

**MOBILE PHONE OWNERSHIP AND THE UPTAKE AND USAGE OF DIGITAL FINANCIAL SERVICES:  
FINDINGS FROM A FIELD EXPERIMENT AMONG SMALLHOLDER FARMERS IN TANZANIA**

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**SUMMARY**

Mobile technologies have swept through the developing world, and many believe they are revolutionizing not just person-to-person communication and the transmission of information but also access to financial services. Traditionally, most people in sub-Saharan Africa, especially women, have been unbanked—they tend not to use formal financial institutions for savings or payments. The increasing accessibility of mobile money platforms, therefore, is potentially transformative—it opens the door, even among the poorest around the world, to financial inclusion. Mobile digital financial services have attracted great interest from development agencies, NGOs, and academics focusing on poverty alleviation and empowerment. Extant research and programming, however, have tended to take it as a given that potential users of digital financial services already own a mobile device. There is less systematic knowledge of the actual effects of mobile phone ownership on access and use of digital financial services. This represents an important question given the critical disparities in mobile and smartphone ownership, especially among women, the poor, and rural residents. How much does unequal access to mobile devices affect use of digital financial services? What is the uptake rate of mobile money for new phone users? What factors lead new phone users to become active mobile money users?

To address these questions, we are undertaking a series of randomized-controlled trials on the impact of mobile phone uptake on non-phone owners. This briefing reports on the results of phase 2 of our research program—a medium-sized RCT undertaken for 5 months<sup>1</sup> among 392 female smallholder farmers in Tanzania, in which 148 participants were enrolled in a mobile technology training program and received a basic mobile phone handset, a Tigo SIM card and start-up credit; 95 received the equivalent value of the phone package as an unconditional cash transfer, and 149 were in the control group.

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<sup>1</sup> The experiment ran from December 2015 until May 2016.

Consistent with existing studies that suggest mobile phone ownership is instrumental to the uptake and use of digital financial services,<sup>2</sup> we find the distribution of the mobile phone package significantly accelerated participants self-reported and actual use of mobile money. At baseline only 8% of participants reported having a mobile money account; however, by endline 76% in the phone group reported having one compared to 13% in control and 48% in the cash group. (The sizable increase of mobile money use in the cash group is largely due to some 40% of the recipients using their cash grant to buy mobile phones. We discuss this below.) Moreover, those in the phone and cash groups were significantly more likely to report being *super-users*<sup>3</sup>: 7% of the phone and control groups report using the mobile money service daily or several times a week, compared to only 2% in the control group.<sup>4</sup>

Beyond self-reported effects, we also tested the phone intervention on actual mobile money use. To do so, we offered all participants a small grant at the end of the study, and offered a 70% premium if they accepted the transfer via mobile money—thus providing a strong incentive for participants to accept mobile money over cash. Those in the phone group were 33% more likely to accept the grant as mobile money offer versus the control group (63.5% v 47.7%). The results are even more striking when analyzed based on who receives the mobile money transfer—whether the participant or someone else. Of those who accept the mobile money transfer, those in the phone group were 560% more likely to report it went to their own account rather than someone else’s account (74% v 11%). In short, owning a mobile phone not only increases one’s likelihood of using mobile money in a real world situation in which there are significant benefits to using such a service (and costs not to) but it also ensures one has more control over the financial remittances she receives.

Overall, getting phones into the hands of low-income women who previously had little access to this technology and minimal experience with digital financial services is found to be effective at significantly boosting the uptake and usage of mobile money across the board, including setting them on the track to become super-users. We see no evidence that uptake and usage of mobile money by those in the phone group is constrained by age, level of income, prior familiarity with mobile technology, prior use of mobile money, the number of phones in the

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<sup>2</sup> Scharwatt, Claire Pénicaud, and Elisa Minischetti, “Reaching Half of the Market: Women and Mobile Money,” Connected Women GSMA, September 2014. Available at: [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/09/2014\\_DI\\_Reach-half-of-the-market-Women-and-mobile-money.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/09/2014_DI_Reach-half-of-the-market-Women-and-mobile-money.pdf)

<sup>3</sup> Note that this measure codes participants who do not own mobile money accounts as “0”. The question: “If yes, how often do you use your mobile money account?” was only asked to participants who reported owning a mobile money account. It is plausible that most participants who do not own mobile money accounts, also do not use mobile money services, but we know that this is not a perfect correlation. The reported difference between groups is, therefore, likely smaller than reported. This is because those in the control group are, because of the experimental intervention, systematically less likely to report owning a mobile money account.

