SWIFT INSTITUTE

SWIFT INSTITUTE WORKING PAPER NO. 2012-003

CAN MOBILE MONEY BE USED TO PROMOTE SAVINGS? EVIDENCE FROM PRELIMINARY RESEARCH NORTHERN GHANA

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JANUARY 2013

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Acknowledgements

This research would not have been possible without the financial support from the SWIFT Institute and the close partnership with Catholic Relief Services/Ghana and the Catholic Diocese of Wa. In particular, we are indebted to Kris Ozar (CRS), Robert Asambobillah (CRS), Thomas Dapilah (Catholic Diocese of Wa) and Fulgencious Nwin-Ninge (Catholic Diocese of Wa). We also greatly appreciate the support of Franklin Belnye of the Central Bank of Ghana and of MTN/Ghana in Jirapa and Wa. Finally, we greatly appreciate the research assistance of Megan Rounseville, Rebecca Tapscott, Elizabeth Yepsen and Bamba Abdulrahamane.

I. Overview of Research

In the remote areas of sub-Saharan Africa, less than 20 percent of the population has access to any type of formal financial institution. Yet access to financial services is a key aspect of development, as credit and savings allow households to invest, save and respond to shocks. Households in such contexts typically share risk by self-insurance (savings), including "at home savings" (i.e., under a mattress), saving with collectors (i.e., *susu*) or "rotating savings clubs". In addition to savings, rural households often use migration to urban areas as a means of diversifying household income. While these strategies are important risk-sharing mechanisms for rural households, they are also subject to risks, including theft (in the case of the mattress), restricted access at relevant times (in the case of the savings club), fees (to the *susu* collector) or high transaction costs (in the case of remittances).

Since 2005, a new technology—mobile money—has become available in over eighty countries worldwide. Mobile money (m-money) is a product that allows clients to use text messages to store value in an account accessible by the handset, convert cash in and out of the stored value account, and transfer value between users (Aker and Mbiti 2010). As compared with the traditional means of sending and receiving money within many developing countries, such as Western Union and MoneyGram, the postal service or delivery by friends or family, m-money substantially reduces the costs of transferring money (Jack and Suri 2012).

M-money offers a new potential mechanism for increasing the financial inclusion of the world's poor. First and foremost, since m-money can reduce the monetary and security costs associated with money transfers, it can allow households to send or receive money when it is needed, thereby improving households' ability to share risk (Jack and Suri 2012, Blumenstock, Eagle and Fafchamps 2012). Beyond money transfers, m-money could also be used to create a secure pseudo-savings account, where individuals can deposit smaller savings amounts for more immediate needs (Mas and Mayer 2012). As the "account" is password-protected, the m-money savings channel could offer greater security (as compared with savings under the mattress) while having increased access (as compared to the annual "share out" of savings clubs). In addition, m-money could encourage individuals to save for particular objectives.

This research seeks to understand **whether and how m-money can promote financial inclusion of the world's poor, particularly those living in rural areas.** In particular, the purpose of this research is to address some of the potential barriers to m-money adoption and usage in Ghana, with a goal towards providing insights into whether m-money services could be used to: 1) provide cash transfers to extremely vulnerable populations; 2) facilitate savings within rural areas, either by allowing individual members of savings groups to save, facilitating savings among different savings or promoting savings objectives; or 3) allow households to receive remittances from migrants.

To better understand the barriers, this research followed two stages. The first stage involved a scoping visit to meet with key stakeholders (mobile phone operators, governmental officials, consumers and international organizations) to better understand the extent and type of m-money services available and the potential barriers to adoption. The second stage involved the implementation of an "action-oriented research" program, The purpose of the action-oriented research was to understand rural households' demand for formal and informal financial services (including money transfer and savings services), their access to and usage of m-money and whether and how this technology could be used to improve households' access to financial services.

The location of this research is in northern Ghana, which was chosen for four primary reasons. First, despite a relatively stable economy and a number of formal financial institutions, there is still limited access to formal credit and savings institutions, particularly in rural areas. Second, there is a long history of informal savings in Ghana, either via *susu* collectors or through rotating village savings clubs. Third, while mobile phone coverage is substantial in Ghana, m-money is a relatively recent

phenomenon, although there are numerous m-money providers. And finally, households engage in a substantial amount of migration to diversify income sources and smooth risk.

There are several potential barriers to the adoption and usage of m-money in Ghana (CGAP 2011, Dzokoto and Mensah 2011). In an effort to build upon that earlier work, this study conducted "action-oriented research", providing services designed to address some of the constraints to m-money adoption. These included: 1) a mobile phone raffle and access to a mobile money agent; 2) a sensitization campaign on mobile money with access to a mobile money agent; and 3) a combination of the two. We then observed how individuals responded to these services in terms of their adoption and use of mobile money.

Overall, we found that rural populations' interest in adopting m-money was extremely high. All of the savings group members in our study registered for the product, which required attending a village meeting, providing a form of formal identification to register and waiting for the account to be activated. While the SIM cards were provided free of charge, the wait time was non-trivial: Individuals had to wait at least 2-3 hours for the registration process, and in some cases had to provide their ID cards to the m-money agent so that he could complete the registration in the nearby urban center, a wait time of 1-2 weeks.

