Can games measure mobile money adoption? Evidence from Mozambique

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Abstract

Forecasting the adoption of technological innovations is difficult but potentially impactful, particularly in rural low-income communities worldwide. This paper tests a novel method to measure mobile money adoption by employing behavioral measures to elicit preferences for saving or remitting using mobile money. I link these game decisions to individual-level mobile money administrative transaction data; my findings show that while willingness to remit through mobile money strongly predicts adoption in the second and third years after mobile money was introduced, willingness to save in the mobile money game is a strong predictor of future mobile money cash-in and any mobile money transaction in the first, second, and third years.

Keywords: Mobile Money, Technology Adoption, Behavioral Games, Saving,

Remittances, Measurements, Mozambique, Africa

1. Introduction

Sub-Saharan Africa has achieved radical gains in mobile phone adoption (Aker and Cariolle 2023) and has experienced an increase in the number of mobile telephone subscriptions from approximately 87 million in 2005 to over 1 billion subscribers in 2023.[1] The extensive ownership of mobile phones across Sub-Saharan Africa has improved communication between rural and urban households, and across borders (Aker and Blumenstock 2014). Further, it has also catalyzed a wave of low-cost innovations across critical sectors such as finance (Suri 2017), agriculture (Fabregas et al. 2019), education (Aker and Ksoll 2020; Angrist et al. 2022), and health aiming at improving people's lives in one of the poorest regions of the world.[2]

One notable example is mobile money, a technology that has been revolutionary in promoting financial inclusion through lowered transaction costs. Mobile money provides a secure platform for poor people to save (e.g. Suri and Jack 2016; Batista and Vicente 2020a; De Mel et al. 2022; Batista et al. 2022), instantly transfer funds across a country (e.g. Jack et al. 2013; Jack and Suri 2014; Riley 2018; Lee et al. 2021; Batista and Vicente 2023), or access credit (Suri 2017). Furthermore, mobile money is widely accessible through its agent network, and owing to this, the share of adults with a mobile money account in Sub-Saharan Africa has nearly tripled from 12 % to 33% in 2021, yet growth in the traditional banking system has been relatively stagnant.[3]

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[1] Source: The International Telecommunication Union (ITU) 2023 database, December 17,2023 .The dataset covers mobile phone subscriptions and internet penetration across the globe, Retrieved from https://www.itu.int/en/ITUD/Statistics/Documents/facts/ITU_regional_global_Key_ICT_indicator_aggregates_Nov_2023.xlsx

[2] For a detailed explanation on innovations in the health sector read the article "How digital tools could boost efficiency in African health systems." McKinsey & Company, accessed December 17,2023, https://www.mckinsey.com/industries/healthcare/our-insights/how-digital-tools-could-boost-efficiency-in-african-health-systems#/

[3] Demirgüç-Kunt et al. 2022, The Global Findex Database 2021

Mobile money transaction data from telecommunication companies allows researchers to observe which individuals adopted it and their usage patterns accurately.[4] In practice, researchers are either constrained by telecommunication companies or governments to access individual-level transactions data due to privacy concerns. In such cases, most researchers frequently rely on self-reported adoption elicited through questions embedded in surveys to track mobile money adoption (e.g., Jack and Suri 2014; Munyegera and Matsumoto 2016; Ahmed and Cowan 2021). However, a large body of prior research on technology adoption particularly, in agriculture, has found that surveys are unreliable measures of adoption due to misreporting, social desirability status, and social norms (for a summary of recent studies see Abay et al. 2023). For example Jayachandran et al. (2017) an RCT evaluating the effectiveness of payment for ecosystem services on forest conservation in Uganda, combines both satellite and survey data to measure adherence to their intervention and found that treated individuals underreported the number of trees they felled in the household surveys. It is worth noting that such a measurement error, which cannot be easily noticed in the absence of an alternative data collection method, introduces a bias in survey data, affecting the quality of the collected data, which could misguide policymaking.

In this paper, I advance the knowledge of mobile money and technology adoption by asking an important question. Can games measure mobile money adoption? My results show that measured behavior in mobile money adoption games is a strong predictor of real-life adoption and usage patterns of mobile money, contributing in terms of measurements to the mobile money literature. First, I found that willingness to use mobile money to save measured during each survey round strongly predicts any mobile money transaction will take place in the future (at the end of each year). I also show that the behavioral willingness to save using mobile money as measured in

[4] See for example (Blumenstock et al. 2015; Khan and Blumenstock 2017; Batista and Vicente 2020b; Aggarwal et al. 2020; Lee et al. 2021)

a game strongly predicts the probability of making a mobile money cash-in. Furthermore, in another specification, I found that willingness to save using mKesh in the game predicts an increase in the amount stored in the mobile money account in 2012 and 2014.

Second, in the remittance game, I found that willingness to remit using mobile money is a strong predictor of making any mobile money transaction in 2013 and 2014. Also, I find that the behavioral willingness to remit using mobile money measured in a game predicts well, with some delay, the likelihood of sending remittances through their mKesh account. Finally, I show that the marginal willingness to remit using mobile money as measured in the game strongly predicts receiving remittances in 2013 while its predictive power becomes weak in 2014.

My study is relevant to researchers and policymakers thinking of potential strategies to increase adoption and utilization of mobile of money to perform transactions. Based on my approach, adopters and never-adopters of mobile money can be identified and followed up to understand their reasons for rejecting mobile money before it is rolled out on a large scale. It is worth noting that, despite the high rates of mobile money adoption, there are significant disparities in the usage patterns of mobile money across Africa; for instance, in 2020 mobile money transactions in East Africa were worth $475 billion while Southern Africa lagged with only $3 billion.[5] Furthermore, other technologies in health care such as contraceptives, water purifiers, and the use of fertilizers, pesticides, and high-quality seeds in agriculture have low adoption rates in Africa. Lastly, researchers could employ games to measure adoption of mobile money when there is a possibility of being denied access to administrative data.

[5] GSMA(2021). State of the Industry Report on Mobile Money 2021, accessed December 17,2023 https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report- on-Mobile-Money-2021_Full-report.pdf

The rest of the article proceeds as follows: Section **2** explores related literature and highlights our contributions to this literature. Section **3** summarizes background Information and the context of our study. Section **4** explains our mobile money adoption game design in detail. Section **5** explains data sources and provides descriptive statistics. Section **6** explains our estimation strategy. Section **7** describes and discusses our results. Finally, Section **8** provides policy recommendations and conclusions.

