0.28	0.58	0.87	0.56	0.73	0.55
July	0	0.32	0.58	0.70	0.48	0.63	0.51
August	0	1.46	1.16	0.62	0.38	1.03	0.93
September	0	0.68	0.83	0.90	0.30	1.12	0.74
October	0.25	0.27	0.51	0.78	0.29	0.75	0.48

Panel B: Average deposits per account active at end of previous month (LKR)

Month	Kegalle	Kandy	Kurunegala	Katugastota	Matale	Pelimathalawa	Total
February	0	0	0	0	0	0	
March	0	47	0	0	0	0	47
April	0	34	0	0	0	0	34
May	0	46	14	104	34	68	60
June	0	23	58	59	52	51	43
July	0	27	55	50	49	41	41
August	0	108	113	45	28	84	71
September	0	54	74	63	26	81	56
October	16	22	44	48	25	61	36
Total	16	362	359	370	215	385	390

TABLE E5: Effects of fee level on usage

	Made at least one deposit Probit	Total deposit amount OLS	Total deposit amount (w/o incentives) OLS	Made at least one deposit Within 2 km of Bank Probit	2-5 km from Bank Probit
Fee: 0 percent	0.069** (0.035)	136.1* (77.0)	116.1 (75.4)	0.130*** (.047)	0.018 (0.060)
Fee: 2 percent	0.022 (0.043)	196.5 (144.9)	146.7 (113.3)	0.102* (0.061)	-0.08 (0.07)
Fee: 4 percent	0.011 (0.042)	104.1 (120.5)	68.2 (109.6)	0.071 (0.060)	-0.018 (0.072)
Located < 2 KM from bank branch	-0.108*** (0.027)	-198.9** (91.8)	-154.0* (79.0)		
Located > 5 KM from bank branch	-0.087** (0.037)	-35.5 (106.3)	-8.5 (103.2)		
Months since demonstration	0.037*** (.005)	50.2*** (14.9)	34.7*** (11.8)	0.013** (0.006)	0.059*** (0.007)
Obs	1284	1284	1284	587	1284
R-squared	0.44	0.019	0.013	0.023	0.106

Notes: The coefficients in the probit regressions show the marginal effects of a change in the independent variable. All regressions include the treatment stratification variables (quartile of formal savings and ability to read text messages).

Annex F: Discussion of Product Delays

Relative to the initial project timeline, we experienced numerous delays in the timing of the rollout. These affected both our survey operations and the experience of the users. As we noted in the text, the initial discussions by the mobile operator and potential banking partners were held during 2010. Once a decision was made, a four-way (mobile operator, bank, software firm, research project) Memorandum of Understanding was drafted for signature. The MOU required approval from the boards of both the mobile operator and banking partner. The approval from the mobile operator came quickly. The MOU was first on the agenda of the board meeting at the bank in November 2010, but was not taken up for lack of time. Similar circumstances occurred a couple of other times in 2011. The MOU was finally approved by the bank board and signed by all parties on 28th September 2011.

In February, 2011, the banking partner did allow limited testing of the product on a small number of research project phones and accounts. This testing began in March 2011. Around the same time the bank began an internal audit of the software, to make sure that it performed as designed and that it operated in a secure fashion. We should note the product required that the bank give the software company substantial access to its accounting system. In the summer of 2011, as the audit was nearing completion the bank suffered a credit card fraud. The fraud was not in any way related to our project, but it did make the bank more cautious about the access given to the software company. This caused some further delays in our broader launch of the product. But in August 2011, the bank allowed product testing to be extended to other research project staff accounts. This was an important step to allow the project RAs to gain some experience using the product. At a banking partner board meeting in November 2011, the board agreed to move forward with the rolling out the product to the project participants. With this approval, we began opening accounts for the participants selected into one of the treatment groups in December 2011.

In February 2012, project RAs began the one-on-one product demonstrations by in Kandy. During February and March the demonstrations were limited to one of the six cities in which the project was carried out so that we could closely monitor the initial use of the product. Indeed, shortly after the demonstrations began, a glitch was discovered in the IS platform on which the product was built. The mobile operator's *m-purse* account was debited each time a deposit was made. This account was not being replenished, and had gone to a negative balance. By March a permanent fix had not been implemented for this issue, and the bank suspended use of the system. The system remained out of service – meaning deposits could not be made – for a period of about two weeks. By late March a set of procedures to replenish the mobile operator *m-purse* account was in place and we were assured that the issue had been resolved permanently and that the system would not be suspended again. In April, we therefore began demonstrations in four of the other five cities (excepting Kegalle).

Finally, in the summer of 2012, we learned that the banking partner could not locate 137 of the account forms filled out by participants. Most of these (119) were in a single branch (Kurunegala). This delayed demonstration for these participants until early 2013.

The pre-launch delays were costly to the project because we were surveying a sample of the participants on a monthly basis. We suspended surveys in early 2011 for a two months. However, as of May 2011, we expected to be in a position to launch the product by July, and we felt we needed a current baseline survey. So we began the survey again. The delay in the launch from that point was always incremental, and given the high cost of not having a current baseline survey at the time of launch, we continued with the monthly surveys.

The post-launch delays were costly for the same reason, but also because they caused some problems with the logistics of the product rollout. For example, at the time the paperwork was processed and the account was approved by the bank, a text message with a temporary PIN was sent to the participant. But delays in the demonstrations meant that the text was often deleted from the system by the time the RA arrived. Thus, we began asking the bank to send a new message just before scheduled visits. More seriously, the delays – and more so the period when the system was suspended – may have dampened enthusiasm for the

product. We attempted to overcome this with some short-term incentives to use the product, provided in Kandy in August and September 2012. We plan similar incentives in other cities in early 2013.