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Kenya's Mobile Revolution
and the Promise of Mobile Savings

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Abstract

The mobile revolution has transformed the lives of Kenyans, providing not just communications but also basic financial access in the form of phone-based money transfer and storage, led by the M-PESA system introduced in 2007. Currently, 93 percent of Kenyans are mobile phone users and 73 percent are mobile money customers. Additionally, 23 percent use mobile money at least once a day. New potential for mobile money has come with the rise of interest-earning bank-integrated mobile savings systems, beginning with the launch of the M-KESHO system in March 2010. The authors examine the mobile savings phenomenon, using data collected in a special survey in late 2010. They show that the usage of bank-integrated mobile savings systems like M-KESHO remains limited and largely restricted to better-off Kenyans. However, what the authors term "basic mobile savings"—the use of simple mobile money systems as a repository for funds—is widespread, including among those who are otherwise unlikely to have any savings. Holding other characteristics constant, those who are registered for M-PESA are 32 percent more likely to report having some savings.

Kenya's Mobile Revolution and the Promise of Mobile Savings

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1   Introduction

Kenya has undergone a remarkable information and communications technology (ICT) revolution. At the close of the 1990s, less than 3 percent of Kenyan households owned a telephone, and fewer than 1 in 1,000 Kenyan adults had mobile phone service. By the end of 2011, 93 percent of Kenyan households owned a mobile phone.[1]

A unique facet of the ICT phenomenon in Kenya has been the widespread proliferation of mobile money. Starting with the M-PESA system launched by Safaricom in 2007 and later joined by other systems, mobile money has become a fixture in the lives of Kenyans, extending a basic form of financial access to a wide population.

Mobile money platforms have evolved since inception and have entered a new phase with the advent of bank-integrated mobile savings products. The first such product, M-KESHO, was launched in March 2010 as a partnership between Safaricom and Equity Bank.

In this paper we examine the mobile savings phenomenon, using data collected in a survey during October and November of 2010. The concept of "savings" on mobile platforms is not well defined, and we begin by putting forward a classification of the existing innovations. We differentiate between "basic mobile savings" and "bank-integrated mobile savings." Basic mobile savings refers to the simple storage of credit using a mobile system such as M-PESA. Bank-integrated mobile savings refers to systems which include a fuller set of banking services such as interest payments on deposits or overdraft facilities. This is the first study that examines patterns of use of bank-integrated mobile savings in Kenya.

The paper is organized as follows. Section 2 presents findings on the overall prevalence of mobile phone and mobile money usage in Kenya based on the Afrobarometer survey conducted at the end of 2011. Section 3 reviews the existing literature on the broader mobile money phenomenon. Section 4 describes how mobile money works in Kenya and shows the growth of mobile money usage over time. Section 5 describes the data on mobile savings analyzed in this

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[1] These 1999 telephone ownership figures are based on census data, the 1999 mobile phone figures are drawn from the International Telecommunications Union statistical database, and the 2011 mobile ownership figure is based on the 2011 Afrobarometer survey.

paper. Section 6 describes the concept and measurement of mobile savings. Section 7 presents the core analysis. Section 8 discusses the future of mobile savings and concludes.

2   The Reach of Mobile Phones in Kenya

This section reviews recent data on the extent to which mobile phone and mobile money usage has penetrated Kenyan society. The information presented here comes from the Kenya Afrobarometer survey, which was conducted in November and December 2011. The Afrobarometer sample is representative of the population of Kenyan adults (age 18 and older).

The Afrobarometer data show that mobile phone access has reached extremely high levels in Kenya (Table 1). The survey asked each respondent if he or she every uses a mobile phone and, if so, who owns the phone that he or she uses most often. Eighty percent of Kenyan adults own their own individual phones, an additional 10 percent use a phone owned by someone else in their households, and 3 percent use a phone owned by someone outside their households. Slightly lower numbers of women and rural residents own their own individual phones—78 percent of women and 77 percent of rural residents— and women and rural residents are more likely to use a phone owned by another member of their household. Overall phone usage rates differ very little between men and women and between urban and rural households. On average Kenyan households own 2.4 mobile phones, and 93 percent own at least one phone (Figure 1).

The survey separately asked how often respondents normally use a phone to 1) make or receive a call, 2) send or receive a text message, and 3) send or receive money or pay a bill. A detailed tabulation of the basic findings from these questions is shown in Figure 2. As with the mobile access figures, the usage rates for particular mobile functions are strikingly high. At least once a day, 81 percent of Kenyan adults make or receive a call, 61 percent send or receive a text message, and 22 percent send or receive money or pay a bill using a mobile phone.

Differences by gender in mobile phone usage for particular functions are small. Nearly the same number of women as men make or receive a call on a daily basis (80 percent versus 82 percent). The gender gap is slightly higher for daily use of text messages (58 percent versus 65 percent) and for daily use of mobile money (21 percent versus 24 percent). A comparison of urban and

rural patterns shows larger gaps but still high usage rates for particular functions even in rural areas. Rural residents are less likely than urban residents to make or receive calls on a daily basis (78 percent versus 88 percent). They are also less likely to use text messages on a daily basis (57 percent versus 71 percent) and to use mobile money each day (20 percent versus 28 percent).

The typical mobile money user does not use it every day. Half of all adults (68 percent of all mobile money users) use mobile money less than once per day. However, a substantial majority in all categories uses mobile money at least occasionally: 73 percent of all adults, including 70 percent of women, and 70 percent of rural residents.

3   Literature on Mobile Money

The proliferation of mobile money in Kenya has generated research attempting to explain the roots of the phenomenon and to understand its effects. Kimenyi and Ndung'u (2009) attribute the rapid growth in mobile money in Kenya to four factors: a conducive legal and tax environment, private-public policy dialogue, strategic and prudent macroeconomic policies, and a guarantee of the existence of a contestable market discouraging dominance by initial entrants. Comninos et al. (2008) argue that the initial success of Kenya's mobile money transfer industry can be attributed to the high demand for remittances generated by rural/urban migration, while its rapid scaling is due to the mobile providers' growth strategy.