2. Literature Review

In the spirit of Carletto (2021), we believe that innovating new ways to collect quality data is necessary for effective policymaking. My findings make a methodological contribution to the mobile money and technology adoption literature by suggesting an alternative approach to measure adoption. According to Camerer (2003), behavioral games are defined as scenarios that mimic real-world settings. This implies that by observing someone's behavior in the game, we can infer their preferences towards mobile money adoption. I confirm this assumption by showing that behavior in the games predicts actual mobile money adoption and usage in the administrative mobile money data. Economists and psychologists have used economic games to measure personality and economic preferences such as risk aversion, loss aversion, and trust. Furthermore, some technology adoption studies have for a long time mainly employed a behavioral approach to measure willingness to pay for new technologies(Berry et al. 2020). New evidence from a randomized field experiment in Mozambique, Armand et al. (2023), shows a correlation between revealed corruption tendencies in the game and real-world corruption behavior. But during my survey of the literature, I did not find any study that has ever attempted to use games to predict technology adoption. I expand this literature by measuring the predictive power of behavioral measurements of technology adoption with administrative data on actual mobile money adoption.

My study is part of the overall mobile money literature. One strand of the mobile money adoption literature highlights the importance of mobile money as a savings tool. The poor in Sub-Saharan Africa, particularly in rural areas, have limited access to formal financial services (Karlan and Morduch 2010). Experimental impact evaluations have documented the effect of using mobile money accounts to achieve saving goals. For example, Habyarimana and Jack (2022) found that mobile money accounts boost savings, human capital investment, and the likelihood of secondary school attendance using a randomized field experiment in Kenya. Existing studies have also found that having a mobile money account increases the level of savings (e.g. Suri and Jack 2016; Dizon et al. 2020; Aggarwal et al. 2020; De Mel et al. 2022; Batista et al. 2022). Batista and Vicente (2020a) implemented a randomized control trial to show that farmers who were given access to interest-bearing mobile money accounts increased their savings and led to their investment in fertilizers.

Another strand of this literature shows the role of mobile money as a remittance tool. A study by (Lee et al. 2021) suggests that treated urban migrants with more information and access to a mobile money account send more remittances to their families in the village. Earlier studies by Jack and Suri (2011) and Munyegera and Matsumoto (2016) showed that having a less risky tool to send remittances, mobile money, improves consumption smoothing in rural Uganda and Kenya, respectively. Additionally, mobile money has been shown as an effective tool for financial support to households affected by a severe drought (Aker et al. 2016). Yet poor households are vulnerable to idiosyncratic and aggregate shocks. In the absence of government or International aid, non-experimental studies (e.g. Jack et al 2013; Jack and Suri 2014, Riley 2018) and experimental studies (Batista and Vicente 2023) find that households with mobile money accounts are less vulnerable to negative shocks such as natural disasters through their ability to share risks.

2. Background Information, Study Context

My study was conducted in Mozambique, a country located in the southeastern part of Africa with a population of approximately 33 million yet is estimated that over 60% of this population resides in rural areas.[6] Most of this rural population depends on rain-fed subsistence agriculture as a source of livelihood. In addition, most people in rural areas are in low-income households with little or no income-generating activities, with little access to formal financial products (Dupas and Robinson, 2013). Exclusion from the formal financial systems means a lack of access to secure savings or credit. Consequently, in the absence of formal financial institutions, this part of the population often resorts to informal finance, such as keeping their money at home "under the mattress", rotating and saving cooperation (ROSCA), or with a shop owner.

Remittances are a very powerful source of financial support especially for the rural population in Africa for example during adverse events such as droughts, and floods. However, in Mozambique, they are often sent through risky channels, namely bus or taxi drivers, friends, and relatives. This format of sending urgently needed support leads to a loss of money if the support does not reach the person it was intended to help or when there are several delays in delivering the money or traveling to pick it up (Jack and Suri 2011). Furthermore, a less risky avenue involves very high costs such as time and transport when a migrant takes the money by him/herself to their

[6] The World Bank in Mozambique Country Overview December 12,2023 ,https://www.worldbank.org/en/country/mozambique/overview#:~:text=The%20national%20poverty%20rate%20surged,in%20poverty%20in%20urban%20areas

relatives in the village. In the context of Mozambique, Batista and Vicente (2023) reported evidence of the effectiveness of mobile money as a platform through which urgent support can be sent to households in rural Mozambique affected by a large flood in 2013.

Mobile money was launched in Mozambique in 2011 by Carteira Móvel. Based on its success in Kenya after its launch in 2007, mobile money rapidly spread across Africa and the globe, and by 2018 it had been deployed to over 90 countries.[7] Batista and Vicente (2013) leveraged its introduction in Mozambique and, in partnership with Mcel, conducted a field experiment in 2012 covering the southern rural areas of Maputo Province, Gaza, and Inhambane in which they achieved high take-up rates of mobile money. A good feature of their intervention is that the sampled participants had never used mobile money, hence allowing me to effectively study the adoption of mobile money and how people make decisions to adopt new technologies.

3. Game Experiment Design

Batista and Vicente (2013) explained in detail the field experiment that launched mobile money in treated villages with the help of Mcel, while the control villages did not receive any treatment. As part of the large experiment, they conducted simple behavioral games with all participants including individuals in both the treatment and control villages while carrying out surveys. First, these games elicited the willingness to transfer funds or to save money. Specifically, they measured the willingness to transfer money to a relative in Maputo city (the capital city of Mozambique) the main destination for urban migrants. In addition, they played another game that measured the marginal willingness to save. The second phase of these games measured the marginal willingness to adopt mobile money as a remittance channel or a savings tool. This round of games captured

[7] According to the GSMA State of the Industry Mobile money report 2018 ,available at https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/02/2018-State-of-the-Industry-Report-on-Mobile-Money.pdf

the marginal willingness to use mobile money as a substitute for conventional means of saving or sending remittance in rural Mozambique. Next, I provide a detailed explanation on how these games were played in the field.

