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Towards Sustainable Development

RESEARCH SERIES No. 127

A PATHWAY TO FINANCIAL INCLUSION: Mobile Money and Individual Savings in Uganda

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March 2016

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ABSTRACT

This study provides a micro perspective on the impact that mobile money services have on an individual's saving behavior using 2013 Uganda FinScope data. The results show that although saving through mobile phones is not a common practice in Uganda, being a registered mobile money user increases the likelihood of saving with mobile money. Using mobile money to save is more prevalent in urban areas and in the central region than in other regions. This can be explained by several factors. First, rural dwellers on average tend to have lower incomes and thus have a lower propensity to save compared with their urban counterparts. Second, poor infrastructure in rural areas in terms of the lack of electricity and poor telecommunication network coverage may limit the use of mobile phones and consequently the use of mobile money as a saving mechanism. Overall, the use of mobile money as a saving mechanism is still very low, which could be partly explained by legal limitations that do not incorporate mobile finance services into mobile money. The absence of interest payments on mobile money savings may also act as a disincentive to save through this mechanism. Given the emerging mobile banking services, there is need to create greater awareness and to enhance synergies between telecoms companies and commercial banks.

Keywords: Mobile Money, Financial Inclusion, Savings, Uganda

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1. INTRODUCTION

Exclusion from the formal financial system has increasingly been identified as a barrier to eradicating poverty (Donovan 2012). Indeed, lack of access to financial services such as credit and savings reduces households' ability to invest, save and respond to shocks (Aker and Wilson 2013). At the macro level, low levels of financial inclusion lead to lower economic growth and exacerbate income inequality (Demirgüç-Kunt *et al.* 2008). Financial inclusion refers to the absence of price or non-price barriers in the use of financial services (Sharma and Kukreja 2013). In other words, financial inclusion comprises all initiatives that make formal financial services available, accessible and affordable to all segments of the population (Alliance for Financial Inclusion (AFI) 2013).

Compared with other parts of the world, Africa registers the lowest levels of financial inclusion among its population, which is largely poor. Only 25 percent of the adult population own an account in a formal financial institution compared with 39 percent in Latin America and the Caribbean, and 89 percent in high income countries (Demirgüç-Kunt and Klapper, 2013). Consequently, a number of African governments have adopted financial inclusion as one of the means to spur economic growth and development. To achieve financial inclusion of the poor, the evolution of mobile money has been cited as a game changing agent (IFC Mobile Money report 2011; ITU-T 2013; EPRC 2013). Mobile money technology is a viable platform for financial services to be extended to large segments of the population at a relatively lower cost compared with traditional branch-banking that requires substantial investments both in infrastructure and personnel (Jack and Suri 2011; Nandhi 2012).

In Uganda, various efforts have been made both by the government and its partners to sustainably improve financial inclusion. For instance, the financial inclusion project of the Bank of Uganda (BoU) intends to expand access to financial services to a cross-section of Ugandans. One key to achieving this goal is through the growth of mobile money services in the country (BoU, 2013). In 2006, 62 percent of Ugandans (8.1 million) were financially excluded with only 18 percent (2.4 million) having an account in a formal financial institution, including commercial banks, Microfinance Deposit Institutions (MDIs) or credit institutions regulated by the BoU. Only 3 percent were served by semi-formal Savings and Credit Cooperatives (SACCOs) or microfinance institutions (MFIs), while 17 percent (2.2 million Ugandans) used informal financial services through informal groups like Accumulating Savings and Credit Association (ASCA), Village Savings and Loan Associations (VSLA) and Rotating Savings and Credit Association (ROSCA) (The Steadman Group (U) Limited 2007). On the one hand, the introduction of mobile money in 2009 was followed by an increase in the proportion of the population using formal non-bank financial services from 7 to 34 percent (Economic Policy Research Centre, 2013). On the other hand, the use of informal services fell from 42 percent to 31 percent between 2009 and 2013. These developments are largely attributed to the evolution and adoption of mobile money.

Despite these efforts and developments, there is limited empirical evidence on the extent to which mobile money services have impacted the saving behavior of Ugandans. It is against this background that this paper seeks to provide a micro perspective on the impact of mobile money services on individuals' saving behavior for the purposes of promoting financial inclusion in Uganda. This paper hypothesizes that being a registered mobile money user increases the likelihood of saving with mobile money. Using the 2013 Uganda FinScope data, this paper takes the quasi experimental approach of instrumental variable estimation to determine the impact of being a registered mobile money user on saving with mobile money. We also contrast the factors that influence an individual's choice in saving in different ways, i.e., formal, informal, non-bank formal and through mobile money.

Similar to Jack and Suri (2011) and unless otherwise stated, in this paper, saving through mobile money refers to keeping money on a mobile money account for future use. Findings from the study show that saving through mobile money is not a common practice in Uganda but being a registered mobile money user increases the likelihood of saving. Similarly, registered mobile money users in rural areas are still less likely to save with mobile money than their counterparts

in urban areas. Spatially, individuals in the central region, including Kampala, show a higher propensity to save through mobile money than their counterparts in other regions.

The paper is organized as follows. Section one provides the introduction to the study. Section two presents a brief overview of mobile money growth in Uganda, while section three presents both the theoretical and empirical literature. Section four provides the methodology and data while the study's results are presented and discussed in section five. The final section contains the conclusions and policy options.

2. AN OVERVIEW OF MOBILE MONEY GROWTH IN UGANDA

Like most developing countries, Uganda grapples with low levels of formal financial inclusion. Statistics show that in 2013 only 20 percent of the adult population had accounts in formal regulated financial institutions, nearly 34 percent were using only non-bank formal/ semiformal institutions and 31 percent were using informal institutions; an estimated 2.6 million adults were financially excluded (EPRC 2013). In terms of savings, despite the fall in exclusion from 28.9 percent in 2009 to 6 percent in 2013, the majority of the adult population saved through informal means (Figure 1).

