

An Experimental Impact Evaluation of Introducing Mobile Money in Rural Mozambique

Cátia Batista

Univ. Nova de Lisboa
CReAM, IZA, and NOVAFRICA

Pedro C. Vicente

Univ. Nova de Lisboa
IGC, BREAD, and NOVAFRICA

Bank of Mozambique/IGC/NOVAFRICA Workshop
‘Alargando a Adopção de Serviços Financeiros em Moçambique: Desafios e Inovações’
Maputo – July 8, 2015

Motivation

- **Financial inclusion in Sub-Saharan Africa in 2011:**
 - Data from the Global Financial Inclusion (Global Findex) database show that 24% of adults in Sub-Saharan Africa had an account at a formal financial institution
 - The most frequently cited reason for not having a formal account is lack of enough money to use one; but cost, distance, and documentation requirements are cited by more than 30% of non-account-holders
 - Gallup reported that in 11 Sub-Saharan African countries, 32% of households received internal remittances (the majority of which were received through informal channels)

Motivation

- **In rural areas of Mozambique** access to financial services is still very limited:
 - **Formal savings products:**
only 1.3% of adult rural population (Finscope, 2009) vs. average 20% in SSA (Gallup 2009)
 - **Formal money transfers:**
used in less than 20% of urban-rural remittance flows (Finscope, 2009)
- **But the picture is changing, Global Findex, 2014, shows that:**
 - 34% of adults in Sub-Saharan Africa have an account
 - 12% have a mobile money account
 - 37% received internal remittances, 28% through m-money

Mobile Money: An Opportunity?

- **Mobile money typically allows:**
 - Cashing-in money to a cell phone account (through a local agent)
 - Using e-money to transfer to any person through a cell phone
 - Paying for products or services
 - Buying airtime
 - Cashing-out e-money (from a local agent)
- **Mobile Money has been a huge success in recent years**
 - In Kenya, M-PESA got 60% of the adult population conducting annual transactions worth 10% of GDP two years after inception in 2007

Literature on mobile money (M-PESA)

- **Jack and Suri (2011):**
 - While describing the M-PESA experience, raise a number of interesting potential economic effects of mobile money
 - M-PESA could affect the ability of individuals to share risk and to make more efficient investment decisions
 - By providing a safe storage mechanism, M-PESA could increase net household savings
- **Jack and Suri (2013):**
 - Does mobile money improve risk sharing?
 - Per capita consumption falls for a non-user household when they experience a negative income shock (7-10pp), as it does for households who lack good access to the agent network
 - M-PESA user households experience no such fall in per capita consumption
 - Users of M-PESA achieve some of these improvements in their ability to smooth risk via remittances: in face of a negative shock, user households are more likely to receive remittances (13pp more likely, equivalent to 6-10 percent of annual consumption)

Research Question

- **What is the economic impact of newly introducing access to mobile money?**
- **Main outcomes of interest:**
 - Adoption pattern
 - Savings
 - Remittances
 - Consumption

Methodology

- **Randomized field experiment**
 - 102 locations in rural (Southern) Mozambique
 - 51 with newly-recruited mobile money agents, community-wide dissemination (popular theatres and community meetings), individual dissemination to a rural sample plus their corresponding migrants in Maputo
 - Started mid-2012
- **Measurement through administrative records and household surveys**
 - Measurement until end of 2014, with 3 rounds of surveying

Treatment Intervention

- **Treatment Part 1: Agent**
 - Recruitment (March-May 2012)
 - Local vendors with full shelves
 - Needed licence to operate as vendors
 - Needed bank account
 - Training before remaining activities (June-July 2012)
 - Contract signed by Carteira Móvel
 - Materials handed-out (agent poster, other posters, agent cell phone)
 - Briefing:
 - Community theatre and meeting
 - Self-registrations
 - Cashing-in
 - Purchases in shop
 - Other mKesh operations



Agent recruitment

- **Treatment Part 2: Community theatre and meeting**
 - mKesh jingle played from mKesh agent shop
 - Theatre played after canvassing the location with the help of local authorities
 - Script including mentions of:
 - mKesh Safety (based on the mKesh PIN)
 - Savings using mKesh
 - Transfers using mKesh
 - Self-registration in mKesh
 - Community meeting after theatre with overview of the service, open for questions