a) Remittance Game

Respondents were asked if they had close relatives in the nearest city of Maputo and only individuals with a family member residing in the city were allowed to play the remittance game. This explains why the number of observations in this game is lower than those of the saving game in Tables **A2a, A2b, and A2c** This game involved giving all respondents in both treatment and control group 20 MZN in cash which was approximately 1 USD from 2012 to 2014 when we conducted our experiment. Then, the respondents had to decide whether to keep the 20 MZN in cash or send the money to their close relative living in Maputo city of their choice. However, only respondents who decided to remit the 20 MZN were allowed to proceed to the next phase of this game where an additional decision regarding the channel through which these remittances were to be transferred. Specifically, the respondents were asked whether to remit the 20 MZN through their mKesh account, or the traditional format of sending remittances. Traditional means of sending money to a relative or a friend in rural Mozambique is normally through someone in your network traveling to the city or the village for example a family member, a friend, or a long-distance bus driver. In this game, their traditional channel was for the respondents to send their remittances in an envelope through their enumeration team at no cost.[8] This alternative channel to mKesh was more attractive since the enumerators were the ones giving out the money to be sent and it could create some form of assurance that they would at least deliver the funds to their

[8] See a sample of an envelope we used in **Figure A1a in the Appendix**.

relatives in Maputo. In addition, their enumerators charged zero fees to transport the envelope carrying the 20MNZ compared to the bus drivers who normally charge up to 20 percent of the money they bring to rural areas from the capital city yet sometimes end up disappearing with the money entrusted with them. Furthermore, mobile money charges a small transaction fee for sending remittances.

b) Savings Game

Respondents in all the survey rounds were given 20 MZN in cash and asked for their preference to hold the 20 MZN in cash or save it. This first phase of the game allowed me to capture the respondent's willingness to save but only individuals who had decided to save were allowed to make an additional decision about their preferred saving method. Specifically, he/she could either save through cashing-in the 20 MZN on their mKesh account or through the conventional way of saving. In rural Mozambique, the common method of saving in rural areas is saving 'under the mattress' because of the absence of formal financial institutions. Therefore, they replicate the traditional saving methods in the game by proposing to our respondents that they could cash-in the 20 MZN in an envelope, seal it with wax then keep it[9]. They made this option attractive by promising to give respondents 50% interest in the next survey round after a year if our enumeration team found the seal on the envelope intact during the time of the survey. It is worth noting that respondents were not aware when the next round of surveys would be held but keeping the 20 MZN in the envelope would increase the value of the sealed envelope one year later. Hence, the conventional saving method looked appealing to the respondents, and had to choose whether to maintain the status quo or adopt mKesh as their preferred platform to store their money.

[9] See a sample of an envelope we used in **Figure A1b in the Appendix**.

4. Data and Descriptive Statistics

I use results from a large, randomized field experiment that launched mobile money locally known as mKesh in rural villages in southern Mozambique (Batista and Vicente 2013). The intervention involved recruiting mobile money agents and sharing information through a well-scripted play and flyers. A sample of individuals was randomly chosen to experiment with how mobile money works by opening a mobile money account, setting their PIN, and cashing-in and withdrawing money.[10]

I use mainly four data sources in this study. First, surveys were conducted in 2012, 2013, and 2014 to collect household-level data on each of the participants. Through interviews information was collected on household consumption expenditure, age, gender, and bank account ownership status. Second, behavioral games were used to elicit the marginal willingness to save or send remittances using mobile money technology at the individual level starting in 2012 till 2014. Notably, the third and most important source of data used in this study is the mobile money administrative data from Carteira Móvel, an implementing partner of the field experiment. The dataset covers mobile money transactions for all the respondents in the treatment and control group in our sample from 2012 to 2015 including cash-ins, transfers sent and received. This dataset allows me to link a respondent's decision in the game to their true adoption of mobile money by observing whether an individual sent a transfer, received a transfer, made a mobile money cash-in, or the balance in their mobile money account. Furthermore, to understand the impact of a large flood that affected households in my study sample, I constructed an indicator variable for exposure to the large flood using the Standardized Precipitation Evapotranspiration Index (SPEI).[11]

[10] See Batista and Vicente (2013) for details on the randomization process and balance checks.
[11] For a detailed explanation on how this variable was created and the data source see Batista and Vicente (2013)

Each of these games was played in two stages. The first phase was designed to elicit respondents' willingness to save or remit. Then, in the second phase, which is the focus of this paper, only individuals who were willing to save or remit played it. Based on this condition, I assume that an individual's savings and remittance preferences are consistent, implying that if an individual prefers not to save or remit, they are also not interested in doing the same using mobile money. I construct the behavioral measure variable considering respondents who were cut off by the first game by assigning zero to participants who were not willing to save or remit. This helps to recover observations that were lost and increases the sample size.

The dependent variables are any transfer received, any transfer sent, any mobile money cash-in, and any mobile money transaction which I constructed by creating an indicator variable equal to 1 if we observe that an individual performed at least one transaction in the mobile money transactions dataset, respectively. Additionally, I also use the value of mobile money balance in each mKesh account in Mozambican metical as a primary outcomes of interest in my regression analysis.

Tables A2a, A2b, and A2c in the Appendix report summary statistics of the main variables used in our analysis in this article. The descriptive statistics show that the average age and share of women in our study population is stable across the 3 rounds of surveys at approximately 38 years with women representing 60% of the study population. **In Table A2a**, results from the mobile money game show that 11% of the participants are willing to send remittances through mobile money while 13% are willing to save using mobile money. However, in 2013 as reported in **Table A2b**, these numbers fell to 6% and 10% respectively. Finally, **Table A2c**, reported that in 2014, approximately 15% of the sample was willing to save using mobile money while only 8% was interested in using mobile money to send remittances to their friends and relatives in urban

areas. Additionally, I report summary statistics of the mobile money administrative data records. It can be observed that there were high adoption and usage rates of mobile money; in 2012 34% of the sample performed any mobile money transaction. Although the number of individuals who processed any mobile money transaction using their mobile phone numbers slightly decreased to 29% in 2013, it increased to 39% in 2014. Furthermore, in terms of performing specific transactions, on average 12% of respondents are observed to have sent at least a transfer in 2013 while approximately 9% made a mobile money cash-in in the same year. In 2013, on average 6% of our sample sent funds using mobile money compared to 12 % that cashed-in money on their mobile money accounts. Lastly, 11% on average cash-ined their money on mobile money in 2014 whereas It can be observed that on average only 4% of our study population sent at least one transfer using their mobile money accounts.