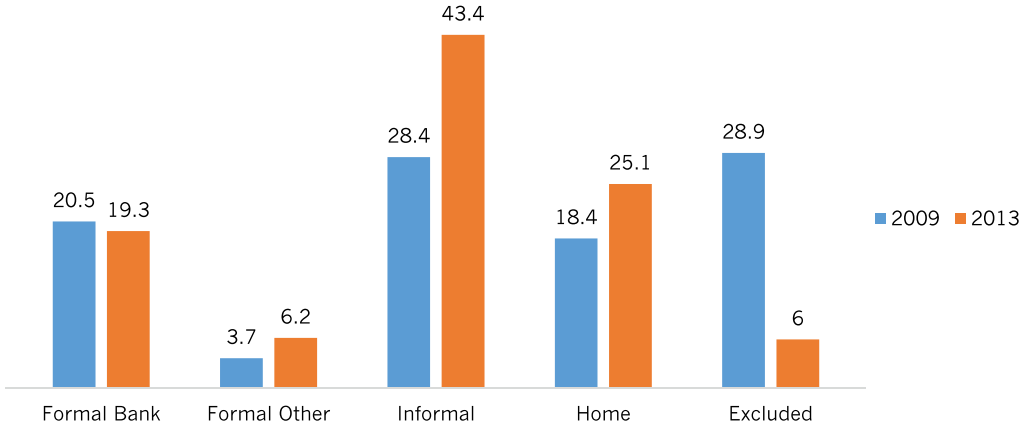
Mobile money use and its evolution in Uganda

Mobile money refers to the use of mobile phones to perform financial and banking functions (IFC Mobile Money report 2011). This definition encompasses a number of services, which include payments (e.g., person-to-person transfers, utility payments), finance (e.g., insurance products), and mobile banking (e.g., account balance inquiries), among others (Donovan 2012; Gencer 2011). Globally, the growth of mobile money has been phenomenal, particularly in developing and emerging economies where a large proportion of the population are excluded from more formal traditional financial services (GSMA 2014).

The structure of mobile money

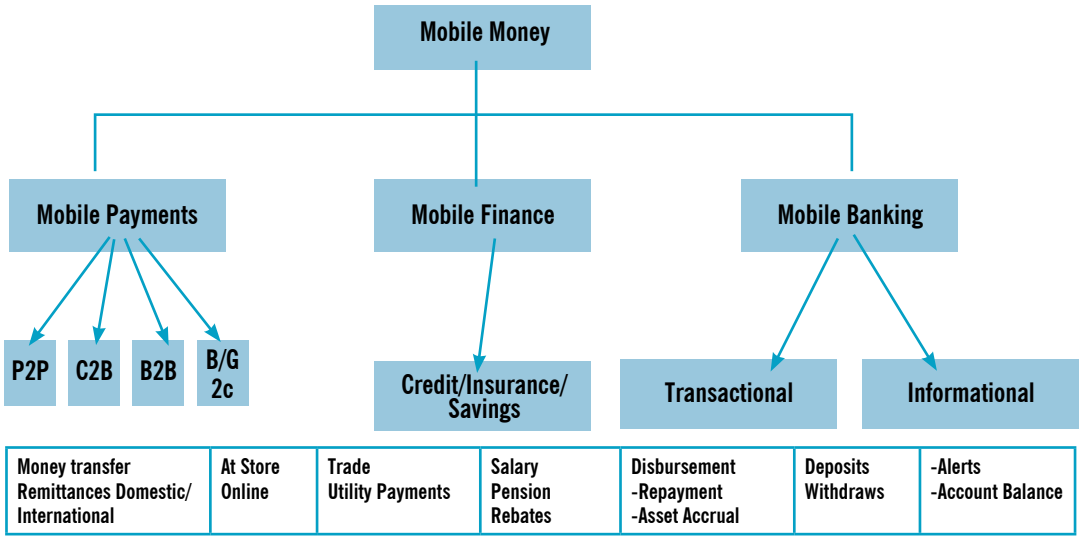
Figure 2 illustrates the structure of mobile money services. Under mobile payments there are person-to-person (P2P), sometimes referred to as peer-to-peer, which represents remittances from individuals both domestically and internationally; customer-to-business (C2B), which encompasses payments for retail goods purchased at the store or online; business-to-business (B2B), which represents payment for goods and services between firms; and business-to-government or government-to-customers (BIG2C), which includes salary payments, taxes, and pensions, among others. Under mobile finance, there

Figure 1: Savings mechanisms in Uganda in 2013, %



Notes: i) Formal banks (Regulated by the Bank of Uganda): These include commercial banks, micro-deposit taking institutions (MDIs) and Credit institutions); ii) Other formal microfinance institutions (MFIs), Savings and credit cooperative organizations (SACCOs), Insurance companies, cell phone mobile money, non-banking financial institutions such as foreign exchange bureaus, money transfer services like Western Union; iii) Informal —all other institutions including village savings and rotating groups – Rotating, Savings and Credit Associations (ROSCAs), Village Savings and Lending Associations (VSLAs), Accumulating Savings and Credit Associations (ACSA), Non-government organizations (NGOs), investment clubs, savings clubs, services by employers and other village groups such as burial societies and welfare funds. Other informal services include shops and investing through property such as houses for rent, livestock and crop produce to be sold later or farm inputs to use at a later date. FinScope III also considers borrowing, such as credit from a shop, school, health center and individuals to be informal access; and v) Financially excluded (unserved) are non-users of formal banks, non-bank formal or informal institutions. Products and services categorized under financial exclusion include saving in a secret place, shops or with friends/relatives; borrowing from friends or family members; or money transfers using individuals.
Source: EPRC, 2013

Figure 2: Structure of Mobile Money Services

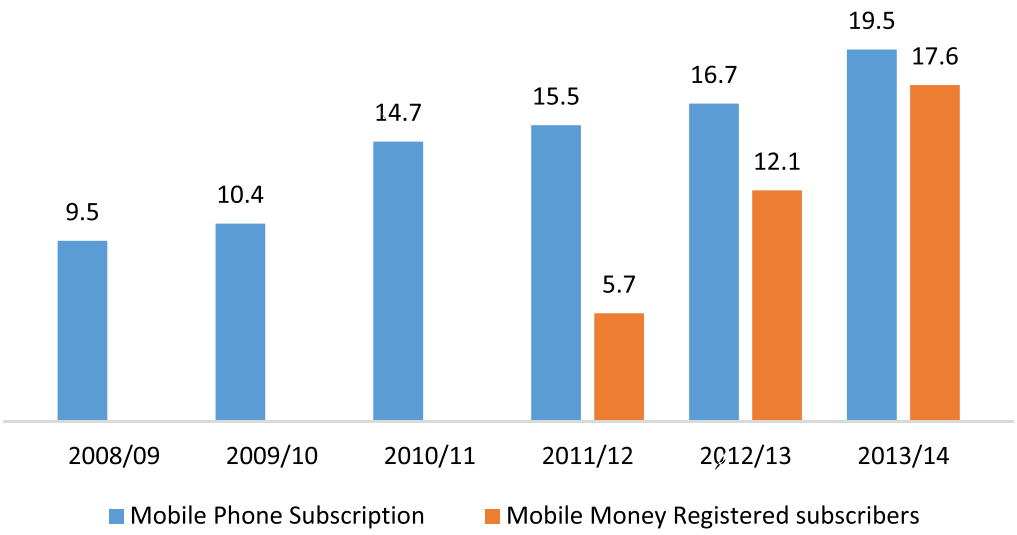


Source: Adapted from Gencer 2011.

is provision of credit, savings, insurance and other financial products, while in mobile banking there are transactional and informational services such as checking for account balance.