<sup>4</sup> This result is robust to different cut-off points. The analysis presented here reports on *super-users*—those who use mobile money at least multiple times per week—with statistically significant differences between the phone and cash groups, compared to the control group. This result increases in statistical strength and magnitude when considering *active-users*—those who use mobile money at least once per week—and with *regular-users*—those who use mobile money at least once per month.

household, marital status, household bargaining power, or access to electricity.<sup>5</sup> The only factor that has a consistent and significant additive effect on mobile money use is *education or literacy*.

This rest of the briefing paper is organized as follows. We first provide a description of our research design. Then we report key findings on the effect of the mobile phone package on uptake and use of digital financial services. We conclude by discussing the implications of the findings and next steps.

## RESEARCH DESIGN

This briefing paper reports on a medium-sized randomized-controlled trial undertaken for 5 months among 392 female smallholder farmers in Tanzania in 2015 and 2016 and in partnership with Tigo Tanzania and the Journalists Environmental Association of Tanzania (JET), a local non-governmental organization working in Rufiji and Kilwa Districts in Pwani and Lindi Regions, respectively. Recruitment and screening of participants for mobile phone ownership prior to the start of the study was undertaken by JET.<sup>6</sup> Once 392 women were recruited, a team of female field assistants from REPOA gained the consent of program participants (see Appendix) and undertook a baseline survey.

The general characteristics of study participants at the outset of the study were low-income smallholder farmers with minimal levels of literacy (less than 40% could read), low levels of mobile phone use (nearly 70% used a phone once a week or less) and little or no uptake of digital financial services (at baseline only 8% reported having a mobile money account and even fewer—only 3%—reported using a mobile money account to save money, though most (70%) are familiar with the instrument).

Participants were randomly assigned to one of three study groups:

- *Phone group*: 150 participants were invited to attend a mobile technology training workshop where they received training in mobile phone use and were given a cost-free basic mobile phone handset (Nokia 105) along with a Tigo SIM card and 10,000 Tanzanian Shillings of start-up credit (around US \$5 at the time). During the training workshop, participants had their SIM card registered with Tigo and were enrolled in Tigo Pesa (Tigo's mobile money service).

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<sup>5</sup> In some specifications, such as having a mobile money account, electricity access at home is significant but this is not consistent across outcome measures.

<sup>6</sup> To reduce adverse selection into the program by existing phone owners, during initial recruitment and screening of non-phone owners, potential participants were informed about a new development program for non-phone owners that JET was planning in conjunction with its partner, CARE International, but they were not informed it involved the distribution of cost-free phones.

- *Cash group*: 100 participants were given the equivalent value of the phone package (phone+SIM+start-up credit) in the form of an unconditional cash transfer (this was valued at \$23).
- *Control group*: 150 participants received neither a phone package nor cash at the outset of the study. But a few months after the end of the study, these participants received a mobile phone handset as well.<sup>7</sup>

Table 1 reports the balance on key covariates across study groups. There are no statistically significant differences between the control group, cash group and phone group.

<b>Table 1. Baseline characteristics across study groups</b>			
	<b>Control</b>	<b>Cash</b>	<b>Phone</b>
Age	36.84	37.18	37.32
Education level	6.70	6.26	6.53
Income level	3.31	3.6	3.2
Marital status	4.08	3.72	4.12
Mobile use	3.36	3.26	3.48
Mobile phones in HH	0.56	0.61	0.57
Mobile money familiarity	0.77	0.66	0.71
Mobile money account ownership	0.04	0.13	0.09
Financial services preferences	2.56	2.47	2.16

Roughly five months after the distribution of the phone and cash, we revisited program participants to evaluate their phone use and uptake of mobile money, as well as assess them across a number of different dimensions—level of social connectedness, economic independence, civic and political participation, household bargaining power, individual efficacy, and degree of affectedness by gender-based violence. In this briefing paper we only report on the uptake and usage of digital financial services.

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<sup>7</sup> This study has very low participation attrition rates across study groups. A total of 98% of the sample was located for the baseline survey, distribution of treatment, and endline survey, with 148 of 150 phone group participants, 95 of 100 cash group participants, and 149 of 150 control group participants available for each stage of the study.

## FINDINGS

### *Manipulation and Compliance Checks*

Before reporting the uptake and usage of digital financial services, we first describe the results of several compliance and manipulation checks we made to make sure participants still had the phones and were using them.