5. Estimation Strategy

I use a Linear Probability Model (LPM) to examine the relationship between the outcomes of the adoption games and real-life mobile money adoption behavior, as shown below:

$$y_{it} = \alpha + \beta X_{it} + \phi z' + \eta C + \varepsilon_{it} \quad \text{..... (1)}$$

Where

y_{it} – is the dependent variable; we use 5 administrative mobile money data variables of interest, namely any mobile money transaction, any transfer sent, any transfer received, any mobile money cash-in, and the mobile money balance of individual *i* in year *t.*

X_{it} – variable of interest and β is the coefficient of interest, which measures whether the willingness to save or remit using mobile money in our game by individual *i* in year *t* predicts mobile money usage in the administrative data by individual *i* in year *t*+1.

z' - vector of demographic controls including education, household consumption expenditure, owning a bank account, and gender.

C - community controls which include treatment village and province-fixed effects

ε_{it} - error term

Equation (1) includes individual demographic and community-level controls to account for potential biases in our estimates. Based on an existing study by Batista and Vicente (2020b) the sample in the same experiment to study adoption patterns found that individual characteristics such as years of education completed and owning a bank account as key determinants of adopting mobile money. In contrast, Jack and Suri (2011) found that gender, household consumption expenditure, education level, and owning a bank account significantly influenced the decision to adopt mobile money in Kenya. Additionally, I control for the treatment status of an individual because as part of the intervention, the treated villages learned about the benefits of mobile money, were helped to open a mobile money account, and had mobile money agents recruited in their villages. In addition, an earlier study by Munyegera and Matsumoto (2016) found an association between proximity to mobile money agents and usage of mobile money. I also include province-fixed effects to account for differences in characteristics across provinces which could affect an individual's decision to adopt or use mobile money. It should be noted that in all our regressions, we used clustered standard errors to account for potential correlations between participants in the same Enumeration Area and include year fixed effects.

6. Results and Discussion

a) Savings Game and Administrative data

Table 1: Any mobile money transaction and willingness to save with mobile money

Dependent variable ------>		Any mobile money transaction								
	Year	2012 (1)	2013 (2)	2014 (3)	2012 (4)	2013 (5)	2014 (6)	2012 (7)	2013 (8)	2014 (9)
Willingness to save using Mobile Money	Coefficient	0.384***	0.570***	0.405***	0.372***	0.530***	0.371***	0.146***	0.194***	0.099***
	Standard error	(0.040)	(0.041)	(0.040)	(0.040)	(0.045)	(0.042)	(0.025)	(0.036)	(0.031)
R-squared adjusted		0.073	0.139	0.095	0.073	0.131	0.093	0.646	0.569	0.599
observations		1,819	1,263	1,326	1,664	1,068	1,226	1,664	1,068	1,226
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014. The dependent variable isa dummy variable that takes a value of 1 if the respondent made any mobile money transaction. Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are

Table 1 reports the results of regressions that use the revealed willingness marginal to save using mobile in the game to predict any mobile money transactions. Any mobile transaction is a dummy variable equal to 1 if an individual made any mobile money transaction. Focusing on **columns 7-9**, where I include both demographic and community controls, I find that in 2012 individuals willing to save using mobile money predicted to have a 14% increase in the probability of carrying out any mobile money transaction. This coefficient increased to 19% in 2013 and decreased to 9% in 2014. **Columns 1-9** show that willingness to save using mobile in the game is a strong predictor of adopting mobile money technology and these estimates are significant at a 1% level.

Table 2: Any mkesh cash-in and willingness to save using mobile money

Dependent variable------->		Any mkesh cash-in								
	Year	2012 (1)	2013 (2)	2014 (3)	2012 (4)	2013 (5)	2014 (6)	2012 (7)	2013 (8)	2014 (9)
Willingness to save using Mobile Money	Coefficient	0.289***	0.569***	0.440***	0.270***	0.580***	0.412***	0.205***	0.493***	0.340***
	Standard error	(0.043)	(0.046)	(0.042)	(0.044)	(0.046)	(0.042)	(0.041)	(0.048)	(0.042)
R-squared adjusted		0.100	0.280	0.234	0.105	0.291	0.222	0.209	0.347	0.295
observations		1,819	1,263	1,326	1,664	1,068	1,226	1,664	1,068	1,226
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is a dummy variable equal to 1 if an individual made any mkesh cash-in. Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%.

Table 2 shows how the behavioral willingness to save using mobile money measured in the game predicts the probability of making a mobile money cash-in. In **Column 1** I find that willingness to save using mobile money in the game increases the probability of making a mobile money cash-in by 29 % on average in 2012 the year mobile money was introduced, keeping other factors constant. This coefficient increased to 57% in 2013 and later decreased to 44 % in **columns 2 and 3**, respectively. However, these estimates are biased because we do not control for other factors that may be driving these results.

Next, in **columns 4, 5, and 6**, I run the same regressions but include demographic controls such as education, household consumption expenditure, bank account ownership, and gender. I find that the coefficient in column 4 remains constant at 29% but slightly changes to 58% and 41% for 2013 and 2014, respectively. In the final **columns 7-9**, I add both demographic and community controls in our specifications as shown in **Equation (1)**, these estimates slightly decrease but remain statistically significant at a 1% level. These results suggest a positive association between marginal

willingness to save using mobile money and making mobile money cash-ins as shown by the increased likelihood of making mobile money cash-ins. I assume that based on how mobile money is operated and the setup of our saving game, making cash-ins on one's mobile money account is a form of saving money on the mKesh account.

Table 3: Mkesh balance value and willingness to save with mobile money

Dependent variable------ >		**Value of Mkesh Balance**								
	Year	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Willingness to save using Mobile Money	**Coefficient**	28.996***	83.938*	43.635***	29.751***	93.159	44.059***	18.763**	74.466	20.560*
	Standard error	(7.499)	(49.671)	(11.436)	(8.058)	(56.573)	(11.890)	(7.514)	(55.476)	(12.245)
R-squared adjusted		0.038	0.020	0.030	0.047	0.022	0.034	0.162	0.028	0.132
observations		1,819	1,263	1,326	1,664	1,068	1,226	1,664	1,068	1,226
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is the mKesh Balance in a respondent's mobile money account in Mozambican local currency know as meticais (MNZ). Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%.