A month after the registration, 10 percent of participants had used the service, solely for receiving a money transfer. However, 2.5 months after the initial intervention, m-money usage increased to 26 percent of households, with 86 percent of users receiving money transfers and 70 percent of users saving on their mobile phone. Usage was relatively higher among individuals living in the villages where a mobile phone raffle was conducted (as compared with the sensitization campaign or both), and was highest among those who either had a mobile phone (before the intervention), who won a mobile phone in the raffle or who had attended school. Sensitization was primarily important for usage among those who had access to a mobile phone.

Usage of the product was affected by several factors: 1) there were significant delays in activating the m-money service, due to limited mobile phone coverage and the m-money agent's ability (and willingness) to travel to rural areas; 2) the time frame between initial registration and the follow-up visits may not have been sufficient for individuals to start using the product, especially for savings; or 3) households' might have had limited demand for using service after registering, either due to difficulty in using the service or lack of trust in its viability. According to the qualitative data collected, respondents stated that the delays in registration were the primary reason that they had not used the service by the time of our visits.

Given the small sample size and limited time frame of this intervention, none of the observed differences between the different treatments can be interpreted as causal, and we cannot use these results to predict whether similar outcomes would be observed in other rural contexts. Nevertheless, this research suggests that a subset of poor rural households may demand mobile money, primarily for money transfers, which can help households to cope with agricultural and health shocks, such as drought, illness and death. Perhaps most importantly, these results suggest that overcoming the barriers to m-money adoption may be quite simple and cost-effective. Additional research is required in a larger number of villages, and with greater collaboration with mobile phone operators, to further explore these results.

II. Financial Services and Mobile Money in Ghana

A. Financial Services in Ghana

Ghana is currently classified as a middle-income country, with a per capita income of USD $1,430 per year. Between 2000 and 2007, 30 percent of the population lived on less than USD $1 per day and 54 percent lived on less than USD $2 per day (World Bank 2012). Approximately 29 percent of the

population has access to a formal financial institution, defined as a bank, microfinance institution or cooperative.

With limited access to formal savings devices, such as loans, credit and insurance, rural households often use informal financial services to cope with shocks, diversify income and invest. The most common strategies in Ghana are migration and self-insurance (savings). In fact, over 54 percent of households have at least one migrant member, typically searching for employment in larger urban centers. Migrants send remittances to rural areas via the postal service, MoneyGram, bus or via a friend or family member. Yet these money transfer systems come at a substantial monetary and security cost; in fact, over 10 percent of households have reported having money stolen when using one of these informal money transfer services (CGAP 2012). These high transaction costs can reduce the amount and frequency of remittances sent to rural areas, thereby making it more difficult for households to smooth consumption and invest.

In addition to migration, households also use savings via informal services as a key financial device. Households in Ghana commonly save via a *susu* collector (a collector who holds a client's savings for a fixed period of time for a fee); a rotating savings and loan association (often known as a SILC), whereby a group of individuals deposit savings on a weekly basis and receive the accumulated savings after a fixed period of time (usually yearly); and savings under the mattress. While savings groups are usually more secure (the savings is kept in a locked box with three keys) and can encourage larger savings amounts, the savings cannot be accessed quickly in the case of an emergency. On the other hand, while personal savings can help a household deal with short-term shocks, they are usually smaller amounts and are subject to higher risk (in terms of theft and loss).

B. Mobile Money Services and Adoption

Over the course of the past decade, mobile phone coverage and adoption in Ghana has increased substantially. While less than 1 percent of the population had access to mobile phone coverage in 1999, this increased to over 55 percent in 2009, and continued to rise dramatically in the past few years (GSMA 2009). Coinciding with this increase in coverage has been an increase in mobile phone adoption and usage, from 150,000 mobile phone subscribers in 2000 to approximately 11 million subscribers in 2009, representing over half of the population (Wireless Intelligence 2012).

In addition to phone and SMS capabilities, several other services have been introduced into Ghana over the past few years, namely, mobile financial services. This has primarily focused on m-money, with five mobile phone operators offering some type of m-money services in Ghana, including MTN, Vodafone, Tigo, Glo and Zain. In addition, the Central Bank introduced a service known as "EZWICH", a biometric bankcard introduced by the Central Bank of Ghana that can be used at ATMs, in an effort to increase financial inclusion by enabling access to illiterate individuals.

The introduction of m-money services into many developing countries, and Ghana in particular, offers a new opportunity for improving households' access to formal financial services. Since m-money can reduce the transaction costs (monetary and security) associated with domestic money transfers, it can allow households to send or receive money more frequently, thereby improving households' ability to share risk (Jack and Suri 2012, Blumenstock, Eagle and Fafchamps 2012). In fact, research in Kenya found that households with access to m-money services did not reduce their consumption after a shock (in this case, drought) as compared with those households without access to m-money services. Yet beyond money transfers, m-money could be used to create a secure pseudo-savings account, where individuals can deposit smaller savings amounts into the m-money account (Mas and Mayer 2012). As the "account" is password-protected, m-money could offer greater security (as compared with saving under the mattress) while allowing households to access the money when it is needed (as compared to the annual "share out" of savings clubs). Finally, m-money could encourage individuals to save for particular objectives.

Yet despite its potential, m-money adoption and usage has been relatively low in Ghana. Official statistics estimate that less than 2 percent of the population has used m-money.[1] Promotion of m-money by the mobile phone operators has been high within the Greater Accra Region, as well as some of the larger cities (i.e., Kumasi, Tamale, Cape Coast), with numerous billboards and promotions. While many individuals, especially in urban and peri-urban areas, have heard of m-money, few people have used it personally, understood what it was or were interested in using it in the future (Dzokoto and Mensah 2011, CGAP 2012, personal interviews). In our scoping study, those who said they understood m-money primarily explained it as a way to send money from one person to another within Ghana, serving the same role as the more commonly used Western Union or MoneyGram.