Jack and Suri (2011) report results of a 2009 survey of Kenyan households that use M-PESA. They find that M-PESA reached nearly 40 percent of the Kenyan adult population after only two years of operation. While M-PESA was initially adopted mostly by wealthier households, adoption by less wealthy households was also increasing. Jack and Suri also find an increase in the use of M-PESA by the unbanked population. However, their findings suggest that not owning a mobile phone is a major constraint to the adoption of M-PESA. They also find that M-PESA users with a bank account are much more likely to save on M-PESA than M-PESA users without a bank account. The majority of users cite ease of use and safety as the major reasons for saving on M-PESA.

Qualitative work by Morawczynski (2009) suggests that incomes of rural mobile money transfer recipients have increased due to remittances, which have also led to higher savings by households. These results are based on an ethnographic study conducted in Kibera, a slum in Kenya, in 2007. Participants in a separate qualitative study by Plyler et al. (2010) ranked money circulation as the most important effect of mobile money, and credited mobile money with boosting local consumption. The flow of remittances into rural areas was perceived to have increased local economic activity because M-PESA enabled "just-in-time" remittances that made capital available when it was most needed. Mbiti and Weil (2010) also find some evidence that the growth of M-PESA in communities has been associated with increases in local farm employment.

Mbiti and Weil (2009) find that the major use of M-PESA is for transfers and that there is relatively little storage of value. At the same time, they also show that a significant number of survey respondents indicate that they use their M-PESA accounts as a vehicle for saving. Mbiti and Weil also find evidence that M-PESA use decreases the use of informal savings mechanisms such as ROSCAs, and increases the probability of being banked.

Other important benefits of M-PESA include increased security of funds, and the empowerment of women. Hughes and Lonie (2007) suggest that mobile money transfer is more secure and cost effective than alternative methods of money transfer, such as using couriers or friends. Focus group participants in Plyler et al. (2010) highlight the greater security they enjoy because they are able to keep funds as mobile money, rather than at home in cash. Men in the Kibera slum focus on the aspect of physical danger due to mugging, which has decreased because fewer people carry large amounts of cash. Likewise, other respondents in the study indicate that local businesses and street vendors often convert their cash to M-PESA at the end of the day for safekeeping. Additionally, mobile money empowers women by giving them an independent place to store and manage funds that is private and inaccessible to other family members.

Survey data examined by Aker and Mbiti (2010) show that current users of mobile money transfers in Kenya tend to be wealthier, better educated, urban and already banked, with most transfers occurring within urban areas and remittances being smaller but more frequent. They also develop the theory of the general mechanisms through which mobile phones remove constraints to social and economic progress. They assert that improved access and use of

information reduces search costs and facilitates co-ordination among agents, thereby increasing productive and market efficiency. Mobile phones also create employment and increase incomes by spurring demand for mobile-related services. In addition, mobile phones enable social networks to respond more immediately to idiosyncratic shocks, thereby reducing household exposure to risk.

On the basis of a study of 409 small business entrepreneurs in Kenya, Mbogo (2010) finds that for micro-businesses, factors responsible for adoption and continued usage of mobile money transfer include convenience, support, cost, satisfaction and security.

Camner and Sjöblom (2009) compare the adoption of M-PESA in Tanzania to adoption in Kenya. They find much lower adoption rates in Tanzania, which are explained by the lower mobile telephony market share of Vodacom, which is the M-PESA provider in Tanzania, its inability to build a strong agent network, and its lower marketing budget. Other factors are Tanzania's generally lower GDP growth, smaller proportion of unbanked population, higher financial illiteracy, more dispersed population and the absence of a national ID.

4   The Basics of Mobile Money

Mobile money systems consist of electronic money accounts that can be accessed via mobile telephones. They are often likened to simple bank accounts, although a basic mobile money system does not pay interest or provide loans. Each of the mobile service providers in Kenya currently has a mobile money service. Safaricom's M-PESA was introduced in March 2007, Zain's Zap (now known as Airtel Money) was initiated in February 2009, yuCash started in December 2009, and Orange's Orange Money was launched in November 2010. The following description is based on M-PESA, which is by far the largest system, although the other systems are similar.

To have a mobile money account and make a deposit, a customer must own a cell phone SIM card with the mobile operator and register for a mobile money account. The customer then can make cash deposits at the physical offices of one of the operator's mobile money agents. These cash deposits create electronic money credit in the customer's account.

Customers can make person-to-person transfers of mobile money credit to the accounts of other mobile money users on the same network. They can also use their mobile money credit to pay bills and to buy phone airtime. Withdrawals (conversion to cash) can be made at the offices of the network's mobile money agents. It is also possible for a mobile money customer to make a transfer to someone who is not registered with the same network. In this case, when notice of the transfer is received in the form of an SMS text message, the recipient can receive the cash at a mobile money agent.

After a slow start in 2007, mobile money usage has since grown rapidly. As of June 2011 the value of person-to-person transactions alone exceeded 30 percent of GDP (see Figure 2).[2] Due to the rapid growth of mobile money usage, the portrait of mobile money users is a moving target. Figure 3 summarizes various sources on total numbers of mobile money users through June 2011. The number of mobile money subscribers as of June 2011 was over 17 million, representing approximately 3 out of every 4 Kenyans age 15 and older.[3]

5   Data

We analyze mobile savings data from a survey conducted by the Financial Sector Deepening – Kenya (FSD-Kenya) organization during the period October to November 2010. Data were collected for 6,083 individuals. These observations were then categorized into M-PESA users and non-users, and a more extensive questionnaire was administered to M-PESA users, comprising a subsample of 2,692 observations. An extra 103 observations were collected by the snowballing method to boost the sample of M-KESHO users. These observations were dropped from the analysis presented here. Individual probability weights are used to make the sample nationally representative.