Table 3 reports how the preference to save using mobile money as measured in the game predicts having a balance in a respondent's mobile money account. The outcome variable is the mKesh account balance in the Mcel mobile money transactions dataset at Individual level. The results in **columns 1-3**, show that that willingness to save using mobile money predicts having a balance in the mobile money account in 2012, 2013, and 2014. It is important to note that these regressions do not include any controls.

To get more precise estimates, I added individual characteristics as controls to the above specification for results in **columns 4-6**.I find that willingness to save using mobile money as

measured in the game on average increases the mobile money balance by 30 MNZ in 2012. In **column 8** , I do not find any significant effect of willingness to use mobile money as a saving platform on the cash balance left in the mobile money at the end of 2013. In 2014, the marginal willingness to save using mobile money increased the mKesh balance kept on the mobile money account to 44 MNZ (as shown in **Colum 6**)

In **columns 7- 9**, I consider additional factors that could bias our previous estimates in **columns 4-6** such as treatment status and the province of a respondent. I find that willingness to save using mobile money increased the mKesh balance by 19 MNZ in 2012 and 21 MNZ in 2014. These coefficients are statistically significant at 5% and 10 % levels, respectively.

b) Remittances Game and Administrative data

Another dimension captured in the games was the willingness to remit using mobile. Mobile money provides a fast, low cost and secure channel through which remittances can be sent to friends and relatives. In this section, I test whether individuals who show a higher willingness to remit using money in the remittance game , sent transfers, received transfers, or make any transactions using their mobile money accounts.

Table 4: Any mobile money transaction and willingness to remit with mobile money

Dependent variable ------>		Any mobile money transaction								
	Year	2012 (1)	2013 (2)	2014 (3)	2012 (4)	2013 (5)	2014 (6)	2012 (7)	2013 (8)	2014 (9)
Willingness to remit using Mobile Money	Coefficient	0.155***	0.529***	0.422***	0.146**	0.502***	0.366***	-0.023	0.183***	0.138***
	Standard error	(0.054)	(0.057)	(0.063)	(0.057)	(0.060)	(0.065)	(0.037)	(0.047)	(0.042)
R-squared adjusted		0.010	0.066	0.057	0.016	0.091	0.068	0.701	0.589	0.623
observations		1,303	889	882	1,190	762	818	1,190	762	818
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM .The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014. The dependent variable is a dummy variable equal to 1 if an individual made any mobile money transaction, 0 otherwise. Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%.

Finally, **Table 4** reports how the behavioral willingness to remit using mobile money measured using our game predicts the probability of making any mobile money transaction. First, in **columns 1-3** I find a positive relationship between willingness to send remittances through mobile money and conducting any mobile money transaction in the administrative data without any controls. Furthermore, when I include demographic controls in **columns 4-6**, the estimates keep the same approximate magnitude and remain statistically significant at a 1% level.

However**,** in **column 7,** when I include both demographic and community controls our estimate for 2012 becomes statistically insignificant. This result means that willingness to remit in the game is a weak predictor of mKesh usage in the year mobile money was launched. Interestingly, in **columns, 8 and 9** under the same specification, I find that willingness to remit using mobile money is associated with an 18% increase in the probability of performing any mobile money transaction in **Column 8**. This probability decreases to 14 % in 2014 but is significant at a 10 % level in **Colum 9**

Table 5: Any transfer sent and willingness to Remit using mobile money

Dependent Variable ------>		Any transfer sent								
	Year	2012	2013	2014	2012	2013	2014	2012	2013	2014
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Willingness to remit using Mobile Money	Coefficient	0.090**	0.345***	0.322***	0.099**	0.327***	0.328***	0.030	0.271***	0.298***
	Standard error	(0.040)	(0.065)	(0.057)	(0.042)	(0.069)	(0.059)	(0.035)	(0.068)	(0.056)
R-squared adjusted		0.006	0.106	0.168	0.010	0.095	0.163	0.226	0.148	0.204
observations		1,303	889	882	1,190	762	818	1,190	762	818
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014. The dependent variable isa dummy variable that takes a value of 1 if the respondent used mobile money to send a transfer. Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%.

Table 5 presents how willingness to use mobile money as a remittance channel as measured in the game predicts sending any transfers through mkesh. The dependent variable used for all the regressions in the table is a dummy variable equal to 1 if an individual sent any transfer using their mobile money account. I include both demographic and community controls in **columns 7-9**, first, I show that on average willingness to remit using mobile money does not affect sending mobile money transfers in 2012. However, in 2013 willingness to remit using mobile money increased the probability of using mKesh to send a mobile money transfer by 27%, and one year later in 2014 this effect increased to 30%.

These findings suggest that individuals who are willing to send funds using mKesh in the game are more likely to use mobile money in real life to send money to individuals in their networks one year later after mobile money has been introduced. Additionally, It can be observed in **column 7** that when I add community controls to demographic controls to the previous

specification in **columns 4-6**, this is when the estimate for 2012 becomes insignificant, implying a participant's treatment status has a strong effect on who uses mobile to send remittances.

Table 6: Willingness to Remit with mobile money and any transfer received

Dependent variable------ >		Any transfer received								
	Year	2012	2013	2014	2012	2013	2014	2012	2013	2014
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Willingness to remit using Mobile Money	Coefficient	0.121**	0.398***	0.244***	0.121**	0.387***	0.219***	0.012	0.259***	0.109*
	Standard error	(0.050)	(0.072)	(0.064)	(0.051)	(0.069)	(0.068)	(0.042)	(0.073)	(0.062)
R-squared adjusted		0.007	0.070	0.032	0.020	0.084	0.034	0.385	0.234	0.243
observations		1,303	889	882	1,190	762	818	1,190	762	818
Demographic controls		no	no	no	yes	yes	yes	yes	yes	yes
Community controls		no	no	no	no	no	no	yes	yes	yes

Note: All the above regressions include year fixed effects and were estimated using LPM .The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014. The dependent variable is a dummy variable equal to 1 if an individual received any mobile transfer , 0 otherwise. Specification (4), (5),(6) includes demographic controls while Specification (7),(8),(9) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%.