Barriers to Mobile Money Adoption in Ghana

If m-money could potentially serve as a financial tool for rural households in Ghana and offer cheaper and more secure ways of transferring and saving small amounts of money, why aren't more people using it? In other words, what are the barriers to m-money adoption and usage in Ghana? Table 1 outlines three "phases" of m-money adoption, including adoption of the technology itself (i.e., purchasing a m-money-enabled SIM card), initial and ongoing usage.

Table 1: Barriers to Adoption

Adoption of Technology		
• Understanding of costs and benefits* • Trust in the *technology** • Access to technology & services*		
Initial Service Usage		
Demand factors	Product features	Market features
• Individual's social network & its m-money usage • Individual's occupation • Trust in the *service** • Ability to use service†	• Monetary cost of the service* • Actual security of the service • Ease of use • Supply of m-money agent network*	• Alternatives availability, cost, security • Access to mobile phone network
Ongoing Usage		
• Continued customer satisfaction • Continued access, security		

**Most common, Dzokoto and Mensah, CGAP* †*Additional factors from our research*

The decision to ***initially adopt m-money*** – specifically purchasing the SIM card – depends upon several factors. First, the technology and services have to be accessible. Perhaps most importantly, households need to understand what the technology is – and its potential benefits for them – and trust in the service (as compared with similar services). Among these factors, access to m-money agents, information about the service and trusting the technology are the most oft-cited reasons for limited initial adoption (Dzokoto and Mensah 2011, CGAP 2012, personal interviews).

Once the SIM card is purchased and registered, an ***individual must decide whether to actually use the service.*** Deciding to use the service often depends the individual's demand for m-money services, which is strongly related to the individual's occupation; the monetary cost of and trust in the m-money service as compared with other money transfer services; physical access to a (trustworthy and motivated) m-money agent to conduct the transaction; access to a secure and reliable mobile phone network; understanding of how to use the service (which involves a series of text messages and PIN codes in English); and usage by the members of one's social network (which is particularly an issue for money transfers). Among these factors, access to m-money agents, high cost and limited trust in formal

[1]These statistics mirror m-money adoption in many lower-middle income countries, with the exception of countries such as Kenya, South Africa, Brazil and the Philippines.

financial systems have been cited as the most common reasons for limited initial usage (Dzokoto and Mensah 2011, CGAP 2012). Our research confirmed these findings, but also noticed that the ability to use the service - particularly in rural areas, where there are high illiteracy rates – is an additional confounding issue.

Once individuals have initially used the service, continued use depends upon many of the factors outlined above. It further requires that the benefits of the service continue to outweigh the costs, which depends, in part, on customers' satisfaction with the product, including the services provided by m-money agents.

III. Understanding Barriers to M-Money Adoption and Usage

A. Research Approach

To better understand the barriers to m-money adoption and usage in Ghana, particularly in rural areas, this research followed two stages. The first stage involved a scoping visit to Accra and Cape Coast, Ghana in June 2012, where we met with key stakeholders (mobile phone operators, governmental officials, consumers and international organizations) to better understand the extent and type of m-money services available and the potential barriers to adoption. Using the results from this first stage, we then implemented an "action-oriented research" program in northern Ghana. The purpose of the action-oriented research was to understand rural households' demand for formal and informal financial services (including money transfer and savings services), their access to and usage of m-money and whether and how this technology could be used to improve households' access to financial services. For this latter phase of research, we partnered with a non-governmental organization, Catholic Relief Services (CRS), the Catholic Diocese of Wa, and one mobile phone operator, MTN Ghana.

The targeted area of the research was Jirapa, a town with a population of nearly 30,000 located in northwestern Ghana. The research focused on four villages located 5-10 km from Jirapa, all of which were participating in CRS' village savings program. As a result, participants were generally familiar with the concept of savings and therefore more predisposed to save and use financial services. Since the villages were relatively close to Jirapa town, where MTN has a m-money office, the villages had some access to a m-money agent.

Rather than simply observing the financial patterns of m-money users and non-users, each village received one of four interventions, each one designed to partially address the key barriers to m-money adoption outlined above. These included *information* about m-money, *training* on how to use the service, *access* to a mobile phone handset and m-money agent and the cost of the SIM card. The four interventions included the following:

- ***Treatment 1: Mobile phone raffle.*** In this group, a random subset (15-20 percent) of savings group members received a mobile phone via a raffle. The concept of m-money and savings was discussed in a focus group, but detailed information on the product, its services and how to use it was not provided. (This treatment was provided in Nyenvaare.)
- ***Treatment 2: Mobile phone sensitization*.** In this group, savings group members received a sensitization module on m-money (i.e., what it is, the services it can offer and how to use it for transfers and as a savings device). The training used posters with illustrations of a mobile

phone, an explanation on the link between savings groups and mobile phones, and a short skit. (Please see Appendix A for more information). (This treatment was provided in Kuchen.)

- ***Treatment 3: Mobile phone raffle plus sensitization.*** In this group, a random subset of savings group members (15-20 percent) received a mobile phone via a raffle, plus the sensitization program outlined in Treatment 2. (This treatment was provided in Zaghe.)
- ***Treatment 4: Mobile phone to group leaders plus sensitization.*** In this group, mobile phones were provided to the savings group *leaders* (presidents and treasurers), rather than randomly selected group members, and members received the sensitization program. (This treatment was provided in Tigboro.)