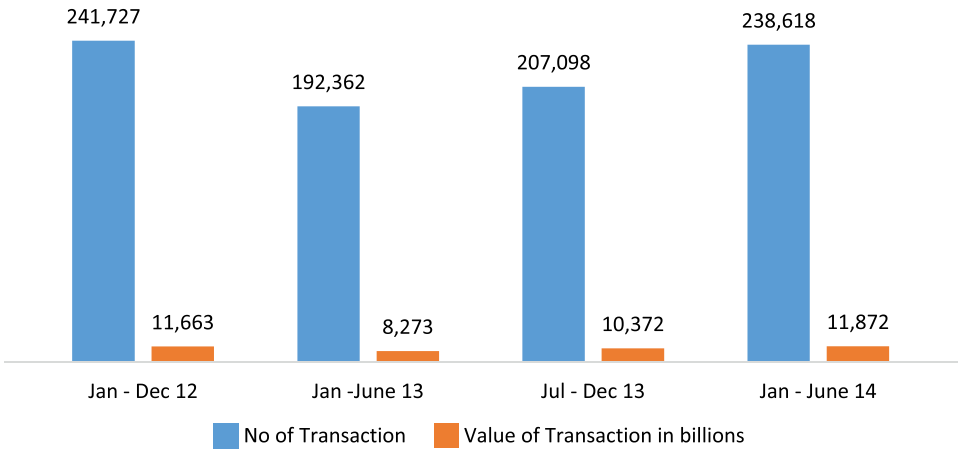
Mobile money was introduced in Uganda in 2009 by MTN[1] following the successful launch of M-Pesa[2] in Kenya in 2007. MTN was followed by other mobile network operators (MNOs), namely Warid, Airtel, Uganda Telecom Ltd, Orange Telecom. Since its introduction, the number of registered mobile money account holders has grown tremendously in Uganda from approximately 5.7 million in 2011/12 to over 17.6 million in 2013/14 (Figure 3). The number of mobile phone subscriptions has increased from approximately 9.5 million in 2008/09 to over 19.5 million in 2013/14 (Figure 3), surpassing the 5.6 million account holders in formal financial institutions including, commercial banks, Credit Institutions (CIs) and Microfinance Depositing Taking Institutions (MDIs)) combined. The number of mobile money agent stands at over 1,790 compared with 477 commercial bank branches with 699 Automated Teller Machines (ATMs) (Appendix 2).

Figure 3: Mobile Phones and Mobile Money Subscription Statistics (millions)



Source: Uganda Communications Commission 2015.

Figure 4: Number and value of transactions



Source: Uganda Communications Commission, 2015.

Between 2011 to June 2014, the number of mobile money transactions grew by 24 percent and the value of transactions grew as well by 43.4 percent (Figure 4). This rapid growth of mobile money in terms of subscription and value of transaction demonstrates its increasing importance in the financial sector and the overall economy. The increase in mobile money registered accounts is partly attributed to the increased mobile phone usage and the mandatory registration of SIM cards in 2012.

Mobile payments: Initially Mobile Telephone Network Operators (MNOs) largely offered person-to-person money transfer services; however, due to technological advancements and increased demand, operators now offer a wide range of products and services. These include payments for utility bills, school fees, airtime purchases, as well as sending and receiving remittances domestically and internationally.

Mobile banking services: the mobile money platform has expanded further with MNOs partnering with other financial institutions such as commercial banks to offer mobile finance services. Individuals can now link to their bank accounts through their mobile phones. This is expected to reduce commercial bank transaction costs and in turn increase financial inclusion in Uganda.

In addition, a number of banks have set up mobile finance platforms to offer mobile banking to both bank and non-bank clients. For example, the Bank of Africa through the Bank of Africa Mobile Wallet offers mobile money services to both its bank customers and non-bank customers. The mobile wallet application offers a wide range of services, including account balance inquires, provision of bank statements, viewing last five transactions, provision of check books, Automated Teller Machine (ATM) card blocking, money transfers from a Mobile Wallet account to a Bank of Africa account, money transfers from a Mobile Wallet account to an account in another bank, money transfers from a Mobile Wallet account to any mobile number on any network, ATM withdrawals without a card, sending TT (sending money/payments to anywhere in the world), utility bill payments (e.g., "Umeme", Water, DSTV, Star Times, and School Fees) and airtime purchases regardless of the network one is subscribed to. Through CenteMobile, Centenary Bank also offers a number of services, including utility bill payments (Umeme, NWSC, and DSTV), checking account balance monitoring, airtime purchase, money transfer from one Centenary Bank account to another Centenary Bank account and provision of mini-statements. A number of other commercial banks have similar platforms that offer a wide range mobile money services, including Equity bank, DfCU, and others. The expansion of mobile money beyond mobile payments indicates the ability to improve financial inclusion. On the supply side, these developments are likely to reduce commercial bank transaction costs and in turn improve financial inclusion. On the demand side, customers are able access their accounts at their convenience regardless of time of the day, reduce costs of travelling to bank branches as well time spent waiting at banking halls.

Mobile Finance: MNO have moved beyond mobile payments and mobile banking to include mobile finance services. With the help of mobile money, financial services such as insurance can be offered to the general public at more affordable rates. For example, in 2013, MTN in partnership with AON and Jubilee Insurance launched a life insurance policy, ("MTN LifeCare"). MTN customers can subscribe to this life insurance policy through MTN Mobile Money services for UShs7,500 to UShs22,500 (approximately US$2.50 to US$8) per year, which will provide death benefits of UShs1 million to UShs5 million (approximately US$345 and US$1,725, respectively). The registration process is simple and convenient. A customer simply dials *221# to get insured with no additional paperwork required.

Despite the noted developments, the expansion of mobile money beyond mobile payments is still limited in Uganda partly due to limitations in legislation. While mobile money falls under financial services, MNOs are licensed and regulated by the Uganda Communications Commission. Under the law, financial services are regulated by the Bank of Uganda under the Financial Institutions Act of 2004. This contradiction has led to a questioning of the legality of mobile money service provisions in Uganda. For example, in 2012, MNOs were sued by a Member of Parliament for the provision of financial services without a license from the central bank.

In 2013, the Bank of Uganda designed guidelines to address mobile money issues. Under these guidelines, mobile money is defined as "e-money available to a user to conduct transactions through a mobile phone and mobile banking as the use of a mobile phone to perform transactions on one's account in a licensed institution (including balance inquiries, mini-statements, statements and checkbook requisitions, forex rate enquiries and funds transfer to other nominated bank accounts)" (BoU 2013). However, this definition is limiting and does not include mobile finance products like insurance, savings or credit. As such, no interest is paid on mobile money in Uganda; therefore, in this paper, unless otherwise stated, saving through mobile money refers to keeping money on a mobile money account for future use.