In Table 6, I explore the association between willingness to remit using mobile money in the game and receiving remittances. In all the regressions for Table 6, the dependent variable is an indicator variable equal to one if an individual received any mobile money transfer, I also include demographic controls in **columns 4-6** and then add both demographic and community controls in **columns 7-9**. First, in column 8, I find that the marginal willingness to remit through mobile money on average increases the likelihood of receiving transfers using mKesh account by 26 %. This coefficient is statistically significant at a 1 % level. **In column 9**, I find a positive weak correlation between willingness to remit using mobile money and receiving funds through mobile money statistically significant at the 10% level. However, **in column 7**, I do not find any significant relationship between behavior in the remittance game behavior and receiving any

transfer. These results suggest that the marginal willingness to transfer funds using mobile money is a weak predictor of receiving funds through mobile money. The significant effect I found in 2013 could be attributed to the large volume of remittances that were sent to help villages in our sample cope with the impacts of a large flood.

a) Saving game discussion

The significantly positive predictive power of the behavioral willingness to save relative to making mobile money cash-in starting in 2012 shows the effectiveness of our approach in forecasting mobile money adoption. Furthermore, we showed that the willingness to save using mobile money in the game has a significant predictive power on mobile money balances only in 2012 and 2014. The insignificant relation between the behavioral willingness to save using mKesh as measured in the games and the actual mobile balance at 2012 may be a result of the large floods that affected households in our sample.

b) Remittances game discussion

When it comes to the remittance games, I found that willingness to remit using mobile money is still a valuable predictor of carrying out any mobile money transactions, sending remittances, or receiving remittances, although its predictive power is lower than that of the savings game. The slow adoption of mobile money to send remittances in the year it was launched in the villages in our sample is a possible mechanism explaining the initially low predictive power of the games in 2012 and how it grows over time. I assume that respondents took time to adapt to using their mKesh accounts to send money since most of the individuals in our sample have low levels of education. It can be observed the summary statistics **Tables A2a, A2b,** and **A2c** that the

average years of schooling in the study population is 6 years, yet education is of the factors that influence mobile money adoption in our sample as illustrated (Batista and Vicente2020b).

Conversely, in 2013 and 2014, I found that the marginal propensity to save using mobile money in the games was a strong predictor of sending transfers using mKesh. Unlike the findings of Lee et al. (2023) whose study in Bangladesh found that people in rural areas are less likely to send remittances via mobile money which they attributed to the low-income status of rural households in their experiment.

In **Table 6**, I also showed that willingness to transfer funds through mobile money is a strong predictor of receiving funds via mobile money and statistically significant at a 1% level in 2013. A similar finding is documented by Batista and Vicente (2023) who showed an increased number of remittances received by households in our sample in 2013 one year after they were affected by a large flood. However, in 2014 two years after the flood, the probability of receiving remittances decreased to 14 % and statically significant at a 10% level. It is important to note, that in the context of our remittance game, sending money to relatives in the city could be a signal of a secure channel through which remittances could be sent. And when support is urgently needed from relatives in urban areas, mobile money is preferred over other channels by urban migrants. In the appendix section of this article, I include heterogeneous effects to account for other factors such as gender, access to financial services proxied by bank account ownership, education, and exposure to floods and how they impact decisions made in the game and their ability to predict mobile money.

7. Concluding remarks

To the best of our knowledge, this is the first paper that uses behavioral games to predict mobile money adoption. I tested a behavioral approach to measuring the adoption of a new financial technology, which can be extended to technology adoption studies in other sectors such as agriculture, health, or education. This behavioral measurement strategy can be considered an alternative to surveys as a measure of adoption of new technologies, especially when no administrative data on technology adoption is readily available. Another advantage is that this behavioral measurement approach can be done before any actual adoption is done.

I found that the willingness to save using mobile money measured using games is a strong predictor of conducting any mobile money transaction and of making a mobile money cash-in. The marginal willingness to remit using mobile money measured in our games is also a good predictor of mobile money adoption, namely making any mobile money transactions or sending transfers.

Overall, the method proposed by this paper can be used by researchers and policymakers to predict cost-effectively the willingness of populations to adopt a novel technology, even in isolated rural areas. Future studies could extend our methodology to examine how adoption decisions are made regarding more specific mobile money platform utilization patterns, such as remote payments or microcredit, and in different sectors, such as adopting new technologies, especially in agriculture, health, or education.

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Appendix

Appendix Tables

a) Summary Statistics Tables

Table A2a: Summary Statistics for 2012

Variable	observations (1)	Mean (2)	SD (3)
Any Transfer Received	1819	0.198	0.399
Any Transfer Sent	1819	0.126	0.332
Any Mobile Money Cash-in	1819	0.0869	0.282
Value of mobile money Balance	1819	16.93	49.64
Any mkesh Transaction	1819	0.344	0.475
Age	1740	37.82	14.30
female	1773	0.613	0.487
Province	1819	2.124	0.626
Treated	1819	0.439	0.496
Years of education	1768	5.625	3.588
Owning a bank account	1770	0.234	0.424
log Household Consumption Expenditure	1754	8.332	0.955
Willingness to remit Using Mobile Money Game	1303	0.111	0.314
Willingness to Save Using Mobile Money Game	1819	0.130	0.336

Note: column (1) is the number of observation, while the mean and standard deviation are in column (2) and (3) respectively

Table A2b: Summary Statistics for 2013

Variable	observations (1)	Mean (2)	SD (3)
Any Transfer Received	1265	0.119	0.323
Any Transfer Sent	1265	0.0585	0.235
Any Mobile Money Cash-in	1265	0.115	0.320
Value of mobile money Balance	1265	22.18	175.3
Any mkesh Transaction	1265	0.292	0.455
Age	1209	38.65	14.51
female	1233	0.609	0.488
Province	1265	2.159	0.612
Treated	1265	0.422	0.494
Years of education	1232	5.566	3.560
Owning a bank account	1247	0.296	0.457
log Household Consumption Expenditure	1118	8.651	0.891
Willingness to remit Using Mobile Money Game	889	0.0551	0.228
Willingness to Save Using Mobile Money Game	1263	0.0982	0.298