Table 2 describes the results of phone ownership rates across study groups as

**Table 2. Phone ownership rates across study groups at endline**

Control	Cash	Phone
8.72%	50.53%	90.54%

reported at the endline. Overall, those in the phone group remain phone owners. Interestingly, when we asked at the end of the study whether those in the phone group still had the phone we gave them, some 20% reported they did not<sup>8</sup>—a high rate of attrition, especially over a period of 5 months. Among the 30 study participants in the phone group who no longer had the phone we gave them: 8 (27%) report the phone as being stolen; 5 (17%) lost; 12 (40%) broken; 2 (7%) sold the phone; and 3 (10%) gave phone to a family member.<sup>9</sup>

The high rate of phone ownership among the cash group was due to the fact that 40% of participants in that study group reported using their cash to buy a phone. (After buying a phone, the second most common use of the cash transfer was investment in agriculture—30% of participants).

The phone distribution appears to lead to a qualitative increase in phone use among phone group participants. In the phone group, more than 85% of participants report being able to use their phone every day or several days a week compared to 60% in the phone group and 28% in the control group.

Interestingly, those in the phone group loan out their phone much less frequently than one might suspect. Forty-nine percent of participants in the phone group report never lending or sharing their phone; 14% report less than once per week; 20% report at least once per week; 14% report several times per week; 3% report everyday.

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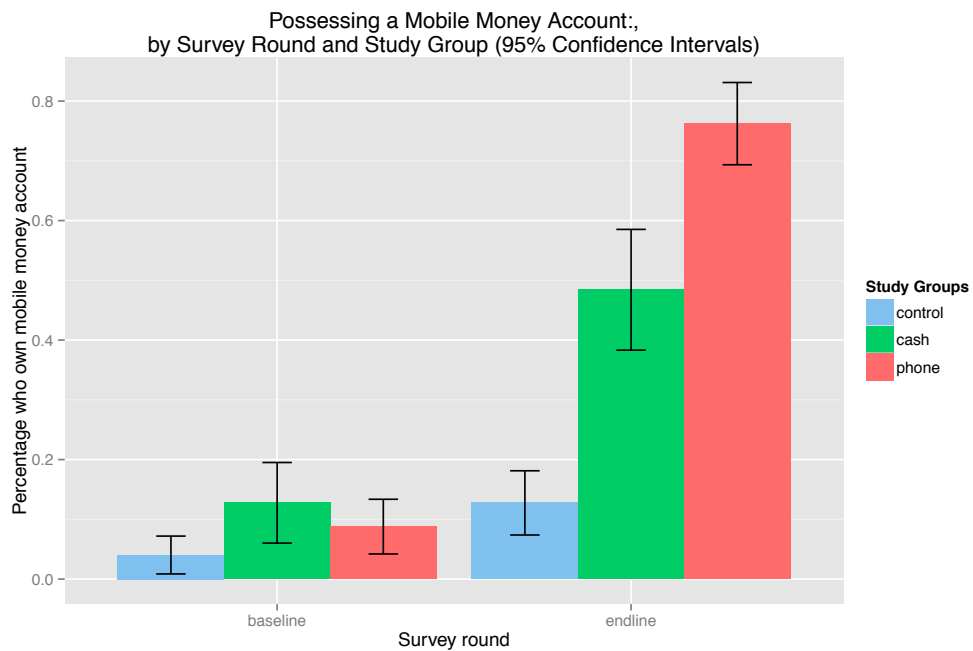
<sup>8</sup> The discrepancy in the phone group between the 90% rate of ownership reported in Table 2 and only 80% retaining their phone suggests half of those who lost their phone were able to acquire a replacement—a very high rate, considering the baseline increase in phone ownership was around 9% (based on control group).

<sup>9</sup> There is no evidence that this attrition is systematic. None of the following factors account for it: marital status, number of phones in household, whether a spouse owns a phone age, education, prior use, access to electricity, latent preference for a phone (prefer a phone to cash transfer).