The survey was not conducted in North Eastern province due to insecurity in the region. Mobile savings data collected include general financial product usage, savings behavior, mobile phone

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[2] These figures do not include mobile money bill payments or transfers from companies to individuals.
[3] This figure, based on dividing the overall number of mobile money subscribers in June 2011 by the estimated population age 15 and older, is compatible with the percentage of the population age 18 and older (73 percent) that reported using mobile money in the November-December 2011Afrobarometer survey, as detailed in Section 2.

ownership and usage, M-PESA usage, mobile savings awareness and usage, and M-KESHO usage.

The questionnaire asks specific questions about M-PESA but does not refer to Zap and yuCash, mobile money systems which were launched in 2009. Subscriber figures show that M-PESA accounts for the overwhelming majority of the mobile money market. Consequently, the dynamics of M-PESA usage differ very little from those of mobile money systems in Kenya as a whole.

A wealth index was created using principal components analysis and used to group survey respondents by wealth quintile. To create the wealth index, we follow the approach established by Filmer and Pritchett (2001). The index weights are given by the first principal component, which is the linear index of all the variables that captures the largest amount of information that is common to all of the variables. The variables included in the wealth index are household items (for example radio, bicycle refrigerator, microwave), quality of toilet facilities (for example flush toilet or pit latrine), quality of water source (for example piped water into dwelling or rainwater), quality of walls (for example stone or mud), quality of roofing material and number of habitable rooms in the household.

6   The Concept and Measurement of Mobile Savings

6.1   The Concept of Savings

M-PESA, the first mobile money system in Kenya, was originally developed primarily as a money transfer device and was attractive because it allowed people to send remittances across distance at low cost. The system has become popular for other uses, including storing credit. The term "mobile savings" has been used to describe this phenomenon.

We distinguish between two types of mobile savings:
- *Basic mobile savings.* This is simply the use of a standard mobile money system such as M-PESA to store funds. Basic mobile savings do not earn interest.

- *Bank-integrated mobile savings.* This term refers to access to an account via mobile phone that offers financial services beyond basic money storage and transfer. Such an account might, for example, pay interest and allow access to loans or insurance.

Bank-integrated mobile savings approaches have received a great deal of attention as a way to provide banking services to the poor. They have the advantage of offering access to basic banking services without requiring proximity to a physical bank branch. Instead, with a bank-integrated mobile savings account, basic banking services can be accessed via a network of mobile phone agents, which in Kenya outnumber the number of bank branches by a factor of 100 to 1 (Mas and Radcliffe 2010).

Mobile savings products have increased rapidly: as of December 2010, there were at least seven systems offering some type of bank account access via mobile phone.[4] Most of these are essentially access to a traditional account via a mobile phone and require the customer first to establish a traditional account at a physical bank. We term these *partially* integrated mobile savings systems." Separately, M-KESHO, a joint venture between Equity Bank and Safaricom, can be considered a *fully* integrated mobile savings system, as it does not require a traditional bank account: customers can sign up via Safaricom agents. M-KESHO had 613,000 subscribers in the six months after its launch. The market has since rapidly expanded as more banks have structured agreements with the mobile service providers. Bank-mobile service provider partnerships are not exclusive, and banks are seeking agreements with multiple mobile service providers with the ultimate aim of providing universal access to their diverse client account bases. Additionally, banks are beginning to build their own agent networks in order to assume a more competitive bargaining position in accessing mobile service platforms.

Partially and fully integrated savings present different types of contracts among the partnering bank and mobile service provider. A partially integrated product clearly delineates the role of the bank, which provides and owns banking services, and the mobile service provider, which provides the mobile telephony infrastructure and controls the agent network. The bank compensates the mobile service provider for access to the network and enjoys the remaining

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[4] These include M-KESHO, Pesa-Pap, KCB Connect, Pesa Chap Chap, ZAP/Standard Chartered, NIC Bank M-PESA link, Co-op Bank M-PESA link.

profits. This type of contract more closely resembles a debt contract between the parties. A fully integrated solution may not draw the same distinction between bank and mobile service provider. In this case, the distribution of surplus depends on the relative bargaining power of the bank and mobile service provider. This type of contract more closely resembles an equity contract between the parties. Equity-like contracts are likely to be more complex and therefore more difficult to negotiate than debt-like contracts, thereby presenting a potential hurdle towards the goal of increasing access.

6.2   The Measurement of Savings

In the 2010 FSD-Kenya survey, respondents were asked "Do you save any portion of your income?" Those who responded affirmatively were asked "Where do you save your money?" The options (not mutually exclusive) were M-PESA, MKESHO/PESA PAP/ KCB Connect, Bank account, SACCO account, ASCA, ROSCA, Microfinance Institution and Other. These responses reflect each respondent's subjective understanding of what it means to "save your money" and whether the respondent's use of each service constituted savings.

In the analysis presented in the following section, we define an individual to have "M-PESA savings" if he or she reports saving a portion of income and lists M-PESA as one of the places for savings. We also examine the use of bank-integrated mobile savings. Respondents are defined to have bank-integrated mobile savings if they report having used M-KESHO.

7   Analysis

7.1   Who Uses Mobile Savings?

Both savings with M-PESA and savings with M-KESHO require the individual to be registered for M-PESA. Table 3 presents a comparison of those registered with M-PESA to the overall population. Forty five percent of individuals in the sample report being registered with M-PESA.[5] In terms of gender, age, and geographic distribution, there are not large differences

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[5] This figure drawn from the survey conducted October-November 2010 is substantially lower than a similar figure presented earlier in the paper: the number of mobile money subscribers in June 2011 was equivalent to roughly 75 percent of the adult population. The difference between the two figures largely reflects the large growth in mobile money subscriptions during that period. It also stems in part from differences inherent in the two sources of the data:

between M-PESA users and non-users in the survey. However, M-PESA users are more concentrated in the middle and upper wealth quintiles.