In general, mobile money is evolving in Uganda beyond mobile transfers to broadly encompass other dimensions of financial inclusion.

3. REVIEW OF RELATED LITERATURE

A number of studies have examined the use and growth of mobile money in developing countries, particularly in sub-Saharan countries (Allen et al. 2014; Nandhi 2012; Jack & Suri 2011). The literature shows that mobile money technology has spread tremendously across the world, especially in developing economies, since its introduction several years ago. This phenomenal growth of mobile services has been aided by a number of factors, including increased use of mobile phones in developing countries (GSMA 2014) as well as the cost and ease of transactions (Jack & Suri 2011).

Developing countries face a number of challenges that are largely attributed to high infrastructural costs that exclude the poor from access to formal banking services. Mobile money has the potential to significantly expand financial inclusion for the poor given its ability to improve access to underserved areas and its high convenience for customers (Di Castri 2013). In Uganda, the increased use of mobile money has been due to the increased use of mobile communication services. The number of mobile telecommunication companies has increased, leading to lower costs for mobile communication services (EPRC 2013). Coupled with the availability of cheaper phones, this has made it possible for a larger segment of the public to acquire mobile phones. The increased use of mobile phones in Uganda has thus aided the quick adoption of mobile money services.

Mobile money provides a safe and cheaper avenue for storing and transferring money across long distances for a number of households (both banked and unbanked). Before the introduction of mobile money, most households in developing countries such as Uganda delivered remittances by hand or informally through friends or bus drivers while a large number stored money informally at home. Available formal channels such as banks and Western Union remain quite expensive and inaccessible to the average

household. The entire process of transferring money was thus expensive, fraught with delays, and involved substantial losses due to theft (Jack & Suri 2011; ITU-T 2013). The introduction of mobile money has thus led to increased access to safe and cheaper means of transferring money between households and firms. In fact, some studies have discovered that the introduction of mobile money leads to a general reduction in transfer charges charged by other formal market players. For example, while investigating the impact of mobile money in Kenya, Mbiti & Weil (2011) discovered that the introduction of M-Pesa led to a reduction in transfer charges by other formal transfer service providers such as banks and Western Union.
The reduced transaction cost resulting from the use of mobile money has a positive impact on household welfare. Jack & Suri (2011) find that mobile money has a significant impact on the ability of households to spread risk due to the reduction in transaction costs. Their findings show that while shocks reduced per capita consumption by 7 percent for households not using mobile money, the consumption of households with access was unaffected. Likewise, by investigating the impact of this mobile money on rural household welfare using household survey panel data from rural Uganda, Munyegera & Matsumoto (2014) found out that mobile money increases household per capita consumption by 69 percent. Their findings further reveal that rural households using mobile money are more likely to receive remittances than their counterparts not using mobile money.

By providing a quick and cheaper avenue to transfer money, mobile money facilitates trade by making it easier for people to pay for, and to receive payment for, goods and services (Jack & Suri 2011). In addition, mobile money facilitates payment of utilities (like water and electricity) and airtime purchases, among others, thus saving households the time required to walk to utility payment points.

Most of the evidence shows that mobile money is primarily used to send and receive money (EPRC 2013; ITU-T 2013) and less for savings and credit facilities. Reading through the literature, it is possible to deduce that the saving "rail" may not be the most suitable direction for mobile companies to be focus on strategically. Unlike other financial inclusion models that employ "credit-led" or "saving-led" approaches, mobile companies seem rather interested in building on the payment "rail". This could stem from mobile companies' fear of regulation (Mas and Radcliffe 2010) and stepping on the mandates of commercial banks. Nevertheless, by providing a safe storage mechanism, mobile money has the potential to increase net household savings and overall improvement in financial inclusion (Nandhi 2012; Mbiti & Weil 2011). Using two datasets collected in 2007 and 2008, Jack & Suri (2011) found an increased proportion of households using mobile money to save their earnings. However, their definition of savings was limited to whether or not an individual had a balance reserve in their phone. Among the reasons attributed to saving money on their mobile money accounts and not elsewhere were the ease of use, safety reasons and emergency situations. Similarly, while analyzing data from 2006 and 2009 financial surveys in Kenya, Mbiti & Weil (2011) showed that the adoption of mobile money decreases the use of informal saving mechanisms such as ROSCAS in addition to increasing the frequency of sending transfers.

Overall, evidence shows that innovations in the mobile money sector that encourage households to save through minimizing transaction costs and the risky nature of informal saving methods increase the possibility of saving by low income earners (Nandhi 2012). In India, for example, a saving mechanism from a phone to a bank account encouraged low income earners such as vegetable sellers and taxi operators to save directly from the phone to the bank, substituting informal and risky savings methods (ibid). This service is also available in Uganda between MTN and Centenary Bank. In Tanzania, Tigo Tanzania pays out interest accrued on a mobile money account, an incentive that is aimed at encouraging mobile money savings (GSMA 2014). For greater financial inclusion in terms of saving products and credit, new approaches are needed in terms of new services, delivery channels and providers (Allen et al. 2015).

4. DATA AND METHODS

4.1 Data

The paper draws heavily on the nationally representative 2013 Uganda FinScope[3] data covering demand, access and usage of financial services. The Finscope III survey builds on the previous nationally representative FinScope I and II surveys conducted in Uganda in 2006 and 2009, respectively. However, FinScope III included a detailed module on mobile money.

Sampling design and sample size.

The Finscope III survey was based on a two-stage stratified random sampling design. In the first stage, selection was done by region and stratum (rural/urban). This first level of stratification corresponded to the geographic domains of analysis, which are the national, five regions and whether the area is rural or urban. In each stratum, the Primary Sampling Unit (PSU) was the Enumeration Area (EA) and was selected systematically using the probability proportional to size within each stratum. The selection of EA was the second stage of stratification and was the ultimate sampling unit. Within each EA, eight households were targeted and household selection was by simple random sampling. Within each household, one adult person (aged 16 years and above) from a list of all adults in given household was selected using the KISH grid method. In this study, we use a total of 3,401 individuals – the actual sampled households with complete information.

Scope of the survey

The survey captured information on the extent to which financial services and products are used, by whom and what constraints are faced by individuals who do not use financial services. The survey captured information at the individual (one individual aged 16 years and above from each sampled household) and household level that is relevant for this study. The individual level information includes age, sex, education, socioeconomic characteristics and use and non-use of financial services; at the household level the variables included wealth status and regional location.

4.2 Methods

Instrumental variable estimation

Assessing impact is often associated with assessing the changes that can be attributed to a particular intervention, such as project, program or policy, both intended and ideally unintended ones (Gertler et al. 2011). Experimental methods and quasi-experiments have been employed in assessing impact. Quasi-experimental methods include matching, differencing, the pipeline approach and the use of instrumental variables.