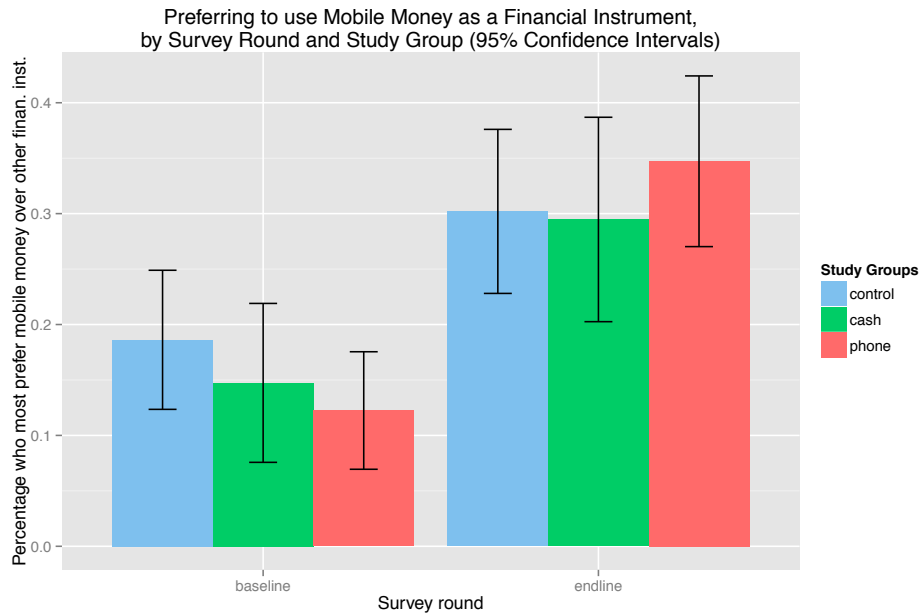
## Uptake and Usage of Digital Financial Services

Five months after the treatments were administered, we evaluated the effect of the mobile phone program on uptake and usage of digital financial services compared to cash and control groups. Overall, we saw strong treatment effects for those in the phone group in the uptake and usage of digital financial services.

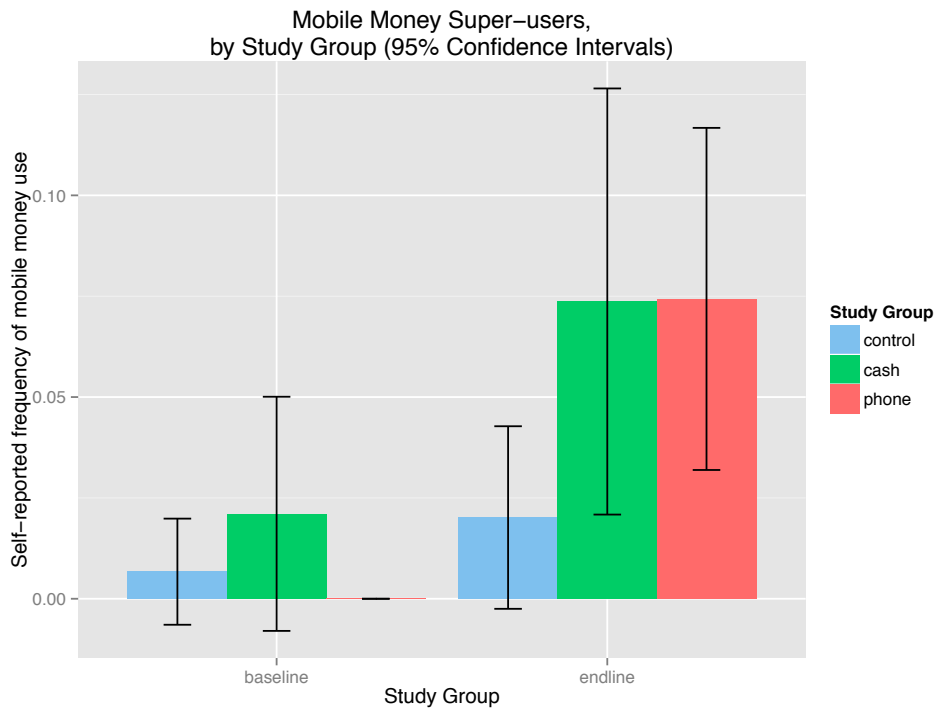
- **Possessing a Mobile Money Account:** At endline, 76% reported having a mobile money account compared to 48% in the cash group and 13% in the control group. (The large increase in mobile phone use among those in the cash group is due to those in the cash group using their grant to buy mobile phones and then becoming more active users of mobile money.)