In addition to these specific treatments, all villages received a visit from the m-money agent, who offered m-money SIM cards, registered interested members and activated the service on their phones. All of the SIM cards were provided free of charge to savings group members (a value of US $.50). Those who wanted to register had to attend a group meeting with the agent, provide an identification card (such as a voter registration card or national health insurance card) and wait for the activation process. As there were numerous problems with the activation process (particularly the slow mobile phone network), some clients had to leave their ID with the agent for a one-week period.

B. Data

In addition to the primary and secondary data collected at the first stage, during the second stage we collected data from savings group members in each village. This included a baseline survey of members' socio-demographic characteristics, savings patterns, mobile phone and m-money access, and migration in August 2012, as well as follow-up surveys with the same household members on the individual and household's registration status, m-money usage, and savings patterns.

IV. Results and Discussion

A. Baseline Survey

Table 2: Baseline Summary Statistics

	Mean	s.d.	Number of observations
Female	95.80%	19.90%	97
Age	41.81	10.88	97
Married	1	0	97
Have some schooling	4.12%	19.98%	97
SILC member	1	0	97
Other SILC group member	7.20%	26.00%	97
Household owns mobile	63.90%	48.20%	97
Household used mobile	68.00%	46.80%	97
Have migrant	89.40%	31.00%	95

Table 2 shows the composition of the sample during the baseline survey. Among the 97 participants surveyed, almost all of them were female, with an average age of 41 years. All of the group members were married, although very few—only 4 percent— had ever attended school. Approximately 63 percent of households owned a mobile phone prior to the study, and 68 percent had previously used a mobile phone (often borrowing from someone else). A high percentage of households—almost 90 percent—had a migrant outside of the village, with two key destinations being Wa (approximately 1.5 hours away) and Accra (over 700 km away). Other migration destinations were other major urban and peri-urban centers in Ghana.

Table 3 shows the same characteristics by each village, in order to determine whether there were differences across the villages prior to the interventions. If, for example, there were important

differences across villages prior to the interventions, then any observed differences in m-money take-up and usage after the interventions could be explained by these pre-existing differences, rather than the mobile phone raffle or sensitization program. The table shows that there were some important differences across the villages prior to the program. For example, while gender, marital status and schooling were largely similar, participants were 3-6 years older in the "*mobile raffle + sensitization*" villages (as compared to the *"raffle only*" village) and were more likely to belong to a second savings group, have used a mobile and have a migrant household member outside the village.

Table 3: Differences across Villages Prior to the Program

Characteristics	Mobile Raffle	Mobile Raffle + Skit	Skit	Observations
Female	96.40%	97.40%	93.50%	97
Age	38.36	44.29	41.9	97
Have some schooling	3.50%	2.60%	6.40%	97
Other SILC group member	3.50%	15.80%	0	97
Household owns mobile	57.10%	60.00%	74.20%	97
Household used mobile	17.90%	92.10%	83.90%	97
Have migrant	78.60%	97.20%	90.30%	95

B. Results

After the initial interventions, a pre-identified m-money agent visited each one of the villages to offer m-money registration to all of the savings group members (regardless of whether or not they won or owned a mobile phone). The m-money SIM card was offered free of charge (a value of USD $.50), and interested individuals had to provide a relevant ID (health insurance card, national ID card, voter registration card) to register. Despite some difficulties in having the m-money agent visit the villages (particularly related to the agent's transport to rural areas), the agent was able to visit each village within one month of the initial intervention.