Community theatre and meeting

- **Treatment Part 3: Individual treatment**
 - Based on leaflet which was distributed to households
 - Actual self-registration
 - Following menu, needed name and document (e.g., ID) number
 - Actual cash-in
 - At the local agent shop
 - 76 MT (around 3 USD) given to each treated individual
 - Actual balance checking
 - Actual purchase
 - At the local agent shop
 - Value of purchase had to be 20 MT (involving 1 MT fee)
 - Description of:
 - Cash-out (involving a 5 MT fee if remaining 50 MT withdrawn)
 - Transfer



mKesh leaflet distributed

Conta mini • Auto-Registo

01 **Ajuda ao Menu mKash**
 Digite *500#
 Digite *000# e Prima a tecla de chamada

02 **Escolha o Idioma**
 1 Português
 2 Inglês
 3 Set

03 **Selecção Auto-Registo**
 1 Auto Registo
 2 136
 3 Voltar

04 **Introduza o seu Nome**
 Auto Registo Nome
 Análise

05 **mKash confirma o registo**
 Auto Registo Análise Sítio
 Confira o registo de adesão com sucesso. Favor de aguardar pela confirmação por SMS. Gratuito pela preferência.

06 **Introduza o seu Apelido**
 Auto Registo Apelido
 Sítio

07 **Selecção do Tipo de Documento**
 Auto Registo Documento:
 1 BI
 2 Passaporte
 3 DNI
 4 Carta Consolação
 5 Cédula Militar
 6 Cartão Euler

08 **Introduza o número do Documento**
 Auto Registo Nº Documento
 Confirmar

09 **Confirmação em ecrã**
 Auto Registo em ecrã
 1 Aceitar
 2 Cancelar

Como Depositar Dinheiro

01 **Ajuda ao Menu mKash**
 Digite *500#
 Digite *100# e Prima a tecla de chamada

02 **Selecção Depositar**
 1 Levantar
 2 Depositar
 3 Transferir
 4 Consultar
 5 Pagos
 6 mConta
 7 136
 8 Set

03 **Introduza o número de celular do Agente**
 Depositar Celular Agente
 82*****

04 **Introduza o montante**
 Depositar montante
 100

05 **mKash Confirma o Depósito**
 Depósito Efectuado
 Montante: 100 Mts
 Saldo disponível: 1429,00
 Ref: 8334
 Gratuito pela preferência.

06 **Confirmação de dados**
 Depositar no Agente Análise Sítio
 82*****
 MONTANTE 100 Mts
 1 Aceitar
 2 Cancelar

07 **Introduza o PIN**
 Depositar Pin (3 dígitos):

08 **Obtenha a confirmação do agente**
 Depositar O seu pedido de depósito de 100 Mts foi enviado ao 8282878167 MONTANTE 100 Mts Solicite confirmação ao Agente

Como Consultar Saldo

01 **Ajuda ao Menu mKash**
 Digite *500#
 Digite *100# e Prima a tecla de chamada

02 **Selecção mConta**
 1 Levantar
 2 Depositar
 3 Transferir
 4 Consultar
 5 Pagos
 6 mConta
 7 136
 8 Set

03 **Selecção Saldo**
 Saldo
 1 Saldo
 2 Extracção
 3 Adição MT
 4 Adição
 5 Voltar

04 **mKash envia-lhe o Saldo da Conta**
 Saldo Saldo corrente: 633,00 Mts
 Saldo disponível: 633,00 Mts
 Gratuito pela preferência.

05 **Introduza o PIN**
 Saldo Pin (3 dígitos):

Como Pagar Despesas

01 **Ajuda ao Menu mKash**
 Digite *500#
 Digite *100# e Prima a tecla de chamada

02 **Selecção Pagar**
 1 Levantar
 2 Depositar
 3 Transferir
 4 Consultar
 5 Pagos
 6 mConta
 7 136
 8 Set

03 **Selecção Comerciante**
 1 Comerciante
 2 Voltar

04 **Introduza o número de celular do Agente**
 Comerciante Celular Agente
 82*****

05 **Comerciante Confirma o pagamento**
 Comerciante 82807907
 ESTACAO DE SERVIÇO A67
 confirma recibo: 300,00 Mts
 ref: xxxxxx111
 Gratuito pela preferência.