Note: column (1) is the number of observation, while the mean and standard deviation are in column (2) and (3) respectively

Table A2c: Summary Statistics for 2014

Variable	observations	Mean	SD
	(1)	(2)	(3)
Any Transfer Received	1330	0.120	0.325
Any Transfer Sent	1330	0.0383	0.192
Any Mobile Money Cash-in	1330	0.117	0.321
Value of mobile money Balance	1330	28.93	88.43
Any mkesh Transaction	1330	0.308	0.462
Age	1264	38.84	14.38
female	1291	0.611	0.488
Province	1330	2.120	0.632
Treated	1330	0.421	0.494
Years of education	1287	5.514	3.533
Owning a bank account	1307	0.275	0.447
log Household Consumption Expenditure	1291	8.384	0.967
Willingness to remit Using Mobile Money Game	882	0.0760	0.265
Willingness to Save Using Mobile Money Game	1326	0.146	0.353

Note: column (1) is the number of observation, while the mean and standard deviation are in column (2) and (3) respectively

b) Heterogeneous Effects

Table A3a: Any mobile money cashin - willingness save using mobile money interacted with gender

Dependent variable ------>		Any cash-in		
	Year	**2012**	**2013**	**2014**
		(1)	**(2)**	**(3)**
willingness to save using mkesh	**Coefficient**	0.167***	0.451***	0.350***
	Standard error	(0.051)	(0.068)	(0.053)
female	**Coefficient**	-0.034**	0.005	-0.020
	Standard error	(0.016)	(0.016)	(0.014)
willingness to save using mkesh X female	**Coefficient**	0.072	0.077	-0.017
	Standard error	(0.060)	(0.090)	(0.062)
R-squared adjusted		0.210	0.348	0.295
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable isa dummy variable that takes a value of 1 if the respondent made any mobile money cash-in . Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Female is a dummy variable equal to 1 if the gender of a respondednt is female

Table A3b: Any mobile money cash-in - willingness save using mobile money interacted with education

Dependent variable ------ >		Any cash-in		
	Year	2012	2013	2014
		(1)	(2)	(3)
Willingness save using mobile money	Coefficient	0.242***	0.472***	0.432***
	Standard error	(0.040)	(0.054)	(0.043)
education	Coefficient	0.006***	0.005*	0.003
	Standard error	(0.002)	(0.003)	(0.003)
Willingness save using mobile money X education	Coefficient	-0.006	0.004	-0.015**
	Standard error	(0.005)	(0.007)	(0.006)
R-squared adjusted		0.209	0.347	0.298
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable isa dummy variable that takes a value of 1 if the respondent made any mobile money cash-in . Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Education is a variable that measures years of schooling attianed by each individual in our sample .

Table A3c: Any mobile money cash-in - willingness save using mobile money interacted with bank account ownership

Dependent variable ------>		**Any cash-in**		
	Year	**2012**	**2013**	**2014**
		(1)	**(2)**	**(3)**
willingness save using mobile money	**Coefficient**	0.216***	0.507***	0.388***
	Standard error	(0.046)	(0.055)	(0.054)
bank	**Coefficient**	0.029	0.042**	0.045**
	Standard error	(0.021)	(0.021)	(0.021)
willingness save using mobile money X bank	**Coefficient**	-0.034	-0.039	-0.132*
	Standard error	(0.064)	(0.103)	(0.079)
R-squared adjusted		0.208	0.347	0.300
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and were estimated using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable isa dummy variable that takes a value of 1 if the respondent made any mobile money cash-in . Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Bank is a dummy variable equal to 1 if an individulas has a bank account

Table A3d: Any mobile money cash-in - willingness save using mobile money interacted with exposure to floods

Dependent variable------ >		**Any cash-in**		
	Year	**2012**	**2013**	**2014**
		(1)	**(2)**	**(3)**
willingness save using mobile money	**Coefficient**	0.167**	0.458***	0.372***
	Standard error	(0.073)	(0.104)	(0.066)
floods	**Coefficient**	-0.005	-0.012	0.020
	Standard error	(0.020)	(0.023)	(0.019)
willingness save using mobile money X floods	**Coefficient**	0.057	0.048	-0.045
	Standard error	(0.090)	(0.113)	(0.081)
R-squared adjusted		0.209	0.346	0.295
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and were estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable isa dummy variable that takes a value of 1 if the respondent made any mobile money cash-in . Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Floods is a dummy variable equal to 1 if an individual was exposed to floods

Table A4b: Value of Mkesh Balance - willingness save using mobile money interacted with gender

Dependent variable ------>		Value of Mkesh Balance		
	Year	2012	2013	2014
		(1)	(2)	(3)
willingness save using mobile money	Coefficient	17.923	142.190	45.674*
	Standard error	(10.938)	(124.548)	(24.791)
female	Coefficient	0.142	-2.246	-2.288
	Standard error	(2.495)	(3.154)	(3.764)
willingness save using mobile money X female	Coefficient	1.600	-121.995	-43.613*
	Standard error	(8.775)	(125.163)	(24.902)
R-squared adjusted		0.161	0.036	0.138
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is the mKesh Balance in a respondent's mobile money account in Mozambican local currency know as meticais (MNZ). Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. female is a dummy variable equal to 1 if an individual is female

Table A4c: Value of Mkesh Balance - willingness save using mobile money interacted with education

Dependent variable ------>		Value of Mkesh Balance		
	Year	2012	2013	2014
		(1)	(2)	(3)
willingness save using mobile money	Coefficient	45.917***	93.788*	51.786
	Standard error	(16.621)	(48.770)	(31.422)
education	Coefficient	-0.796	-2.293	-1.937***
	Standard error	(0.503)	(1.424)	(0.511)
willingness save using mobile money X education	Coefficient	-4.312***	-3.118	-5.071
	Standard error	(1.537)	(5.116)	(3.574)
R-squared adjusted		0.173	0.027	0.136
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is the mKesh Balance in a respondent's mobile money account in Mozambican local currency know as meticais (MNZ). Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. education is a variable measuring years of school of an individual

Table A4d: Value of Mkesh Balance - willingness save using mobile money interacted with exposure to floods