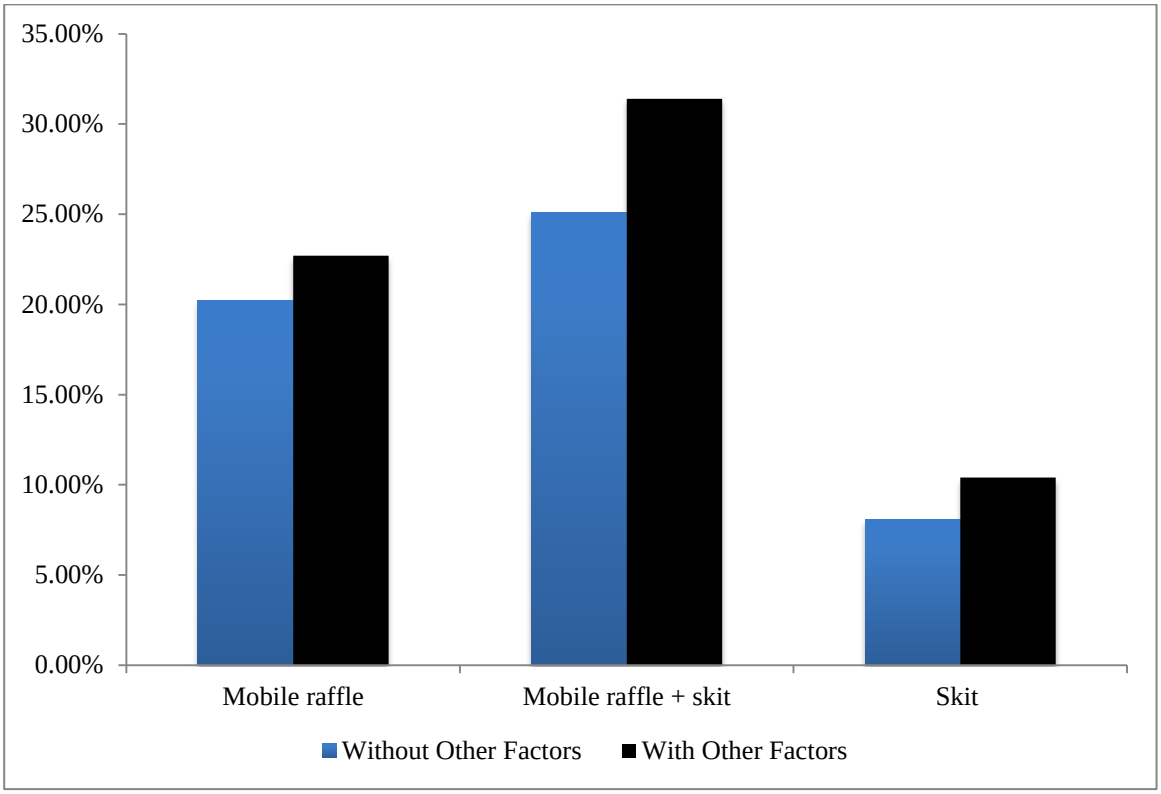
All of the savings group members, regardless of whether or not they owned a mobile phone, signed up for m-money during the agent's visit. This suggests a high interest in m-money among rural populations if access to an agent (and the SIM card) is provided**.** While registration was universal, activation of the SIM card (which is required for using m-money) was delayed for two reasons: 1) the mobile phone network was often down or unavailable, and the m-money agent only had one mobile phone to conduct the registration; and 2) the m-money agent had personal travel planned, and no one was able, eligible or willing to take his place. While the team resolved the first problem by taking individuals' IDs to Jirapa town to activate the SIM cards, the registration was not finalized until one month after the initial visit. This not only prevented households from using m-money during that period, but also could have influenced their opinion of the reliability of the m-money service and the agent. Both of these factors could have subsequently influenced individuals' initial usage of the product, especially for savings.[2] As one savings group member stated, "What happens if I save my money and the I cannot access it (as the network is down)?"

Figure 1 shows individuals' self-reported use of m-money 2.5 months after the m-money activation process was completed. In the first month after the registration, only 10 percent of individuals had used the survey, solely for receiving money transfers, and often replacing their traditional ways of receiving money (such as a friend or family member). Yet this rate of usage increased to 26 percent of individuals approximately one month later (2.5 months after the initial intervention), with 86 percent of users receiving money transfers and 70 percent of users saving on their mobile phone. In the "skit" (sensitization only) group, without any mobile phone raffles, approximately 8-10 percent of individuals

[2]According to interviews with the mobile money agent, the primary constraints to registration were transport to the villages and the reliability of the network. On average, the mobile money agent registers approximately 20-30 new users within a month and receives a commission for each registration. The registration of almost 200 new mobile money users would have represented a six-fold increase in registration, or commission, for the agent over a six-month period.

used the service. In the "mobile raffle" group, mobile money usage was 20-22 percent, even without sensitization. Perhaps unsurprisingly, the rate of usage was highest among individuals in the "mobile raffle + skit" villages, with usage between 25-31 percent of all individuals. This is the case after accounting for factors that could explain mobile money usage, such as baseline mobile phone ownership, whether the household had a migrant, whether the household had experienced a shock and if the individual had attended school.[3] While usage was higher in villages that received a mobile phone (or received a mobile phone and a skit) as compared with those villages that only received a skit, these differences could potentially be due to other factors.[4] Appendix C provides details on the calculations behind Figure 1.