Table 4 shows the figures on the prevalence of various forms of savings overall and by subgroups (all figures are for the entire population, including those who are not registered M-PESA users). Fifteen percent of individuals say that they save with M-PESA. The second column of the table indicates the prevalence of savings with the M-KESHO bank-integrated mobile savings platform. Only a very small number—0.6 percent—indicated that they save with M-KESHO. The small number of M-KESHO users are almost entirely the relatively wealthy; just 0.2 percent of individuals in the bottom two quintiles report saving with M-KESHO.

The last column of Table 4 shows the fraction in the survey who report that they have some form of savings other than M-PESA or bank-integrated mobile savings. Substantial gradients by age and wealth are seen for other savings vehicles. Specifically, younger and poorer individuals are much less likely to have other savings accounts. Table 4 indicates a higher level of savings by men for all types of savings. Additionally, the table indicates higher levels of savings for individuals in urban areas and for wealthier individuals.

A key question is whether there is any evidence that use of M-PESA may increase the prevalence of savings behavior. Table 5 shows a simple comparison of rates of reporting *any* savings, by subgroup, for those who are registered with M-PESA compared to those who are not. Overall, 65 percent of M-PESA users report having some savings, compared to 31 percent of those who are not M-PESA users, for a difference of 34 percent. Of course, this difference may reflect differences between M-PESA users and non-users other than a causal effect. Individuals registered to M-PESA may already be more likely to save than those not registered to M-PESA. For example, one may expect that individuals most likely to use M-PESA would be those able to afford a mobile phone or those able to pay M-PESA transaction costs, implying greater wealth. Additionally, those more capable of understanding financial transactions or those with the technical ability to use mobile phone devices would be more likely users of M-PESA, implying higher levels of education.   Table 5 shows substantial differences by subgroups defined by gender, urban/rural, age, wealth quintile, and province.

the survey-based figures are subject to sampling error and misreporting, while the mobile money subscriptions may double-count some individuals who have multiple mobile money accounts and could reflect in part mobile money accounts that are not used.

Table 6 presents results from probit regressions where the dependent variable equals 1 if the individual has savings of any kind and 0 if the individual has no savings. The results show that controlling for other variables, savings are more likely for individuals who are male, married, living in rural areas, and have higher levels of education, reported income, and wealth. Controlling for these same variables, those who are registered with M-PESA are 32 percent more likely to report having some savings.

This result provides some evidence that M-PESA may increase the prevalence of savings. In attempting to isolate a causal effect of M-PESA on savings, there remains the possibility of differential M-PESA registration rates among those who are more likely to save independent of their use of M-PESA. We attempt to address this possibility using an instrumental variables strategy. Because M-PESA was only introduced in 2007, all those registered for the system at the time of the survey in 2010 had registered during the previous three years. It is likely that an individual's probability of registering for M-PESA is influenced by the prevalence of M-PESA usage in the community, for two reasons. First, the rate of M-PESA usage in the community reflects access to M-PESA agents, which determines how convenient it is put money in or take money out of the system. The network of M-PESA agents has spread over time, and access to agents varies by community. Second, it is likely that there is a community-level learning element to adoption of M-PESA. Individuals are more likely to use M-PESA when knowledge of the system is more prevalent among their neighbors. We use these two "community effects" as the basis for our identification strategy, which is to instrument individual M-PESA registration with the fraction of respondents in the sublocation who are registered with M-PESA. Results from this IV probit model are shown in the second column of Table 6. The results imply that registration for M-PESA increases the likelihood of having some savings by 20 percent.[6]

This identification strategy has weaknesses. We cannot rule out the possibility that there is a similar community effect for savings and that this community effect is correlated with the M-PESA community effect other than through a causal effect of M-PESA. Nonetheless, we take these results as indicative evidence that M-PESA increases savings.

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[6] An alternative approach to the IV strategy is to include the share of households registered to M-PESA in a given sublocation as an additional control in the main regression. Probit results of this model are given in the appendix (Table A1).

Separately, Table 7 profiles M-KESHO users with a probit analysis. The results reflect the same patterns seen in the descriptive statistics: the small number of people who use M-KESHO are more likely to be wealthier, married, more educated, and male.

7.2 How Much Do Mobile Savers Save?

In this section, we analyze how much people save with M-PESA. Table 8 compares average reported amounts of savings per month for those who report saving with M-PESA only, with other savings vehicles only, and with both M-PESA and other accounts.[7] Overall, the average amount saved is substantially larger for those who save with accounts other than M-PESA. Those who save only with M-PESA save on average 1,305 Kenyan shillings per month (about US$13), compared to 2,282 Kenyan shillings per month for those who save only with other accounts, and 2,959 Kenyan shillings per month for those save with M-PESA *and* other accounts. M-PESA savings are less than savings with other vehicles but still substantial. Much of the difference in average amounts between M-PESA savers and others is driven by the fact that those who save with accounts other than M-PESA tend to be wealthier individuals who save more. Among those in the poorest quintile, the differences in amount saved are much less: 1,052 for M-PESA savers, 1,075 for other accounts, and 1,130 for those who save with both M-PESA and other accounts.

To consider the possible effects of M-PESA usage on savings behavior, we regress log average monthly savings amounts on various explanatory variables and a dummy for M-PESA registration. The OLS version of these results is presented in the first column of Table 9. The coefficient estimates show that controlling for covariates, savings amounts are higher for men, those with higher education, those living in urban areas, and those in wealthier and higher income households. Controlling for those variables, those who registered with M-PESA save 12 percent more than those not registered. The second column of Table 9 presents an instrumental variables version of the same regression, using the same instrument—fraction of respondents in the sublocation who are registered with M-PESA—used in the probit savings analysis. The

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[7] Average monthly savings was calculated by combining responses to questions concerning the frequency of savings and the average amount saved each time.

coefficient implies that savings are 31 percent greater for M-PESA users, but the estimate is not statistically significant.