Dependent variable ------>		Value of Mkesh Balance		
	Year	2012	2013	2014
		(1)	(2)	(3)
willingness save using mobile money	Coefficient	7.381*	259.797	45.281
	Standard error	(4.302)	(239.876)	(30.590)
floods	Coefficient	0.169	4.281	1.519
	Standard error	(3.026)	(3.742)	(3.542)
willingness save using mobile money X floods	Coefficient	17.517	-241.976	-34.879
	Standard error	(12.234)	(242.126)	(31.443)
R-squared adjusted		0.164	0.054	0.134
observations		1,664	1,068	1,226
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is the mKesh Balance in a respondent's mobile money account in Mozambican local currency know as meticais (MNZ). Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Floods is a dummy variable equal to 1 if an indvidual was in a village affected by floods

Table A5a: Any Transfer sent - willingness remit using mobile money interacted with exposure to floods

Dependent variable ------>		**Any transfer sent**		
	Year	**2012 (1)**	**2013 (2)**	**2014 (3)**
willingness remit using mobile money	**Coefficient**	-0.009	0.336***	0.288***
	Standard error	(0.051)	(0.103)	(0.083)
floods	**Coefficient**	0.004	0.014	-0.001
	Standard error	(0.021)	(0.018)	(0.011)
willingness remit using mobile money X floods	**Coefficient**	0.060	-0.091	0.017
	Standard error	(0.069)	(0.134)	(0.112)
R-squared adjusted		0.226	0.147	0.202
observations		1,190	762	818
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is a dummy variable equal to 1 if an individual sent a transfer .Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Floods is a dummy variable equal to 1 if an indvidual was in a village affected by floods

Table A5b: Any Transfer sent - willingness remit using mobile money interacted with gender

Dependent variable ------>		Any Transfer sent		
	Year	2012	2013	2014
		(1)	(2)	(3)
willingness remit using mobile money	Coefficient	0.050	0.288***	0.257***
	Standard error	(0.050)	(0.077)	(0.088)
female	Coefficient	0.044**	0.028	-0.001
	Standard error	(0.021)	(0.018)	(0.010)
willingness remit using mobile money X female	Coefficient	-0.035	-0.033	0.076
	Standard error	(0.064)	(0.128)	(0.129)
R-squared adjusted		0.226	0.147	0.205
observations		1,190	762	818
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is a dummy variable equal to 1 if an individual sent a transfer .Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Female is a dummy variable equal to 1 if an indvidual is female

Table A5c: Any Transfer sent - willingness remit using mobile money interacted with bank account ownerhsip

Dependent variable ------>		Any Transfer sent		
	Year	2012	2013	2014
		(1)	(2)	(3)
willingness remit using mobile money	Coefficient	0.044	0.245**	0.432***
	Standard error	(0.048)	(0.109)	(0.081)
bank	Coefficient	0.029	0.004	0.007
	Standard error	(0.025)	(0.016)	(0.014)
willingness remit using mobile money X bank	Coefficient	-0.034	0.062	-0.268***
	Standard error	(0.070)	(0.143)	(0.088)
R-squared adjusted		0.226	0.148	0.231
observations		1,190	762	818
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is a dummy variable equal to 1 if an individual sent a transfer .Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Bank is a dummy variable equal to 1 if an indvidual has a bank account

Table A5d: Any Transfer sent - willingness remit using mobile money interacted with education

Dependent variable ------>		Any Transfer sent		
	Year	2012 (1)	2013 (2)	2014 (3)
willingness remit using mobile money	Coefficient	0.080	0.084	0.121
	Standard error	(0.069)	(0.162)	(0.102)
education	Coefficient	-0.001	-0.002	-0.001
	Standard error	(0.003)	(0.003)	(0.003)
willingness remit using mobile money X education	Coefficient	-0.008	0.017	-0.012
	Standard error	(0.009)	(0.019)	(0.015)
R-squared adjusted		0.226	0.265	0.275
observations		1,190	762	818
Demographic controls		yes	yes	yes
Community controls		yes	yes	yes

Note: All the above regressions include year fixed effects, and we estimate them using LPM. The coefficients of our regressions are shown in the table with standard errors clustered at EA level reported in parentheses. The observations are at individual level in a given year from 2012 to 2014 . The dependent variable is a dummy variable equal to 1 if an individual sent a transfer .Specification (1),(2),(3) includes both demographic and community controls namely province and treatment status .The control variables are either indicated by "yes" if included in the regressions or : conventional "no" if not included . Coefficients are significant at * 10%; ** 5%; *** 1%. Education is a variable that measures years of schooling attianed by each individual in our sample .

Appendix Figures

Figure A1a: Envelope used as the traditional remittance channel in the Remittance game

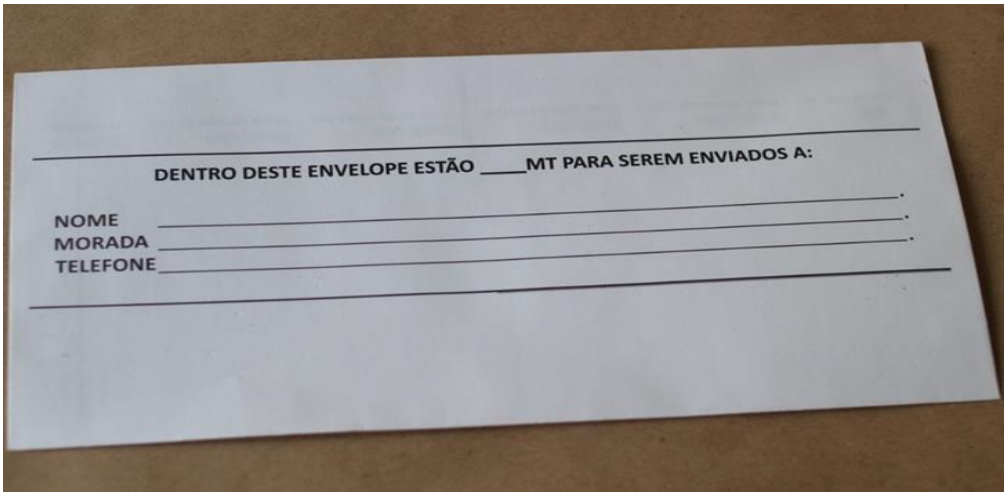

Figure A1b: Envelope we used in the Saving Game as a traditional form of saving