This paper employs the instrumental variable estimation model to examine the effect of being a registered mobile money user on the savings behavior of individuals. Instrumental variable estimation attempts to control selection bias by modelling participation using factors ('instruments') that are correlated with selection but not the outcome. Being a registered mobile money user is potentially endogenous in the equation of whether an individual saves or not. EPRC (2013) established that the use of mobile money is highest among the wealthier and educated, as well as individuals in the younger age group. Given the endogeneity[4] of being a registered mobile money user on saving in mobile money, the use of the Instrumental Variable Probit model potentially resolves the problem by allowing for the use of instruments. Instrumental Variable Probit uses a maximum likelihood estimation and Stata software allows for the Wald test of exogeneity. In the Wald test for exogeneity, the null hypothesis is no endogeneity and if the test statistic is not significant, then there is not sufficient information in the sample to reject the null hypothesis. In such a case, a regular Probit regression may be appropriate. Point estimates from instrumental Probit are still consistent, although those from Probit are likely to have smaller standard errors.

From Appendix 1, we test the endogeneity of being a registered mobile money on the propensity to save formally, informally, non-bank formally and through mobile money. The significance of the residual in the propensity to save using mobile money only and its insignificance in other equations necessitates the use of the instrumental Probit estimation in equation 4 and

the Probit model in other equations (1, 2, and 3).

The impact of being a registered mobile money user on the propensity to save using mobile money is expressed in Eq. (4).

$$Formal_saving = \beta_0 + \beta_1 X_1 + \beta_2 X_1 Y + \beta_3 X_1 Z + \beta_4 H + \mu \quad (1)$$

$$Informal_saving = \beta_0 + \beta_1 X_1 + \beta_2 X_1 Y + \beta_3 X_1 Z + \beta_4 H + \mu \quad (2)$$

$$NonbankFormal_saving = \beta_0 + \beta_1 X_1 + \beta_2 X_1 Y + \beta_3 X_1 Z + \beta_4 H + \mu \quad (3)$$

$$Mobile_saving = \beta_0 + \beta_1 X_1 + \beta_2 X_1 Y + \beta_3 X_1 Z + \beta_4 H + \mu \quad (4)$$

where X_1 is whether an individual is a registered mobile money user, X_1Y is an interaction of whether an individual is a registered mobile money user and location (rural or urban) and X_1Z is an interaction of whether someone is a registered mobile money user and distance to financial institutions; H represents other covariates that affect using mobile money to save, such as wealth status and regional location. The impact of being a registered mobile money user will be ascertained by variables X_1, X_1Y and X_1Z.

The model variables used to instrument whether an individual is a registered mobile money user are distance to the nearest shop and a dummy variable of whether mobile money is accessible. The description and the anticipated signs of the variables are shown in Table 1:

Table 1: Description and anticipated signs of variables used in model estimation

		Expected effect on the likelihood to save through			
Variable	**Description of the variable**	**Formal means**	**Informal means**	**Non-Bank formal**	**Mobile money**
Registered mobile money user	Whether an individual is registered with mobile money	Positive	Negative	Negative	Negative
Have a bank account	Whether an individual has a bank account	Positive	Negative	Positive	Positive/ Negative
Registered rural mobile money user	Whether an individual is registered with rural mobile money	Positive/ Negative	Negative	Positive	Positive
Respondent age	Age of the respondent	Positive/ Negative	Positive	Positive	Negative
Some primary	Individual has a primary education; we contrast it with one without a primary education	Positive	Negative	Positive/ Negative	Positive/ Negative
Completed primary	Individual has completed primary education; we contrast it with one without a primary education	Positive	Negative	Positive/ Negative	Positive/ Negative
Secondary and above	Individual has completed secondary education; we contrast it with one without a secondary education	Positive	Negative	Positive/ Negative	Positive/ Negative
Household characteristics					
Second wealth quintile	Individual is in the second wealth quintile	Positive	Negative	Positive/ Negative	Positive/ Negative
Third wealth quintile	Individual is in the third wealth quintile	Positive	Negative	Positive/ Negative	Positive/ Negative
Fourth wealth quintile	Individual is in the fourth wealth quintile	Positive	Negative	Positive/ Negative	Positive/ Negative

		Expected effect on the likelihood to save through			
Variable	**Description of the variable**	**Formal means**	**Informal means**	**Non-Bank formal**	**Mobile money**
Locational characteristics					
Distance to market	Distance in km to the market	Negative	Positive	Negative	Positive
Distance to semiformal institution	Distance in km to semiformal institution	Negative	Positive	Negative	Positive/ Negative
Interaction of registered and distance to semiformal institution	Interaction of registered mobile money user and distance to semiformal institution	Positive	Negative	Positive	Positive
Individual is in a rural location	Whether an individual resides in the rural areas	Positive/ Negative	Positive	Positive	Positive
Eastern	Individual is located in eastern Uganda; we contrast it with an individual located in central Uganda	Positive/ Negative	Positive/ Negative	Positive/ Negative	Positive/ Negative
Northern	Individual is located in Northern Uganda; we contrast it with an individual located in central Uganda	Positive/ Negative	Positive/ Negative	Positive/ Negative	Positive/ Negative
Western	Individual is located in Western Uganda; we contrast it with an individual located in central Uganda	Positive/ Negative	Positive/ Negative	Positive/ Negative	Positive/ Negative

5. RESULTS AND DISCUSSIONS

5.1 Awareness and use of mobile money

Across economic status, gender, region and education, a considerable number of people own phones and are aware of mobile money services (Table 2). However, across gender, age, educational attainment, employment status and wealth quintiles, there are variations in ownership and awareness. In general, knowledge about mobile money and being a registered mobile money user is higher among males and people with higher levels of education. Predictably, Kampala has the largest percentage of individuals who are knowledgeable and registered with mobile money while northern Uganda lags behind all the other regions. Interestingly, although a considerable number of people within all categories have ever used mobile money or are active mobile money subscribers, fewer people are actually registered mobile money users. The results show that 56 percent of individuals report having used mobile money, although only 33.7 percent are registered users (Table 2). This implies that a significant number of people make over-the-counter transactions (OTC) (through a mobile money agent) or use another person's mobile account (e.g., the account of either a friend or family member). OTCs have been identified as a barrier to increasing mobile money services and thus may limit the spread of financial inclusion.