8   The Future of Mobile Savings

We have shown that basic mobile savings (the use of M-PESA for savings) is common and presented some evidence that M-PESA increases savings. That M-PESA increases savings may seem surprising, given that it does not pay interest and thus functions as a mere money storage device. However, this finding is compatible with qualitative evidence on M-PESA; in the Plyler et al. (2010) focus group study, Kenyans highlighted the value of M-PESA as a place to store funds safe from the dangers of theft and inaccessible to other family members.

Another recent study of savings in Kenya not related to M-PESA provides additional evidence for the value of a simple storage mechanism. In a multi-armed experiment, Dupas and Robinson (2011) provided various opportunities to save for health expenditures through different technologies.[8] The simplest treatment was to provide participants with a simple metal box with a lock and key and a deposit slit in the top. Remarkably, just providing the box increased health savings by 68 percent. Based on follow-up interviews with participants, the authors conclude that this effect was due to "mental accounting," meaning that with the funds set aside, it was easier to refuse requests or limit consumption knowing that the funds were mentally allocated to savings. Respondents said they felt less obligated to share funds with others when they were in the box. Some also said that the hidden aspect of the box was important.

The reports from the qualitative work on M-PESA suggest that mobile money may serve a function similar to the box in the Dupas and Robinson study. Thinking of the M-PESA funds as reserved funds, as well as the fact that M-PESA funds are hidden from others, may make the system a preferred method of savings for Kenyans without easy access to other savings vehicles.

 We have also shown that approximately six months after the introduction of M-KESHO, Kenya's heralded bank-integrated savings platform, use of the platform for savings was very rare. This result also seems surprising given the high rates of use of M-PESA for basic mobile

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[8] The Dupas and Robinson study was carried out in 2008, before takeup of M-PESA was widespread.

savings. If many people use M-PESA for savings, which does not pay interest, why are they not using M-KESHO, which does pay interest? We suggest two inter-related answers to this question. First, the interest payments make M-KESHO only marginally more attractive. As of October 2011, M-KESHO offered an interest rate of 0.5 percent for deposits up to 2,000 Kenyan shillings, and an interest rate of 3 percent for loans above 10,000 Kenyan shillings.[9] The inflation rate for October 2011 was 18.9 percent, thereby implying highly negative real interest rates for M-KESHO users. Although some interest is better than none, if the rate of interest is very low compared to the inflation rate, the possibility of interest may not matter much for savings decisions. Additionally, the M-PESA account and daily transaction limits were raised by 100 percent to 100,000 Kenyan shillings and 140,000 Kenyan shillings respectively, in December 2010. These higher thresholds may have increased the relative attractiveness of M-PESA.

A second possible explanation for the low take-up of M-KESHO is the institutional arrangements required for such a system to function. Bank-integrated savings products such as M-KESHO require two players in order to operate: a mobile phone service provider to provide access to the transactions platform, and a bank to provide savings products and expertise over the platform (mobile survey providers are not licensed under Kenyan law to provide banking services, and similar restrictions are found in other countries.) As a result, the surplus is split between the two entities depending on their relative bargaining power. Additionally, the bank and mobile service provider must negotiate on account ownership and integrate their traditional proprietary platforms.

The complexity of the cooperation required between the bank and the mobile service provider has two likely outcomes. First, the fact that both organizations must profit out of the arrangement reduces the surplus for consumers and in the case of M-KESHO may explain why the interest rates it offers are so low. Second, the shared arrangement between the two companies may create challenges for the two to work together. Although released to much fanfare, M-KESHO has not been widely promoted subsequently, which may reflect difficulties Equity Bank and Safaricom have had in managing the partnership.

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[9] See http://www.safaricom.co.ke/index.php?id=263

Despite these challenges, mobile savings have the potential to add social value, especially to those constrained by the costs of opening and maintaining traditional brick-and-mortar accounts, or those constrained by large distances between their households and the closest savings establishments. Mobile phone penetration in Kenya is far higher than use of financial services. The gap between mobile phone penetration and access to financial services suggests that many currently unbanked individuals could benefit from the provision of savings services through mobile telephony. The results in this paper show that basic mobile savings is already partially filling the gap, answering the acute need many Kenyans, particularly the poor, have for a secure place to store funds. It remains to be seen whether a bank-integrated mobile savings model can be developed that can provide an attractive package for consumers beyond what basic mobile savings systems already offer.