Figure 1: Mobile Money Usage Two Months after the Interventions

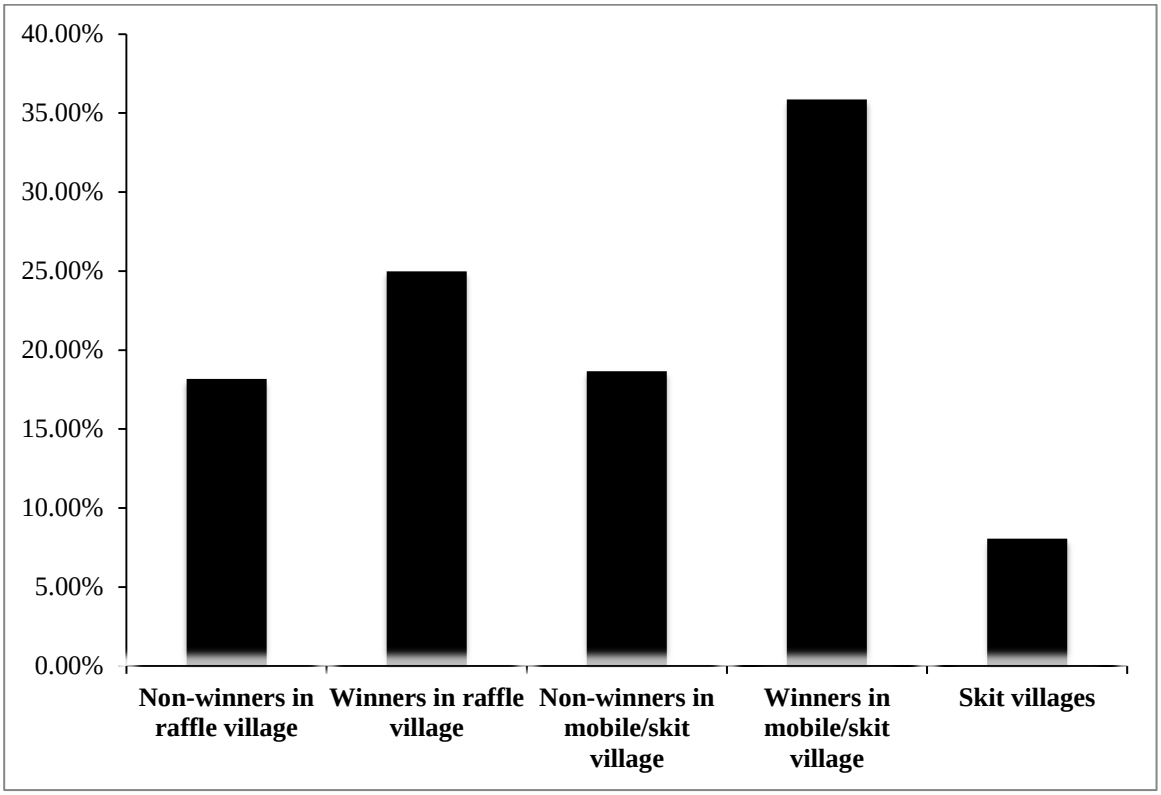


The results in Figure 1 show average m-money usage in each village, regardless of whether or not the individual won a mobile phone. Figure 2 (with details in Appendix D, Table 4) shows these results for mobile phone "winners" and "non-winners" in the mobile raffle villages (as well as the "skit" villages, where no one received a mobile phone). In general, the results suggest that (unsurprisingly) mobile phone "winners" were more likely to use mobile money as compared "non-winners" in both villages, but these differences were stronger in the "mobile raffle + skit" villages. For example, while 18 percent of the non-winners in the mobile raffle villages used the service, 25 percent of winners used the service (a 7 percentage point difference). Similarly, while 18 percent of "non-winners" used the service in the "mobile + skit" villages, approximately 35 percent of the winners used the service in those villages, a 17 percentage point difference. Thus, having access to a mobile phone was correlated with higher usage, and sensitization (as provided by the skits) was associated with even higher usage. While this is

[3]In general, baseline mobile phone ownership was a strong positive predictor as to whether the household used mobile money.
[4] Figure 1 shows the conditional means of usage in each village, controlling for baseline characteristics. While m-money usage was higher in the "mobile raffle + skit" villages as compared with the "skit" villages, as well as the "mobile raffle" villages as compared with the "skit" villages, these results cannot be interpreted as causal (ie, due to the interventions). Despite the randomization, the small sample size (4 villages) does not allow us to account for other factors that could explain these differences between the villages or state whether there are statistically significant differences between each group.

perhaps not surprising, it does suggest that mobile phone users in rural areas might need an additional incentive or push to adopt m-money, as adoption had not occurred in the absence of the intervention. In addition, it is interesting to note that mobile phone non-winners used the service, suggesting that some spillover effects. Nevertheless, as mentioned above, the interpretation of these results is only suggestive, and cannot be interpreted as causal due to the small sample size and purposeful choice of the villages.

Figure 2. Mobile Money Usage by Mobile Phone Winners and Non-Winners after the Intervention



V. Discussion and Future Research

This research has shown that simple interventions that sought to alleviate the barriers to m-money adoption and usage in northern Ghana were associated with increases in the registration and use of m-money among those living in rural villages. In its initial stages, usage was primarily for receiving money transfers from migrants, but after 2.5 months, approximately 26 percent of all individuals were using mobile money for both receiving remittances and savings. While the empirical findings and generalizability of these results is limited, they suggest that m-money might reduce the transaction costs associated with receiving money transfers, as well as allow households to save, a key strategy for rural households to smooth consumption in response to shocks.

Several factors can potentially explain the universal m-money **registration** among these populations. First, the m-money SIM cards were offered for free (a value of US$.50) and a m-money agent visited each village to register interested individuals, which would not be available in most rural areas in Ghana. Second, the recipients had prior experience with the partners who introduced and monitored the project (CRS and the Catholic Diocese), which means that individuals could have trusted the agent (and hence the service) more. Because of these experiences, participants were also familiar with the concept of savings and therefore more predisposed to save and use financial services.

Nonetheless, m-money registration was not without costs, as individuals had to attend a sensitization meeting (between 1-2 hours), provide an identification card to the m-money agent and wait for the activation of the SIM card (which took several hours). In addition, in some cases, the m-money agent had to take the individuals' identification card, which meant that the individual was without his or her voter registration card or health insurance card for several weeks. This suggests that providing access to the SIM cards and an m-money agent located closer to rural areas could overcome one barrier to initial m-money adoption. Although it seems that access to the m-money agent was the most important for these populations, more research is necessary to be sure.

Beyond registration, ten percent of the population used the service in the month after the activation process was complete, with 26 percent using the service 2.5 months' later. Usage was highest in villages that had a mobile phone raffle + skit (as compared with a skit or mobile phone raffle), but usage was still relatively high in those villages. Users were using the service for receiving transfers (80 percent) or savings (76 percent), and usage was highest among those who had access to a mobile phone, either via the raffle or before the program started. Nevertheless, we cannot exclude the possibility that these observed differences in usage were due to other factors, rather than the interventions themselves.

This rate of usage was higher than expected given the short time frame. Yet whether the rate of usage will persist, increase or transform to include savings is hard to determine, and requires additional rounds of data collection, in a larger sample of villages. There are several factors—such as delays in activating the service, the cost of the service and trust—that could affect usage in the longer term. This research suggests that there is demand among rural populations for m-money, primarily for transfer services. While this wasn't the original intention of this study, transfers can serve as an important coping strategy, especially for the rural poor.