06 **Introduza o montante**
 Comerciante Montante
 100

07 **Confirmação de dados**
 Comerciante no Agente Análise Sítio
 82*****
 MONTANTE 100 Mts
 1 Aceitar
 2 Cancelar

08 **Introduza o PIN**
 Comerciante Pin (3 dígitos):

09 **Obtenha a confirmação do agente**
 Comerciante O seu pedido de pagamento de 100,00 Mts foi enviado ao 8282878167 Mts Sal: 8334 Solicite confirmação ao Agente

Operations done as part of individual treatment:
 self-registration, cash-in, checking balance, buying from agent

Como Levantar Dinheiro

01 Acorda no Menu mKesh

02 Insere o Número de Telefone do Agente

03 Insere o Montante

04 Confirma no Simão

05 Insere o PIN

06 Obtém a confirmação do Agente

07 Agente confirma o levantamento

Como Transferir Dinheiro

01 Acorda no Menu mKesh

02 Insere o Montante

03 Insere o Número do Destinatário

04 Insere o Montante

05 Confirma no Simão

06 Insere o PIN

07 mKesh confirma a transferência

mKesh - Preço de Cliente

Tipos de Transações	Montantes em Meticals				
	20-100	101-1.000	1.001-5.000	5.001-10.000	10.001-25.000
Levantamento no Agente ¹	5	8	12	50	50
Transferência			5		
Compra de Senha			25		
Saldo ²			1		
Alterar PIN			1		
Extracto ³			2		
Pagamento ao Comerciante			1		
Levantamento de Senha			Grátis		
Depósito ⁴			Grátis		
Compra de Recargas			10 - 2000Mts		Grátis

1 Depósito mínimo 20 meticals.
2 Pagamento mínimo 100 meticals.
3 Montante máximo de extracção de 500 meticals.
4 O depósito é efectuado em 2 dias úteis.

Para mais informações consulte nos pontos de atendimento ou no site www.mokesh.com
www.mokesh.com.pt | 80 211 0000 - 80 211 0001

Se não se encontra no ponto de atendimento consulte o número de emergência 80 211 0000 - 80 211 0001

Termos e condições aplicáveis em MZ. Todos os valores de montantes são valores brutos, iguais a zeros decimais e válidos somente na rede móvel.

Other information: cash-out, transfer, pricing

b. Sampling and randomization

- **Sampling process:**

- Sampling base: 2007 census enumeration areas (EAs) in 3 southern provinces of Mozambique
 - Maputo-Province (only the North of the province was included)
 - Gaza
 - Inhambane
- Eligibility criteria for EAs:
 - mCel coverage (using 5-km radius from mCel antennae)
 - having bank agency in the same district
- In each EA, households recruited using:
 - Standard n-th house calls (household head or spouse)
 - Additional eligibility conditions:
 - Owning mCel cell phone (for all households in the sample)
 - Having a migrant (spouse or son/daughter) in the family (for half sample)

b. Sampling and randomization

- **Randomization:**
 - Blocks of 2 EA matched on observable characteristics
 - Randomization of the treatment within each pair
 - => **Treatment conducted in 51 EAs (51 control EAs)**
 - Individual treatment not submitted to a randomly-drawn sub-group within treatment EAs (**untargeted individuals**)
- **Reach of the experiment**
 - 102 enumeration areas (EAs) in 3 southern provinces of Mozambique (Maputo-Province, Gaza, Inhambane)
- **Rural panel composed by 2040 individuals/households**