Table 2: Awareness of mobile money in 2013, %

Characteristic(a)	Population share(b)	Knowledge about mobile money(c)	Registered user(d)	Currently using(e)
Uganda	100.0	76.8	33.7	56.0
Gender				
Female	52.5	73.3	27.6	52.5
Male	47.5	80.7	39.9	59.7
Age Group				
Below 18	3.1	75.0	8.8	33.7
18-24	19.8	84.5	31.2	53.9
25-39	41.1	80.9	39.0	61.3
40-59	23.9	74.4	34.3	56.1
60+	12.2	55.3	20.8	42.4
Educational attainment				
No formal education	23.7	54.6	18.1	39.2
Some primary	37.4	72.8	21.9	45.2
Completed primary	15.2	86.8	35.4	58.8
Some secondary	9.7	88.7	44.3	70.7
Completed O level & above	14.0	96.6	59.8	77.4
Employment status				
Self employed	63.8	76.6	31.3	55.1
Paid employees	16.3	80.9	48.4	68.7
Contr. family members	5.3	70.7	34.0	51.0
Not working	14.7	75.0	26.5	46.5
Wealth quintile				
Lowest	18.5	62.0	14.7	31.6
Second	20.0	68.6	19.6	41.5
Middle	21.2	76.6	27.8	54.1
Fourth	21.2	83.6	39.5	63.4
Fifth	19.2	92.2	56.6	78.4
Place of residence				
Rural	80.9	73.5	28.8	50.7
Urban	19.1	90.7	50.7	74.5
Region:				
Kampala	5.3	96.8	60.6	83.0
Central exc. Kampala	24.1	88.7	36.8	66.7
Eastern	25.6	70.9	28.3	51.3
Northern	20.9	65.5	22.9	34.8
Western	24.15	76.5	36.1	57.4

Source: Author's calculations based on the 2013 Uganda FinScope data.

5.2 Using mobile money to save

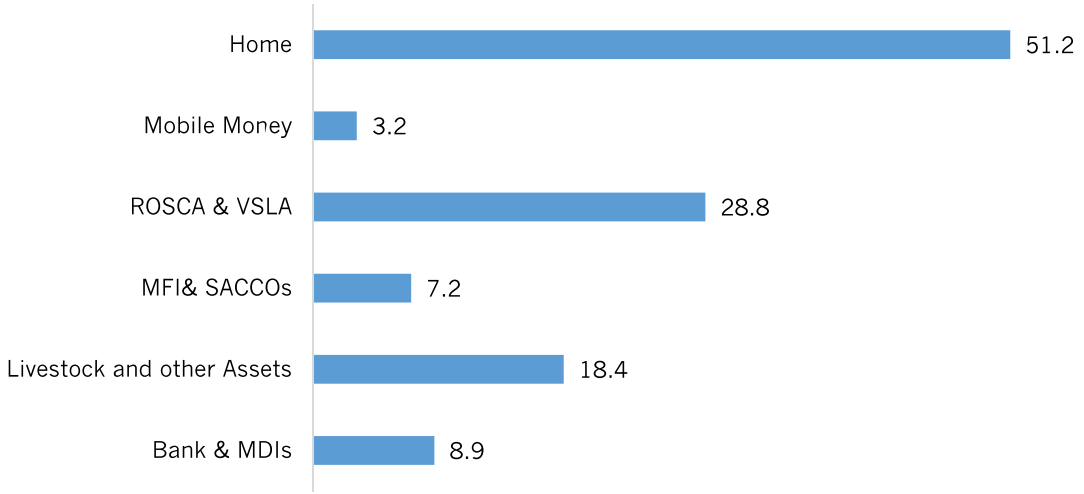
More than half of the population in Uganda save through informal means, i.e., at home and through ROSCAs, ASCAs, Saving Clubs, and Village Groups, etc. About 9 percent save through formal banking institutions, 7.2 percent through non-bank formal means and only 3 percent save through mobile money. In Kenya, saving through M-PESA was also found not to be a common practice (Mas & Radcliffe 2010). As of early 2009, only 21 percent used M-PESA to save money.

Mas & Radcliffe (2010) attribute this to a number of factors. First, there is a lack of interest by Safaricom to publicly promote using M-PESA as a saving tool for fear of provoking the Central Bank of Kenya to regulate it more tightly; the fact that M-PESA deposits are not supervised by the Central Bank of Kenya and hence the minimal trust that customers have yet savings is built on trust. Second, there is a lack of privacy, yet people's saving behavior is centered on privacy and the ubiquity of M-PESA agents, which makes it easy for customers to cash out their funds thus limiting their ability to accumulate funds. Third, there is a lack of interest that accrues from phone savings compared with saving through banks. However, there have been recent technology innovations in the mobile and banking industry, mainly through partnerships. In Kenya for example, m-shwari has emerged as a partnership between safaricom, Vodafone and the commercial Bank of Kenya to provide interest-bearing saving accounts through the M-pesa menu.

5.3 Impact of being a registered mobile money user on which saving mechanism to use

Table 3 presents the econometric results. The results show that being a registered mobile money user increases the likelihood of saving with mobile money. This is similar to findings by Nandhi (2012), who found that mobile money has the potential to increase net household savings and overall improvement of financial inclusion. Furthermore, considering mobile money registration and location (rural or urban areas) shows that registered mobile money users in rural areas are still less likely to save with mobile money than their registered counterparts in urban areas. A plausible explanation for this is that people in rural areas are still poor and any remittances received through mobile money are used to meet their immediate needs. In as much as mobile money is being viewed as an alternative to the access barriers related to formal financial institutions (Mas & Radcliffe 2010), registered mobile money users in rural areas are more likely to save through informal means than their urban counterparts, implying that informal means of saving still override saving through mobile money in rural areas. This finding is partly explained by inadequate supportive infrastructure, which in turn may be affected by network coverage and few mobile money agents, thus making it difficult for the rural population to save through mobile money. Additionally, the issue of liquidity emerges in rural areas. Most mobile money agents often do not have enough float or the security to

Figure 5: Proportion of individual's saving through different savings means in 2013, %



Source: Author's calculations based on the 2013 Uganda FinScope data.

hold large amounts to allow for immediate withdrawal when the need arises.

The results also show that the least developed regions are still less likely to save with mobile money compared with their counterparts in the central region (including Kampala). The plausible explanations may be the presence of a widespread network of mobile money agents in the central region (Appendix 1) and the increased awareness of using mobile money services to save.