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Figures

Figure 1: Distribution of Mobile Phones per Household
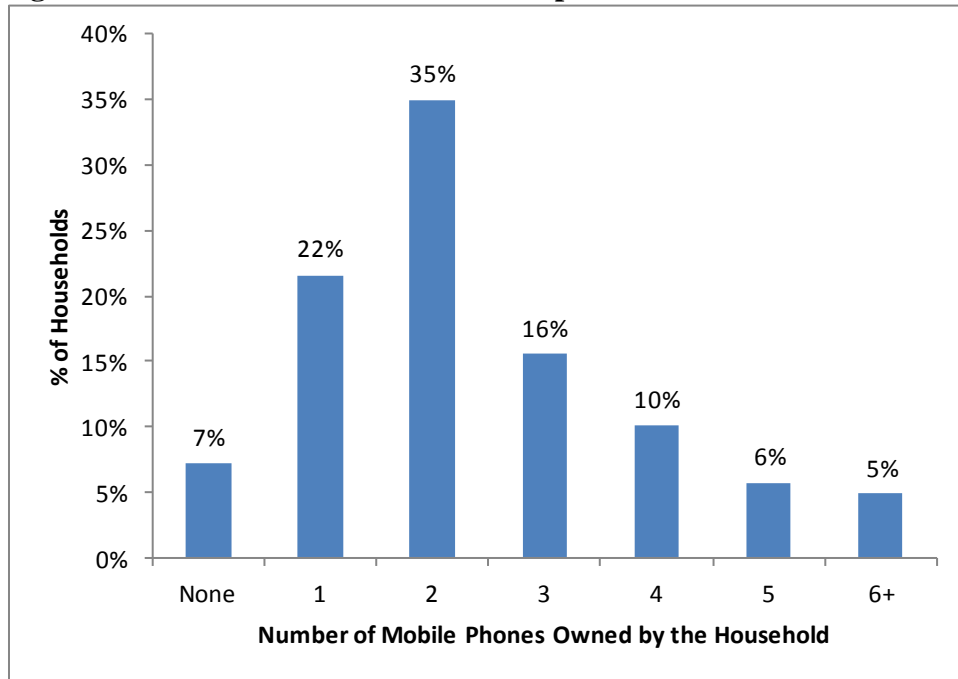
Source: Authors' analysis of Kenya Afrobarometer survey data collected in November and December 2011. The sample (2400 observations) is drawn from the population of Kenyan adults (age 18 and older). The overall mean is 2.4 mobile phones per household.

Figure 2: Mobile Money Person-to-Person Transfers as % of GDP
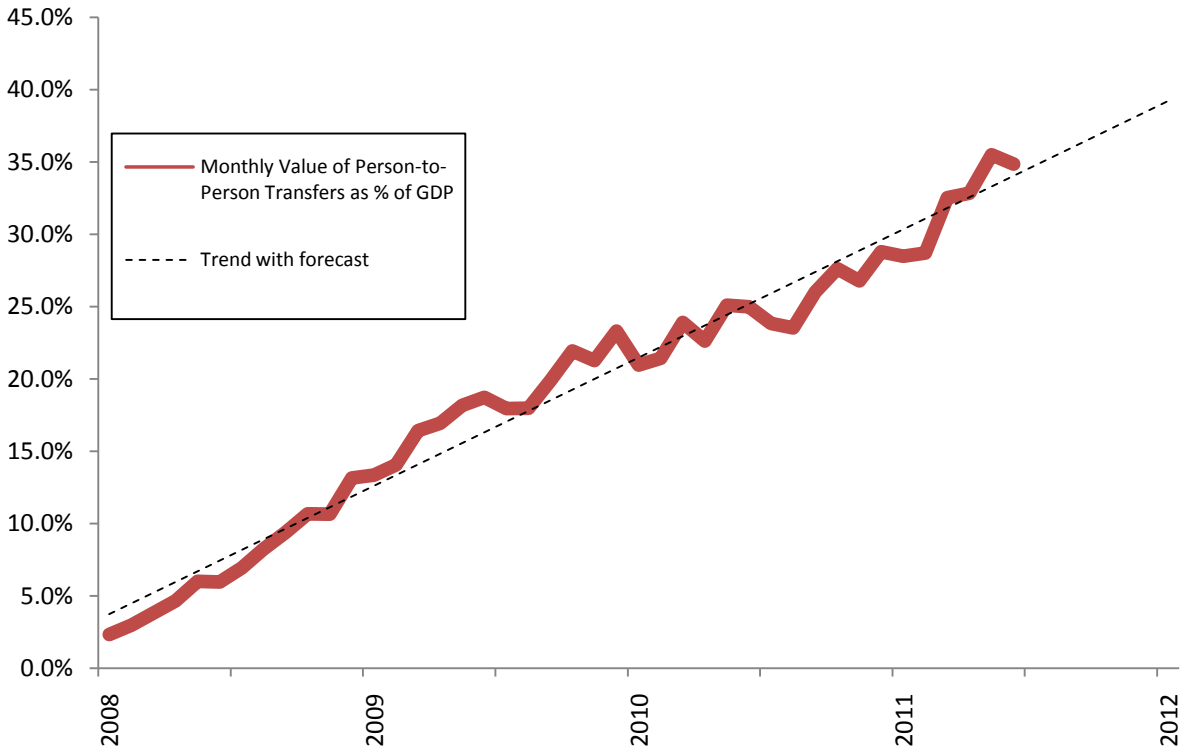
Figure 3: Population Age 15+, Mobile Phone Subscriptions, and Mobile Money Customers

Table 1: Mobile Phone Usage and Ownership

Do you ever use a mobile phone? If so, who owns the mobile phone that you use most often?

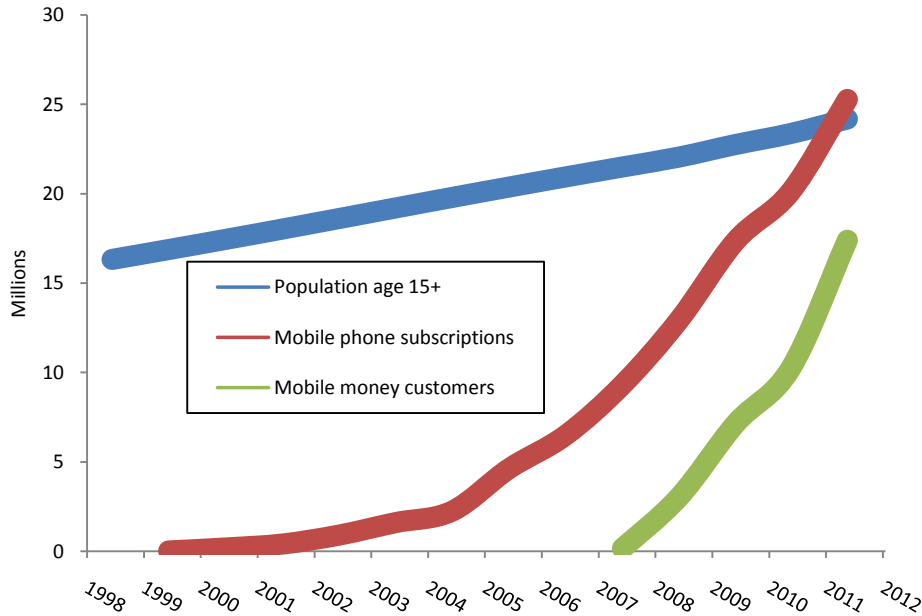|	No, I never use a mobile phone	Yes, I use a mobile phone that I own	Yes, I use a mobile phone owned by someone else in my household	Yes, I use a mobile phone owned by someone outside my household	Total
All Adults	7%	80%	10%	3%	100%
Male	6%	83%	7%	3%	100%
Female	7%	78%	12%	4%	100%
Urban	5%	86%	7%	2%	100%
Rural	8%	77%	11%	4%	100%