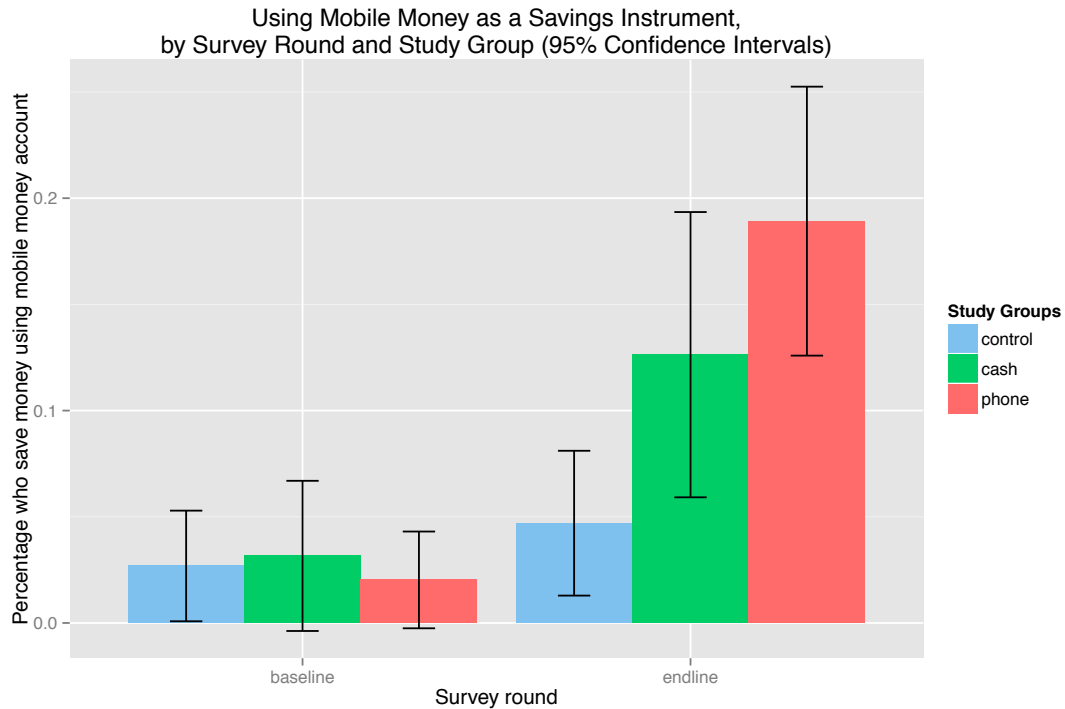
- **Preference to use Mobile Money as a Financial Instrument**
  - 66% increase among control
  - 100% increase among cash
  - 170% increase among phone



- **Proportion of participants that become super-users: using mobile money every day or several times a week across study groups**



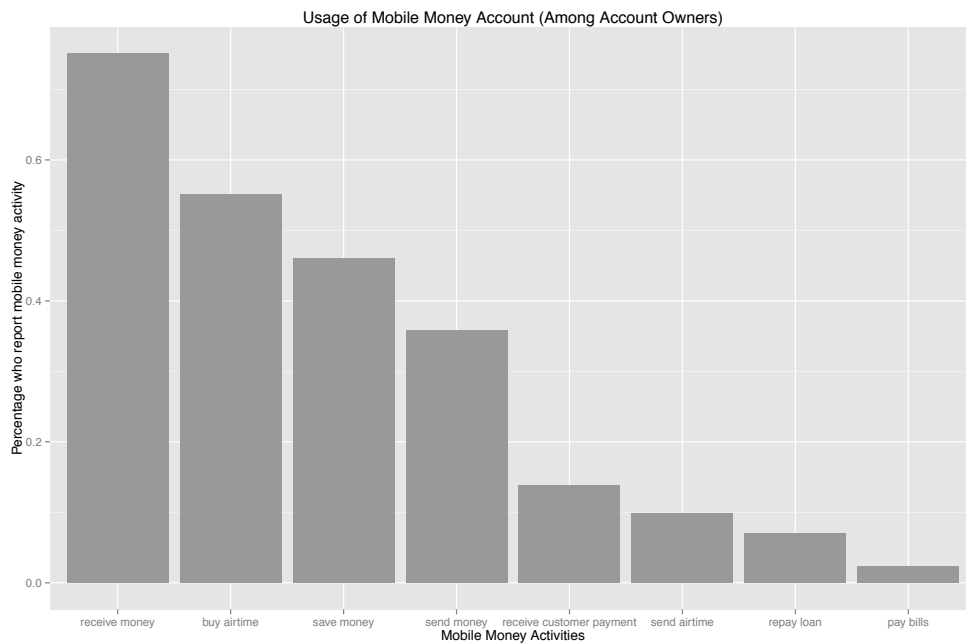
- *Using Mobile Money as a Savings Instrument:* At endline, 19% in the phone group reported using mobile money as a financial savings instrument compared to 13% in the cash group and 5% in the control group.