Table 3: Econometric results

	Saving mechanism				
	Formally	**Informal**	**Non-Bank formal**	**Mobile money**	
Registered mobile money user	-0.571	0.229	-0.078	6.115***	
	[0.43]	[0.24]	[0.29]	[0.65]	
Have a bank account	2.220***	0.074	0.822***	-0.217	
	[0.16]	[0.10]	[0.12]	[0.14]	
Registered rural mobile money user	-0.011	0.425***	0.133	-0.666***	
	[0.20]	[0.14]	[0.16]	[0.17]	
Interaction of registered user and distance to semiformal institution	0.542*	-0.284*	0.296	-2.876***	
	[0.31]	[0.16]	[0.21]	[0.50]	
Distance to semiformal institution	-0.036	-0.076	-0.530***	0.962***	
	[0.24]	[0.09]	[0.15]	[0.32]	
Distance to the market	-0.213	0.054	0.019	-0.127	
	[0.21]	[0.09]	[0.14]	[0.18]	
Respondent age	0.004	0.001	-0.003	-0.011*	
	[0.01]	[0.00]	[0.00]	[0.01]	
Educational attainment (cf: No education):					
Some primary	0.045	-0.010	0.436**	0.153	
	[0.30]	[0.12]	[0.19]	[0.32]	
Completed primary	0.014	0.104	0.534***	0.071	
	[0.33]	[0.14]	[0.20]	[0.33]	
Some secondary	0.592*	-0.034	0.199	0.495	
	[0.32]	[0.15]	[0.23]	[0.34]	
O-level +	0.508*	-0.166	0.466**	0.234	
	[0.30]	[0.15]	[0.21]	[0.34]	
Gender of the household head (cf. male)	-0.268*	0.241***	0.037	0.298*	
	[0.16]	[0.09]	[0.12]	[0.16]	
Primary activity: (cf paid employment)					
Self employed	-0.385**	0.212**	0.185	0.057	
	[0.16]	[0.10]	[0.13]	[0.14]	
Cont'd family worker	-1.658***	-0.359**	0.246	0.058	
	[0.51]	[0.18]	[0.23]	[0.26]	
Not working	-0.540***	-0.090	-0.296	0.051	
	[0.20]	[0.13]	[0.19]	[0.20]	
Wealth index (cf: first quintile)					
Second wealth quintile	0.026	0.165	-0.003	-0.237	
	[0.34]	[0.12]	[0.19]	[0.24]	
Middle wealth quintile	0.421	0.325***	0.310*	-0.288	
	[0.32]	[0.13]	[0.19]	[0.23]	
Fourth wealth quintile	0.371	0.083	0.316	-0.551**	

	Saving mechanism				
	Formally	Informal	Non-Bank formal	Mobile money	
	[0.30]	[0.13]	[0.19]	[0.27]	
Highest wealth quintile	0.672**	0.057	0.268	-0.981***	
	[0.32]	[0.16]	[0.22]	[0.27]	
Eastern	-0.176	0.285**	-0.247*	-0.422**	
	[0.19]	[0.11]	[0.15]	[0.19]	
Northern	0.575**	0.677***	-0.217	-0.297	
	[0.24]	[0.13]	[0.18]	[0.22]	
Western	-0.238	0.545***	0.289**	-0.029	
	[0.20]	[0.12]	[0.14]	[0.18]	
Constant	-2.443***	-0.985***	-1.506***	-2.514***	
	[0.60]	[0.29]	[0.41]	[0.61]	
	1,335	1,335	1,335	1,165	
Athrho					-1.157***
					[0.28]
Lnsigma					-1.924***
					[0.02]
Wald test for exogeneity (/athrho=0)					17.64
P value					0
Number of observations	1,335	1,336	1,337	1,165	

Notes: (i) Instruments (Distance to the shop, dummy variable of whether mobile money is accessible);

(ii) Saving mechanism using formal, informal and non-bank formal means are estimated using the Probit estimation methods, whereas saving through mobile money is estimated through the instrumental variable Probit method.

(ii) Figures in parenthesis are standard errors; level of significance *at 5%, **at 10%, and ***at 15%.

Source: Authors' calculations based on the 2013 FinScope data.

Other important variables that affect respondents' likelihood of saving with mobile money are the age and the wealth quintile (used as proxy for standard of living). Saving with mobile money is associated with younger people who can easily maneuver and follow instructions on a mobile phone (technology use). People in the fourth and fifth wealth quintiles are actually less likely to save with mobile money than those in the lowest wealth quintile. Instead, they are more likely to save with formal means (particularly those in the fifth wealth quintile), thus confirming the role of mobile money in improving financial inclusion of the poor.

6. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has been able to show that although saving through a mobile phone is not yet a common practice in Uganda, being a registered mobile money user increases the likelihood of using mobile money to save. The findings also show that registered mobile money users in rural areas are less likely to save with mobile money compared with their urban counterparts. From a regional perspective, individuals living in the Central region (inclusive of Kampala) are more likely to save through mobile money than individuals living in other regions.

The above findings can be explained by several factors. First, rural dwellers tend to have lower incomes on average compared with their urban counterparts and thus have less to save. Second, poor infrastructure in rural areas, e.g., lack of electricity and poor telecommunication network coverage, may limit the use of mobile phones and consequently the use of mobile money.

Overall, saving through mobile money is still very low, which could be partly explained by limitations in the legislation that do not incorporate mobile finance services into mobile money. First, the absence of interest payments on mobile money saving may act as a disincentive to save through this mechanism. Second, it is likely that the saving "rail" may not be the most suitable direction that mobile companies would like to invest in. To promote savings, there is need for telecom companies and commercial banks to leverage each other's strengths to deliver a comprehensive saving device for areas and poor people that are difficult to reach. Third, the use of mobile money as a saving mechanism still necessitates a widespread financial infrastructure to allow for the smooth operation of mobile agents to deposit and withdraw money whenever the need arises.

Hence, there is a need for the government to draw policies that encourage inclusive growth. For example, infrastructural projects such as roads and energy should be extended to lagging regions in order to boost incomes and savings as well as access to financial services. Second, the government should develop the appropriate institutional and legal framework that fosters the growth of mobile money beyond mobile payments to encompass all spheres, including mobile finance. Such policies should encourage linkages between financial institutions and MNOs to explore synergies and develop the least costly and most effective way to deliver financial services in Uganda. Third, the government should draw guidelines that compel all mobile phone subscribers to register for mobile money accounts. This will likely increase the use of mobile money and mobile money savings, reduce OTCs and reduce the incidences of mobile money fraud.