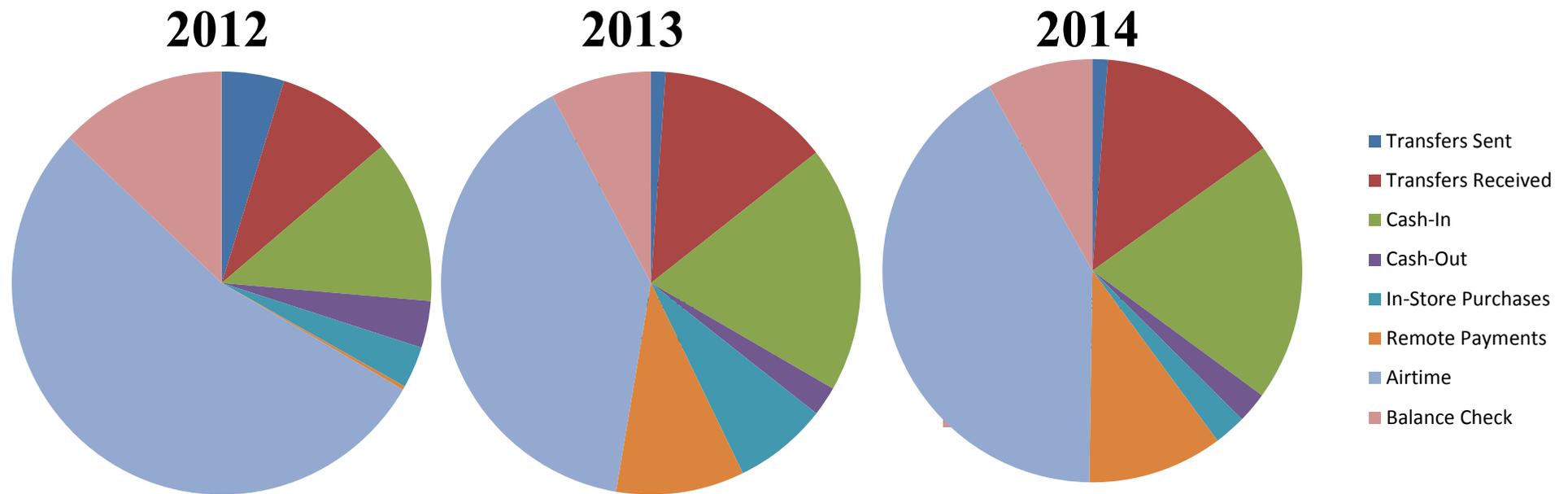
Results: Adoption of Mobile Money

	<u>2012</u>	<u>2013</u>	<u>2014</u>
Control	1.1%	0.4%	0.3%
<u>Treatment</u>	<u>63.1%</u>	<u>52.8%</u>	<u>61.8%</u>

Source: Administrative data.

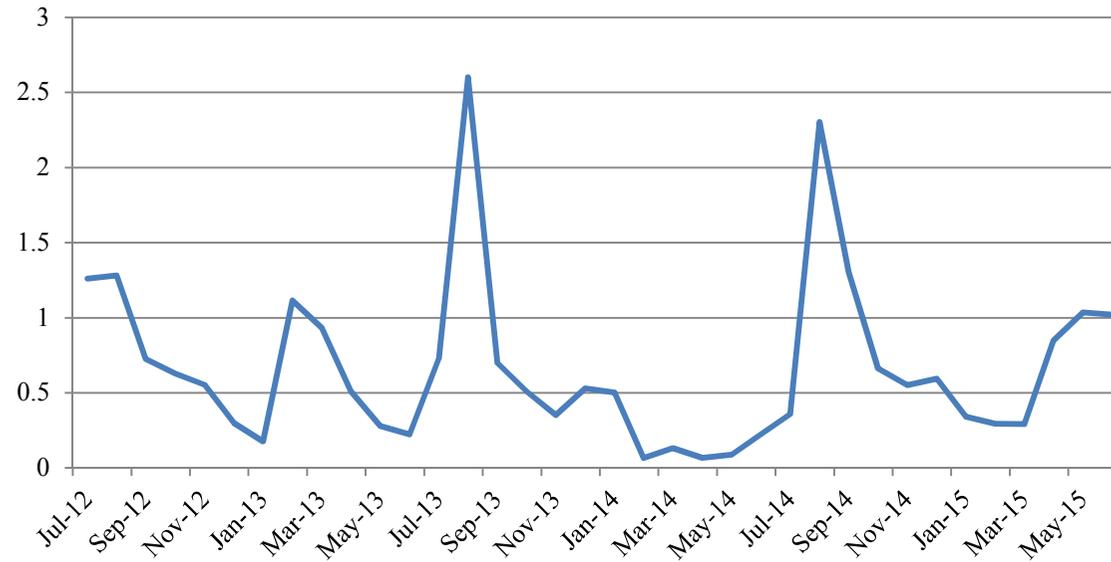
- **63% of individuals in treatment areas** performed at least one mobile money transaction in the first year after intervention.
- This number **decreased but did not fall dramatically** over the following two years.
- There are **no signs of important contamination or alternative sources of mobile money adoption** in our sample, besides the rural intervention we study in this project.