- *Reported Personally Sending and Receiving Money:* There was no evidence of treatment effects across study groups in terms of sending and receiving money, generally. Across all conditions, 57-59% of respondents reported having received money from friends, family, and others within Tanzania as a gift, donation, loan, or for other purposes. In terms of having sent money, in the control group only 13% reported having sent money in past month compared to 19% in phone and cash groups—though this difference is not significant.



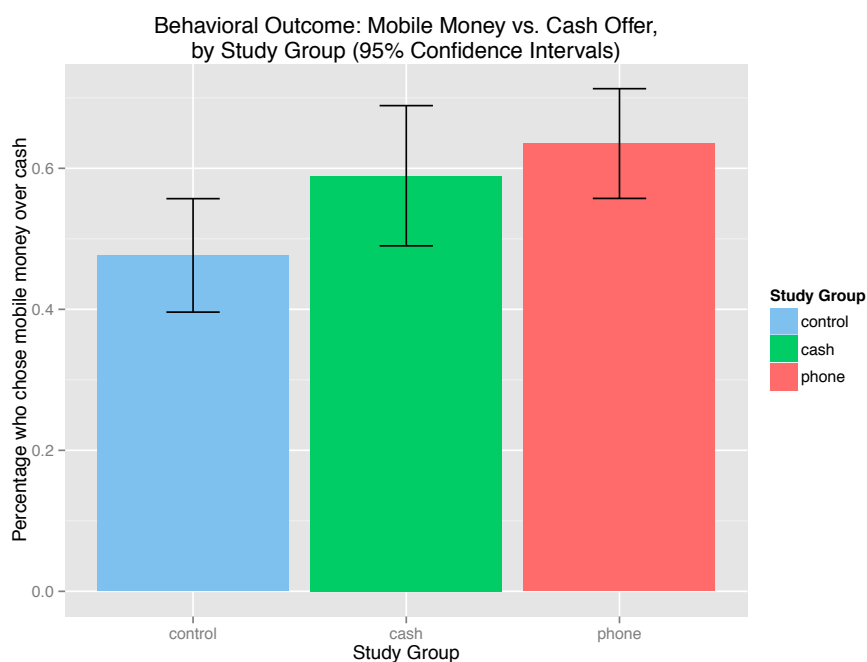
- Among all participants who have mobile money accounts at endline, they reported using it for following purposes:
  - 75% to receive money
  - 55% to buy airtime for themselves
  - 46% to store and save money
  - 36% to send money
  - 14% to receive customer payments
  - 10% to buy airtime for someone else
  - 7% to make loan payments
  - 2% to pay bills



### *Behavioral Outcome*

- With the aim of measuring participants revealed preferences for digital financial services, we concluded the endline survey with an invitation for the study participants to receive a small grant either in the form of cash or mobile money. Because of the barriers present in using digital financial services among participants, we formulated a “hard test” for the preference of cash over mobile money by offering more money to those who chose to take the small grant in the form of mobile money: participants who chose the cash option received 2500 TSH (roughly \$1.15 USD); participants who chose the mobile money option received 4500 TSH (roughly \$2.05 USD). Participants were informed of these differing amounts prior to their choice. Because of the difference in amounts, and the assumption that each of the participants would prefer the larger grant, we were able to behaviorally measure the ability of participants to make use of digital financial services when the stakes of doing so are reasonably high.

- We find statistically significant differences in the comparison between the control vs. cash and the control vs. phone study groups, with 47% of the control group, 59% of the cash group, and 64% of the phone group choosing mobile money over cash. Access to greater financial assets and access to mobile technology both significantly increased the likelihood of study participants to choose mobile money over cash.
- In addition to the significant increase in mobile money use that greater financial assets and access to mobile technology bring, there were also great differences in whether the small grant went to the participant’s own mobile money account or someone else’s, among those who chose mobile money. *Only 11% of those the control group who chose mobile money were able to send the small grant to their own account, while 57% of the cash group and 74% of the phone group who chose mobile money were able to send the small grant to their own account.*