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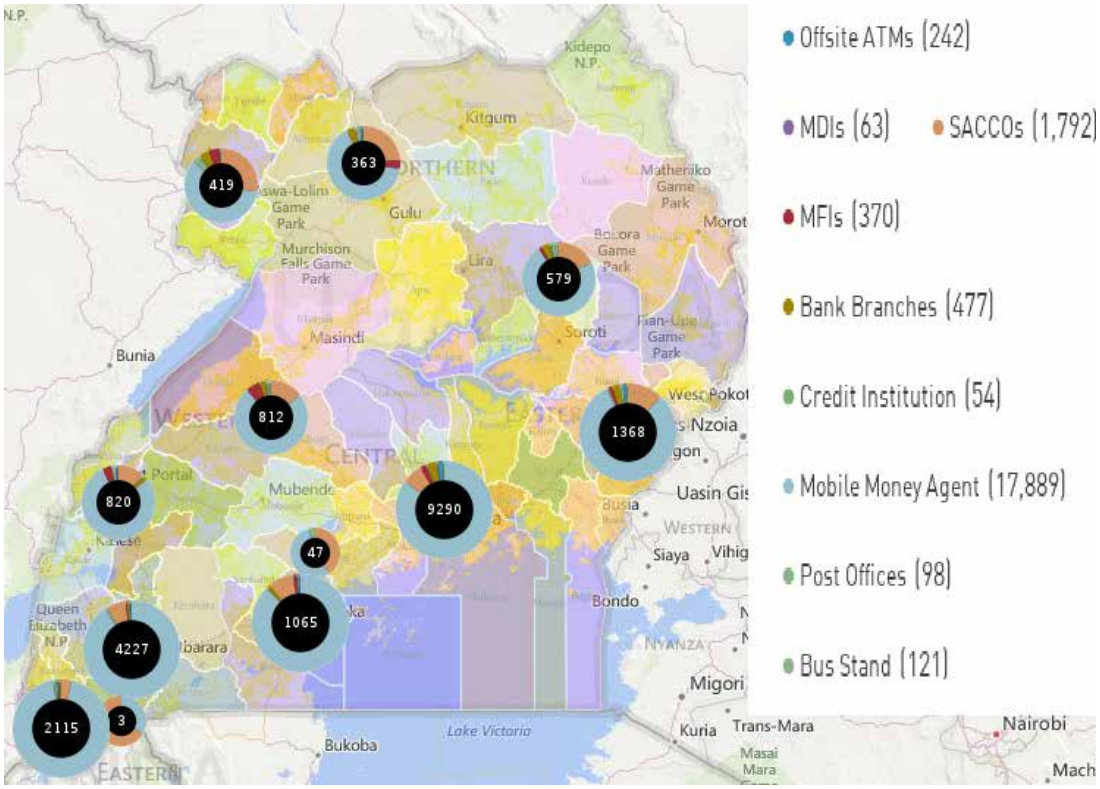
APPENDIX 1: LOCATION OF FINANCIAL SERVICES IN UGANDA



Source: Bank of Uganda, 2014

Table A1: Testing for endogeneity of being a registered mobile money user on the different forms of saving

Variable	Mechanism of saving			
	Formally	Informally	Non-bank formal	Mobile money
Bank account	2.134***	0.239**	0.270**	0.024
	[0.19]	[0.10]	[0.13]	[0.20]
Make airtime expenditures	0.166	0.093	0.316**	0.589***
	[0.18]	[0.12]	[0.15]	[0.20]
Mobile money is accessible	0.088	0.215*	-0.078	-0.106
	[0.21]	[0.11]	[0.14]	[0.20]
Mobile money is cheap	0.030	0.117	0.579***	1.005***
	[0.16]	[0.11]	[0.12]	[0.22]
Mobile money is less expensive	0.092	0.038	-0.067*	-0.111
	[0.18]	[0.03]	[0.04]	[0.09]
Distance to shop	-0.113	0.144	0.826***	0.314
	[0.07]	[0.12]	[0.15]	[0.23]
Respondent age	0.004	-0.001	-0.003	-0.027**
	[0.01]	[0.00]	[0.00]	[0.01]
Some primary education	-0.388	-0.088	0.278	0.366
	[0.26]	[0.16]	[0.23]	[0.48]
Completed primary education	-0.482	0.021	0.295	0.178
	[0.36]	[0.18]	[0.26]	[0.49]
Some secondary education	0.407	-0.083	0.014	0.872*
	[0.32]	[0.19]	[0.28]	[0.50]
O' level and above	0.026	-0.304	0.320	0.814
	[0.30]	[0.20]	[0.26]	[0.52]
Sex of household head	-0.002	0.209*	-0.029	0.585*
	[0.21]	[0.12]	[0.15]	[0.31]
Ownership of land	0.265	0.186	-0.007	-0.374
	[0.22]	[0.13]	[0.16]	[0.26]
Self employed	-0.331	0.233*	0.127	0.035
	[0.21]	[0.14]	[0.16]	[0.25]
Paid employed	-1.191**	-0.328	0.349	-0.321
	[0.54]	[0.24]	[0.36]	[0.48]
Contributing farm work	-0.474*	-0.006	-0.240	-0.323
	[0.25]	[0.17]	[0.23]	[0.31]
Western	-0.357	0.485***	0.303*	-0.206
	[0.28]	[0.17]	[0.17]	[0.26]
Northern	0.371	0.657***	-0.120	-0.732**
	[0.31]	[0.17]	[0.18]	[0.36]
Eastern	-0.153	0.277*	-0.239	-1.037***
	[0.29]	[0.16]	[0.19]	[0.32]
Distance to semi-informal institution	0.159	-0.101	-0.420***	-0.066

Variable	Mechanism of saving			
	Formally	Informally	Non-bank formal	Mobile money
	[0.19]	[0.09]	[0.12]	[0.21]
Wealth quintile 2	-0.332	0.235	0.049	-0.663*
	[0.37]	[0.15]	[0.24]	[0.38]
Wealth quintile 3	0.419	0.336**	0.303	-0.611
	[0.34]	[0.14]	[0.23]	[0.38]
Wealth quintile 4	0.213	0.104	0.100	-1.271***
	[0.32]	[0.15]	[0.23]	[0.40]
Wealth quintile 5	0.676*	-0.155	-0.223	-1.089**
	[0.38]	[0.20]	[0.28]	[0.46]
Residual	***0.154***	***-0.115***	***0.230***	***1.351****
	[0.18]	[0.11]	[0.15]	[0.26]
Constant	-2.783***	-0.919***	-1.294***	-1.273
	[0.60]	[0.33]	[0.45]	[0.80]
Observations	1,234	1,234	1,234	1,167

Table A2: Summary statistics of the variables used in estimation

Variable	Linearized mean	Std. Err.	[95% Conf.	Interval]
Respondent Age				
0	37.1605	0.4746669	36.22768	38.09332
1	36.51981	1.215415	34.13126	38.90836
Education level				
No education				
0	0.1875448	0.0113781	0.1651843	0.2099053
1	0.0533183	0.0200753	0.013866	0.0927706
Some primary education				
0	0.4433908	0.0148502	0.4142069	0.4725747
1	0.1309058	0.0318022	0.0684077	0.1934038
Completed primary education				
0	0.1414432	0.0093676	0.1230339	0.1598526
1	0.0616225	0.0215875	0.0191984	0.1040466
Some secondary education				
0	0.1083455	0.0093798	0.0899122	0.1267789
1	0.1641195	0.046588	0.072564	0.255675
Completed secondary				
0	0.1192757	0.0102276	0.0991763	0.1393751
1	0.5900339	0.0559884	0.4800046	0.7000632
Gender of the household head				
0	0.7857002	0.01125	0.7635915	0.8078088
1	0.7782503	0.0388301	0.7019409	0.8545597
Ownership of land				

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