Evolution of Transaction Types Performed



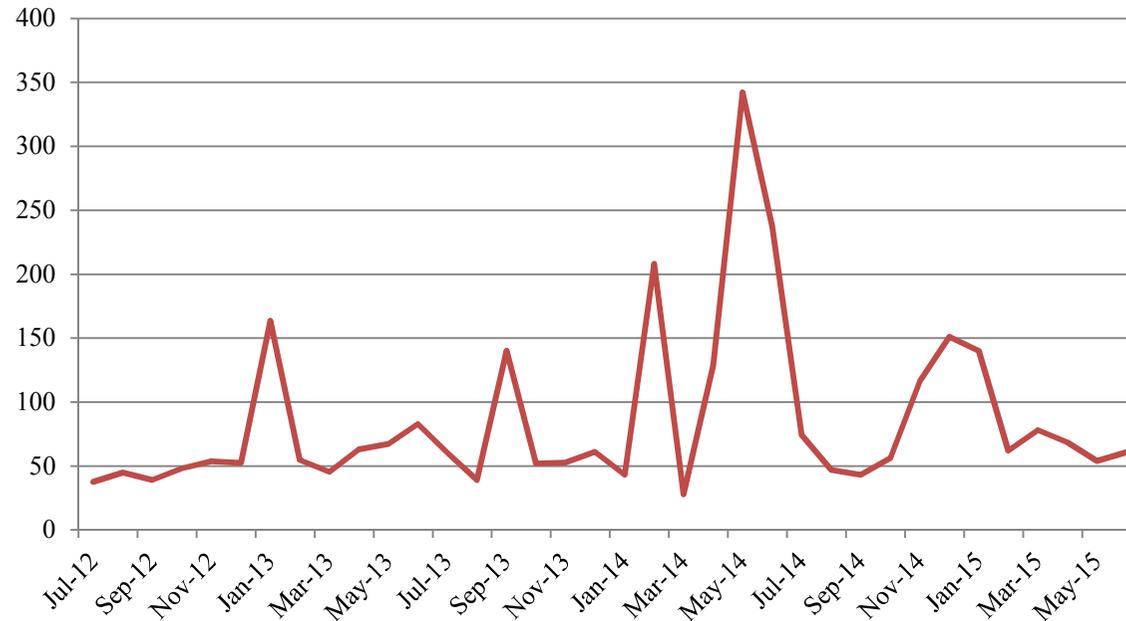
- **Transfers received and remote payments have become increasingly important over time, at the expense of airtime purchase.**

Average Number of Mobile Money Transactions



- **Well functioning agent network and customer support seem crucial to promote consistent usage.**

Average Value of Mobile Money Transactions



- **No obvious pattern: but there seem to be spikes in the lean season (after plantation, before harvest);**

Results: Transfers

- **Survey data (2014):**
 - 7% of total cash transfers received are made using mobile money; 12% of total cash transfers sent using mobile money;
- **1 year after intervention:**
 - probability of receiving remittances is significantly higher by 8.1pp for the treatment group;
 - there is a positive lower increase in the probability of sending remittances.
- **2 years after intervention:**
 - probability of receiving remittances is higher by 6.3pp for the treatment group;
 - there is a lower increase in the probability of sending remittances.