While limited in scope, this research offers some insights into the barriers to m-money adoption and usage, and can provide some recommendations for mobile phone operators (who may be interested in expanding adoption and usage) and the public sector (who may be interested in using the product for social protection transfers or promoting its usage to share risk). These include the following:

1. **Provide improved sensitization of m-money, particularly in rural areas and for illiterate users.** While information about m-money services is ubiquitous in large urban centers, there is little information about the product in smaller urban centers and rural areas. Even in those areas where advertising is predominant, few people understand what the service does. This suggests that mobile phone operators need to develop simpler, more user-friendly materials – such as posters written in English and other indigenous languages, with visuals – to describe what the service is, what it does, how much it costs and how it can be used.
2. **Provide support materials for potential customers on how to use the m-money service.** Beyond advertising on the product itself, a key constraint for individuals living in rural areas is being able to use the service. This is especially the case for those who are illiterate. Simple materials on how to use the product on the mobile phone – such as a poster of a mobile phone with simple instructions on how to use it – could serve as a learning device in rural areas, and allow those in villages who are literate to provide support to interested users. These materials could potentially be developed in partnership with the public sector, such as the government (who might want to use the product for cash transfers to vulnerable populations) or other non-governmental organizations. Such materials should cover m-transfer and savings services.
3. **Distribute m-money SIM cards free of charge.** Mobile phone adoption is quite high in Ghana, even in rural areas. While distributing mobile phone handsets is not scalable or sustainable, and perhaps not an efficient option (given the high rate of sharing of mobile phones), mobile phone operators could offer free m-money SIM cards, particularly in rural areas. Interested customers would still need to provide identification and wait for the activation process, but this would alleviate a key constraint.
4. **Establish a reliable and comprehensive agent network.** One of the key reasons for the success of m-money adoption in Kenya has been the breadth and scope of its agent network. The agent

network in Ghana is limited, with agents primarily located in urban centers and traveling to rural areas on a weekly basis. This limits individuals' ability to access agents for registration, deposits and money transfers, and reduces the advantages of the service. Even if additional agents in rural areas cannot be added, increasing the number of agents and their ability to travel to those rural areas would improve the frequency and reliability of service. Figuring out how to structure the agent network in Ghana will be key to ensuring greater outreach.

5. **Provide training of m-money agents on how to support rural customers.** Our experience with the mobile phone operator in Ghana suggested that the agents did not prioritize, nor were they interested in, rural customers. Providing training to m-money agents on different marketing strategies for encouraging adoption and usage of m-money in rural areas could improve their understanding of the difficulties that such consumers face, and how m-money might be able to uniquely fit their financial needs. This is an issue not only for m-money agents, but other agents working in rural areas.

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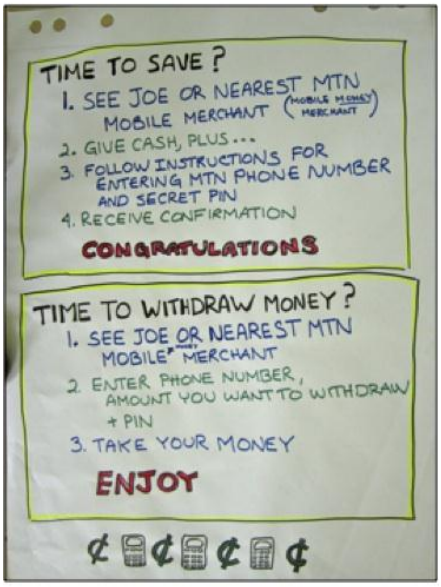
Appendix A:

We used this illustration of a mobile phone to teach people the basic operations for a phone (on, off, how to compose a number, etc.)



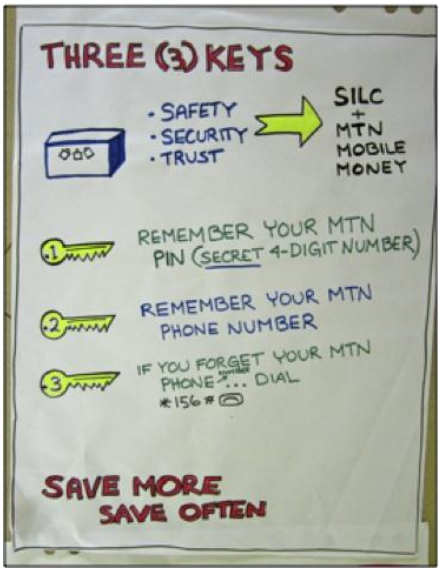
To sensitize people on the steps necessary to use m-money, we created another poster that says:

Time to save?
1. Go to the nearest MTN m-money merchant, Joe.
2. Give cash, plus.
3. Follow instructions for entering your PIN.
4. Receive confirmation

Congratulations

Time to withdraw?
1. Go to the nearest MTN m-money merchant, Joe.
2. Enter your phone number, amount you wish to withdraw plus your PIN.
3. Take your money.