Source: Authors' analysis of Kenya Afrobarometer survey data collected in November and December 2011. The sample (2400 observations) is drawn from the population of Kenyan adults (age 18 and older).

Table 2: Frequency of Mobile Phone Usage for Calls, SMS, and Mobile Money

How often do you normally use a phone to …

Make or receive a call?

	Never	Less than 1 time per day	1-2 times per day	3-4 time per day	5+ times per day	Total	*At least once per day*
All Adults	6%	13%	17%	19%	45%	100%	81%
Male	6%	12%	14%	19%	49%	100%	82%
Female	6%	14%	20%	19%	41%	100%	80%
Urban	3%	9%	12%	19%	56%	100%	88%
Rural	7%	15%	19%	19%	39%	100%	78%

Send or receive a text message or SMS?

	Never	Less than 1 time per day	1-2 times per day	3-4 time per day	5+ times per day	Total	*At least once per day*
All Adults	20%	19%	20%	14%	27%	100%	61%
Male	18%	17%	21%	15%	30%	100%	65%
Female	21%	21%	19%	14%	25%	100%	58%
Urban	13%	16%	17%	15%	39%	100%	71%
Rural	23%	21%	21%	14%	21%	100%	57%

Send or receive money or pay a bill?

	Never	Less than 1 time per day	1-2 times per day	3-4 time per day	5+ times per day	Total	*At least once per day*
All Adults	27%	50%	13%	4%	6%	100%	23%
Male	24%	52%	14%	4%	7%	100%	24%
Female	30%	49%	12%	4%	6%	100%	21%
Urban	20%	52%	13%	5%	10%	100%	28%
Rural	30%	50%	12%	4%	4%	100%	20%

Source: Authors' analysis of Kenya Afrobarometer survey data collected in November and December 2011. The sample (2400 observations) is drawn from the population of Kenyan adults (age 18 and older).

Table 3: Comparison of Individuals Registered with M-PESA and Overall Population

	Individuals registered with M-PESA	All individuals in sample
% Male	54%	50%
% Urban	40%	32%
Age Group		
18 - 24	27%	30%
25 - 34	36%	32%
35 - 44	13%	19%
45 - 54	15%	12%
55 - 64	8%	7%
	100%	100%
Wealth Quintile		
% Poorest	10%	24%
% 2nd Poorest	14%	18%
% Middle	22%	19%
% 2nd Wealthiest	24%	20%
% Wealthiest	30%	20%
	100%	100%
Province		
% Central	13%	12%
% Coast	7%	9%
% Eastern	18%	16%
% Nairobi	11%	9%
% Nyanza	15%	15%
% Rift Valley	27%	28%
% Western	9%	12%
	100%	100%
Marital Status		
% Married	61%	55%
Number of observations	2687	5973

Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010. The estimates shown were calculated using survey sample weights.

Table 4: Percentages Reporting Various Types of Savings, by Subgroup

	Percentage in subgroup reporting …		
	Basic mobile (M-PESA) savings	Bank-integrated mobile savings	Other types of savings accounts
All Kenya	14.7%	0.6%	29.3%
Gender			
Male	16.3%	0.9%	32.2%
Female	13.1%	0.3%	26.5%
Setting			
Urban	17.1%	0.8%	38.7%
Rural	13.5%	0.5%	24.9%
Age			
18 - 24	13.5%	0.5%	21.0%
25 - 34	16.9%	0.6%	35.9%
35 - 44	11.1%	0.6%	23.7%
45 - 54	17.8%	0.9%	38.8%
55 - 64	13.7%	0.4%	34.0%
Wealth Quintile			
Poorest	6.1%	0.2%	10.1%
2nd Poorest	12.0%	0.2%	18.5%
Middle	17.9%	0.7%	29.0%
2nd Wealthiest	18.2%	0.8%	39.1%
Wealthiest	20.9%	1.2%	53.6%
Province			
Central	19.5%	0.7%	46.2%
Coast	7.8%	0.3%	19.3%
Eastern	15.1%	0.7%	33.6%
Nairobi	11.7%	0.8%	38.4%
Nyanza	16.5%	0.9%	33.2%
Rift Valley	14.1%	0.5%	20.2%
Western	15.6%	0.3%	23.9%
Number of observations	5973	5973	5973

Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.
Notes: Other types of savings accounts include Bank, SACCO, ASCA, ROSCA and microfinance accounts. The estimates shown were calculated using survey sample weights.

Table 5: Percentage of Individual Who Report Some Savings, by M-PESA Registration

	Percentage reporting having some savings among those …	
	Registered with M-PESA	Not registered with M-PESA
All Kenya	65%	31%
Gender		
Male	68%	27%
Female	63%	34%
Setting		
Urban	68%	30%
Rural	64%	31%
Age		
18 - 24	58%	19%
25 - 34	68%	32%
35 - 44	72%	47%
45 - 54	68%	30%
55 - 64	63%	25%
Wealth Quintile		
Poorest	55%	36%
2nd Poorest	53%	20%
Middle	62%	26%
2nd Wealthiest	68%	32%
Wealthiest	76%	41%
Province		
Central	74%	37%
Coast	62%	15%
Eastern	65%	24%
Nairobi	58%	29%
Nyanza	73%	35%
Rift Valley	58%	36%
Western	76%	29%
Number of observations	2687	3286

Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.