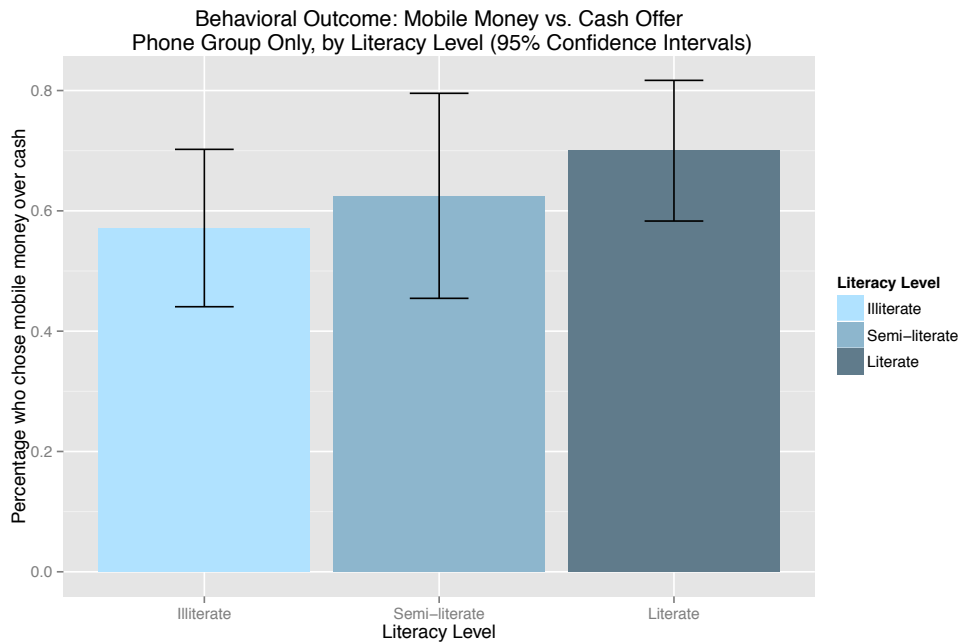
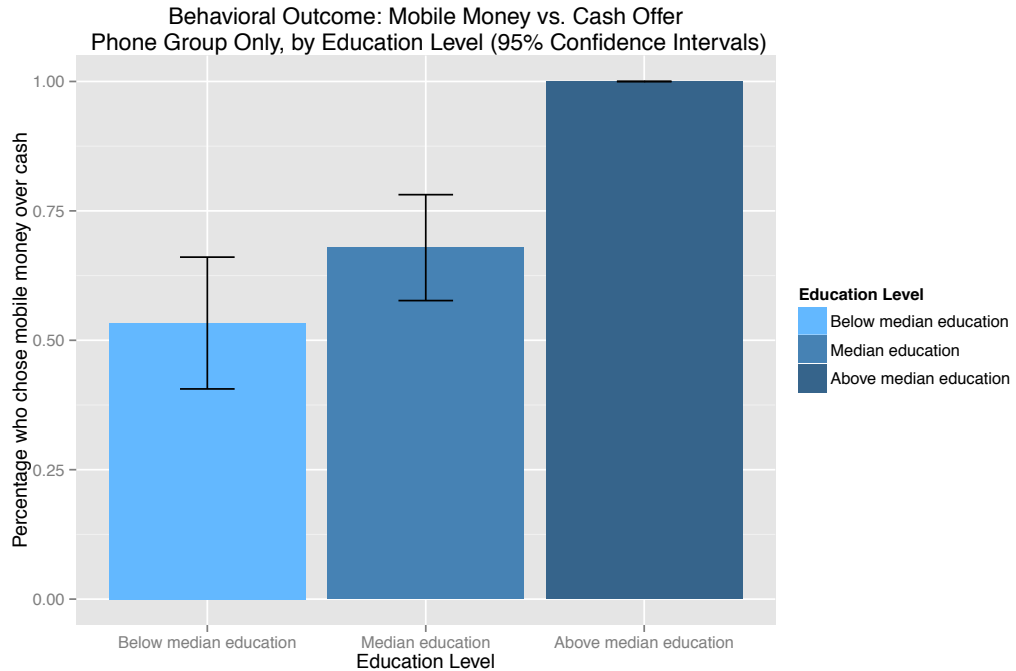