Enjoy



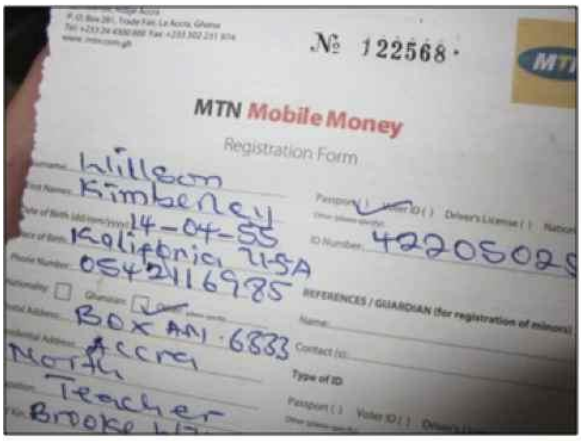
We later add three keys, like the keys to their lock box (note: the first group does not have this):

- Key 1: Remember your PIN
- Key 2: Remember your MTN Number
- Key 3: If you forget your MTN Number, just dial *156#

Appendix B:

Woman learning to use mobile phone.

Sensitization campaign.



Mobile money registration form.

Mobile money agents registering in Jirapa.

Appendix C

Table 3. Mobile Money usage by Village Intervention

VARIABLES	(1) Use mobile money	(2) Use mobile money	(3) Use mobile money	(4) Use mobile money	(5) Use mobile money
Mobile raffle	0.116*	0.196***	0.126*		0.229**
	(0.0639)	(0.0534)	(0.0631)		(0.0918)
Mobile raffle + skit	0.165***	0.246***	0.218***	0.0926	0.322***
	(0.0535)	(0.0406)	(0.0573)	(0.0717)	(0.101)
Skit		0.0806**		0.227**	0.104
		(0.0348)		(0.0910)	(0.0939)
Have migrant (baseline)			-0.0565	-0.0565	-0.0565
			(0.0914)	(0.0914)	(0.0914)
Experienced shock (baseline)			0.0609	0.0609	0.0609
			(0.112)	(0.112)	(0.112)
Attended some school (baseline)			0.379**	0.379**	0.379**
			(0.180)	(0.180)	(0.180)
Member of other SILC group (baseline)			-0.0498	-0.0498	-0.0498
			(0.114)	(0.114)	(0.114)
Constant	0.0806**		0.104	0.104	
	(0.0349)		(0.0939)	(0.0939)	
Observations	232	232	214	214	214
R-squared	0.031	0.215	0.078	0.078	0.2545

This table shows the results of a regression of "using mobile money" on different indicator variables, namely, each intervention ("mobile raffle", "mobile raffle plus skit"). The regression uses data from all individuals (97) pooled across three post-intervention data collection rounds and was used to calculate the conditional means presented in Figure 1. While *, ** and *** typically represent statistical significance of a particular coefficient, the standard errors in this regression are incorrect, as they should be clustered at the village level, which is not possible given the small sample size. Thus, the results in this table can only be interpreted as the conditional means of usage in each village, and cannot be used to interpret statistically significant differences.

The "constant" term represents the mean in the "skit only" group after the intervention. The "mobile raffle" variable is the difference between the "skit only" group and the "mobile raffle" group after the program. To calculate the mean of the "mobile raffle" group after the program, simply add the "constant" term" plus "mobile raffle" variable. The "mobile raffle + skit" variable is the difference between the "skit only" group and the "mobile raffle + skit" group after the program. To calculate the mean of the "mobile raffle + skit" group after the program, simply add the "constant" term" plus "mobile raffle + skit" variable. As the sample size is small, we are unable to draw any conclusions about the statistical significance of each coefficient (and hence different usage in each village).

Appendix D

Table 4: Mobile Money Usage for Mobile Phone "Winners"

VARIABLES	(1) Use Mobile Money	(2) Use mobile money
Mobile raffle	0.101	0.091*
	(0.0684)	(0.06)
Mobile raffle + skit	0.106*	0.0970
	(0.0574)	(0.0703)
Winner in mobile raffle village	0.0682	0.0512
	(0.139)	(0.126)
Winner in mobile raffle + skit village	0.172*	0.208**
	(0.0900)	(0.102)
Have migrant (baseline)		-0.0836
		(0.0931)
Experienced shock (baseline)		0.0125
		(0.108)
Member of other SILC group (baseline)		0.126
		(0.125)
Constant	0.0806**	0.155
	(0.0350)	(0.0949)
Observations	232	214
R-squared	0.053	0.067

This table shows the results of a statistical regression of "using mobile money" on different indicator variables, namely, each intervention ("mobile raffle only", "mobile raffle plus skit") and whether an individual won a mobile phone in the raffle. The regression uses data from all individuals (97) pooled across three post-intervention data collection rounds and was used to calculate the conditional means presented in Figure 1. While *, ** and *** typically represent statistical significance of a particular coefficient, the standard errors in this regression are incorrect, as they should be clustered at the village level, which is not possible given the small sample size. Thus, the results in this table can only be interpreted as the conditional means of usage in each village, and cannot be used to interpret statistically significant differences.

The "constant" term represents the mean in the "skit only" group after the intervention. The "mobile raffle" variable is the difference between the "skit only" group and non-winners in the "mobile raffle" group after the program. The "winner in the mobile raffle village" is the difference in usage between non-winners and winners in the mobile phone raffle group. The "mobile raffle + skit" variable is the difference between the "skit only" group and non-winners in the "mobile raffle + skit" group after the program. The "winner in the mobile raffle + skit village" is the difference in usage between non-winners and winners in the "mobile phone raffle + skit" group.

As the sample size is small, we are unable to draw any conclusions about the statistical significance of each coefficient (and hence different usage in each village or among winners and non-winners).