Table: Transfers Received and Sent

dependent variable ----->		probability to receive transfers 2013		probability to receive transfers 2014		probability to send transfers 2013		probability to send transfers 2014	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
treatment	coefficient	0.081***	0.082***	0.060	0.063*	0.038	0.040	0.033	0.030
	standard error	(0.031)	(0.030)	(-0.037)	(-0.037)	(0.024)	(0.024)	(-0.033)	(-0.032)
mean dep. variable (CI group)		0.205	0.205	0.497	0.497	0.094	0.094	0.303	0.303
r-squared adjusted		0.008	0.015	0.003	0.005	0.003	0.002	0.000	0.016
number of observations		1,221	1,221	1,330	1,330	1,221	1,221	1,330	1,330
controls		no	yes	no	yes	no	yes	no	yes

Note: All regressions are OLS. Dependent variables are based on survey questions asked in the follow-up survey; controls are province fixed effects. Standard errors reported in parenthesis - these are clustered at the location level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results: Savings

- **Survey data (2014):**
 - For those who use mobile money, 6.6% of total savings are kept in the mobile money service;
 - Total savings of the treated individuals increase relative to the control (although non-statistically significant);

Table: Savings

dependent variable ----->		value of total savings	
		(1)	(2)
treatment	coefficient	985.877	974.659
	standard error	(966.519)	(907.781)
mean dep. variable (CI group)		3,917.307	3,917.307
r-squared adjusted		0.000	0.006
number of observations		1,245	1,245
controls		no	yes

Note: All regressions are OLS. Dependent variables are based on survey questions asked in the follow-up survey; controls are province fixed effects. Standard errors reported in parenthesis - these are clustered at the location level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results: Consumption and Risk Sharing

Table: Consumption and Vulnerability in 2013

dependent variable ----->	value of total consumption		no lack of food		no lack of drinkable water		no lack of medical care	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
treatment coefficient	1,521.256	1,268.096	0.047	0.040	0.091*	0.082*	0.012	0.003
standard error	(1,803.400)	(1,682.565)	(0.051)	(0.047)	(0.049)	(0.047)	(0.072)	(0.068)
mean dep. variable (CI group)	23,321.111	23,321.111	2.755	2.755	2.622	2.622	2.436	2.436
r-squared adjusted	0.000	0.014	0.000	0.020	0.002	0.007	-0.001	0.013
number of observations	1,221	1,221	1,199	1,199	1,199	1,199	1,189	1,189
controls	no	yes	no	yes	no	yes	no	yes

Note: All regressions are OLS. Dependent variables are based on survey questions asked in the follow-up survey; controls are province fixed effects. Vulnerability variables are defined on a 0-3 scale, where maximum vulnerability is defined as zero. Standard errors reported in parenthesis - these are clustered at the location level. * significant at 10%; ** significant at 5%; *** significant at 1%.

- Aggregate consumption does not change significantly;
- Treated individuals report being less vulnerable to lack of access to water, and to lack of medical care;

Results: Consumption and Risk Sharing

Table: Consumption and Vulnerability in 2014

dependent variable ----->	value of total consumption		no lack of food		no lack of drinkable water		no lack of medical care	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
treatment coefficient	-667.734	-979.534	0.057	0.055	0.117*	0.124*	0.104	0.095
standard error	(6,460.946)	(6,085.241)	(-0.049)	(-0.047)	(-0.068)	(-0.067)	(-0.071)	(-0.069)
mean dep. variable (CI group)	40,454.857	40,454.857	2.736	2.736	2.497	2.497	2.236	2.236
r-squared adjusted	-0.001	0.012	0.001	0.003	0.000	0.016	0.000	0.016
number of observations	1,330	1,330	1,319	1,319	1,330	1,330	1,330	1,330
controls	no	yes	no	yes	no	yes	no	yes

Note: All regressions are OLS. Dependent variables are based on survey questions asked in the follow-up survey; controls are province fixed effects. Vulnerability variables are defined on a 0-3 scale, where maximum vulnerability is defined as zero. Standard errors reported in parenthesis - these are clustered at the location level. * significant at 10%; ** significant at 5%; *** significant at 1%.

- Aggregate consumption does not change significantly;
- Treated individuals report being less vulnerable to lack of access to water, and to lack of medical care;

Summary and Implications

- Introduction of mobile money in rural areas of Southern Mozambique achieved **good levels of adoption** – however **challenges remain regarding effective utilization of mobile money**, which requires investment a well functioning agent network and customer support.
- **Remittances are the obvious channel of impact of mobile money** (due to an enormous decrease in transaction costs), namely through enlarging networks that can provide insurance against idiosyncratic risk.
- Our work points towards a **role of mobile money in diminishing vulnerability to shocks** – likely through **remittances as savings are not significantly affected**.