Table 6: Probit Model for Savings

Dependent variable = 1 if individual reports having any savings	Probit	IV Probit
Rural	0.0531 **	0.0546 **
	(0.0232)	(0.0228)
Male	0.0441 *	0.0453 *
	(0.0245)	(0.026)
Age	0.0186 **	0.0202 **
	(0.0085)	(0.0091)
Age squared	-0.0002 *	-0.0002 *
	(0.0001)	(0.0001)
Married	0.0625 ***	0.0710 ***
	(0.0212)	(0.0213)
Education	0.0226 ***	0.0249 ***
	(0.0043)	(0.0046)
2nd poorest quintile	0.0550	0.0641
	(0.0573)	(0.061)
Middle quintile	0.1175 **	0.1378 **
	(0.0539)	(0.0574)
2nd wealthiest quintile	0.1715 ***	0.1902 ***
	(0.0497)	(0.0527)
Wealthiest quintile	0.1807 ***	0.2007 ***
	(0.0465)	(0.0483)
Log household income	0.0753 ***	0.0882 ***
	(0.0135)	(0.015)
Registered to M-PESA	0.3238 ***	0.1989 ***
	(0.0206)	(0.0692)
Pseudo R-squared	0.1850	
Number of observations	5087	5087

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.
Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.
Notes: Figures shown are marginal effects. Standard errors are shown in parentheses.

Table 7: Probit Estimates for M-KESHO Users

Dependent variable = 1 if individual reports using M-KESHO	
Rural	0.0041
	(0.0034)
Male	0.0092 ***
	(0.0031)
Age	0.0011
	(0.0008)
Age squared	0.0000
	(0.0000)
Married	0.0082 ***
	(0.0028)
Education	0.0015 ***
	(0.0006)
2nd poorest quintile	0.0119
	(0.0104)
Middle quintile	0.0230 **
	(0.0143)
2nd wealthiest quintile	0.0218 **
	(0.0129)
Wealthiest quintile	0.0222 **
	(0.0146)
Log household income	0.0060 ***
	(0.0021)
Pseudo R-squared	0.0909
Number of observations	5087

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.
Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.
Notes: Figures shown are marginal effects. Standard errors are shown in parentheses.

Table 8: Average Monthly Savings Statistics by Type of Account

Wealth quintile	Average savings per month among those saving …		
	only with M-PESA	only with accounts other than M-PESA	with both M-PESA and other accounts
Poorest	1,052	1,075	1,130
2nd Poorest	1,110	1,282	1,989
Middle	1,125	1,787	2,964
2nd Wealthiest	1,169	1,907	2,202
Wealthiest	2,173	3,381	4,011
All quintiles	1,305	2,282	2,959
Number of observations	388	1,290	578

Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.

Table 9: Regression of Log Average Monthly Savings

	OLS	IV	
		First stage	2nd stage
Rural	-0.2281 ***	0.0313	-0.1922
	(0.0655)	(0.0198)	(0.0607)
Male	0.2509 ***	-0.0006	0.2544
	(0.0457)	(0.0212)	(0.0412)
Age	0.0268	-0.0029	0.0290
	(0.0165)	(0.0059)	(0.0152)
Age squared	-0.0002	0.0001	-0.0003
	(0.0002)	(0.0001)	(0.0002)
Married	-0.0261	0.0771 ***	-0.0580
	(0.0553)	(0.0236)	(0.0529)
Education	0.0537 ***	0.0097 ***	0.0519
	(0.0083)	(0.0032)	(0.0077)
2nd poorest quintile	0.1137	-0.0203	0.0896
	(0.0988)	(0.0036)	(0.0886)
Middle quintile	0.1422	0.0493	0.1512
	(0.0978)	(0.0353)	(0.0889)
2nd wealthiest quintile	0.2251 **	0.0071	0.2227
	(0.0948)	(0.0342)	(0.0886)
Wealthiest quintile	0.3392 ***	-0.0066	0.3612
	-0.1047	(0.0393)	(0.0962)
Log household income	0.3606 ***	0.0597 ***	0.3188
	(0.0346)	(0.0137)	(0.0353)
Registered to M-PESA	0.1179 **		0.3102
	(0.0471)		(0.1921)
Share of registered households		0.7748 ***	
		(0.0461)	
Number of observations	2265	2265	2265
R-squared	0.2532	0.1201	0.2365

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.

Notes: Standard errors are shown in parentheses. "Share of registered households" is the fraction of respondents in the sublocation who are registered with M-PESA.

Appendix

Table A1: Probit Model for Savings

Dependent variable = 1 if individual reports having any savings	
	Probit
Rural	0.0452 *
	(0.0233)
Male	0.0438 *
	(0.0246)
Age	0.0189 **
	(0.0086)
Age squared	-0.0002 *
	(0.0001)
Married	0.0592 ***
	(0.0214)
Education	0.0227 ***
	(0.0043)
2nd poorest quintile	0.0555
	(0.0575)
Middle quintile	0.1196 *
	(0.0541)
2nd wealthiest quintile	0.1753 ***
	(0.0498)
Wealthiest quintile	0.1844 ***
	(0.0465)
Log household income	0.0781 ***
	(0.0137)
Registered to M-PESA	0.3394 ***
	(0.0204)
Share of registered households	-0.1325 **
	(0.0632)
Pseudo R-squared	0.1862
Number of observations	5087

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.
Source: Authors' analysis of FSD-Kenya survey data collected October-November 2010.
Notes: Figures shown are marginal effects. Standard errors are shown in parentheses.