*From mobile phone ownership to an active user of digital financial services*

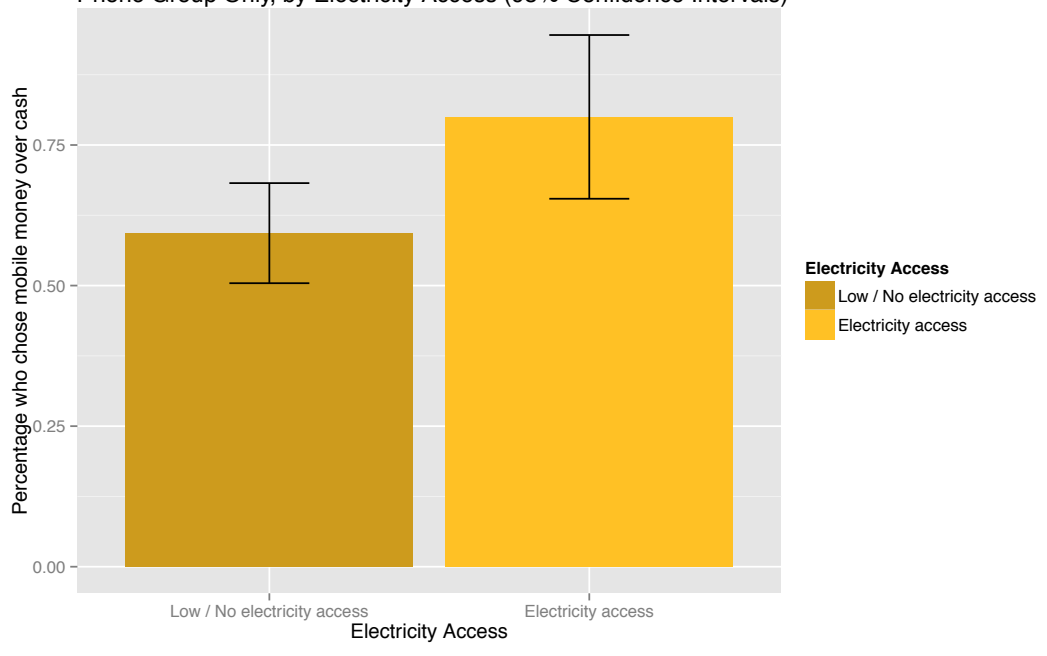
- While we are only able to make causal claims about the relationship between the randomly assigned intervention on digital financial services outcomes, we can still present suggestive claims about why the intervention had its given effects. In answering the question “what factors are related to the uptake of digital financial services?” we conduct an analysis on the associations between digital financial services use and baseline the characteristics of the phone study group. In this analysis, we use a battery of baseline characteristics that may explain why a given mobile phone user could adopt digital financial services in their lives. These characteristics are: age, education, marital

status, baseline mobile money use, phone ownership history, roof material of dwelling, monthly income, access to electricity, number of mobile phones in the household, education level, and access to electricity.

- Among all of these characteristics only education level, literacy, and, in a few specifications, access to electricity, have a statistically significant positive association with digital financial services use and mobile money account ownership.



Behavioral Outcome: Mobile Money vs. Cash Offer  
Phone Group Only, by Electricity Access (95% Confidence Intervals)



## Appendix 1. Program Consent Form

The following consent form was used for all participants:

Participants will be read the following prompt: “The Journalists Environmental Association of Tanzania (JET) and CARE International are working together on a program initiative in your area. The program is in partnership with the mobile network operator, Tigo Tanzania, and Kidogo Kidogo—a social enterprise that works with women in Tanzania. The program entails the provision of mobile phones or a small cash grant to women who do not already own a phone. If you do already own a phone, unfortunately, you are not eligible to participate. Tigo and Kidogo Kidogo are undertaking this initiative because they think it is important that everyone has access to mobile phones. It decided to work with JET and CARE because of the great work the organizations are doing in your districts. Each person selected for the program will receive a mobile phone with a Tigo sim card or a cash grant. The phone packages are donated free of cost from Kidogo Kidogo and Tigo and are the property of the program recipient.

The cash is provided by JET and CARE and can be used however the recipient decides is best. It is important to note: though everyone in the program will receive a mobile phone or cash, unfortunately at this time, Tigo and Kidogo Kidogo do not have enough phones available to give to everyone right now. But don’t worry; they are going to get more phones soon. If you don’t receive a phone or cash grant now, you will get one as the rest of the phones become available, probably in a few months. To determine how to distribute the phones that are available now, Kidogo Kidogo and Tigo will use a lottery or luck of the draw. Each person who agrees to participate in the program will be entered into the lottery. Kidogo Kidogo and Tigo will then randomly draw names based on the number of phones they have available. If your name is drawn, you will be notified by JET and someone from Kidogo Kidogo will come to give you the phone in the near future. Others will be notified once Kidogo Kidogo and Tigo acquire more phones.”