Cashing In (and Out): Experimental Evidence on the Effects of Mobile Money in Malawi

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Mobile money has spread rapidly across Africa since it was first introduced in Kenya in 2007, and has been extensively studied in recent years. However, identification is challenging because mobile money is typically rapidly adopted, making it difficult to preserve a control group. The seminal studies on mobile money are the difference-in-difference studies by William Jack and Tavneet Suri (Jack and Suri 2014; Suri and Jack 2016), which are identified from plausibly exogenous regional differences in adoption timing, and which find that mobile money reduced vulnerability to shocks as well as overall poverty.[1]

However, to date, there have only been a few RCTs about basic access to mobile money.[2] These include Batista and Vicente (2020), who randomize mobile money access at the community level; Lee et al. (Forthcoming), who offer mobile banking to rural-urban migrants in Bangladesh (to both the urban migrant and to the sending rural household); and Wieser et al. (2019), who randomize the roll-out of mobile money agents in rural Northern Uganda.[3]

In this paper, we add to this literature with an RCT conducted among microentrepreneurs in urban Malawi in 2017-18, where usage of mobile money was still modest,[4] even though a nascent

[1] Munyegara and Matsumoto (2016) replicate this design in Uganda.

[2] There have been a number of interventions which layer other financial interventions on top of basic mobile money, but we do not discuss them in detail here due to space constraints. See Suri (2017) for an overview, as well as our companion paper Aggarwal et al. (2020).

[3] Given the growing interest in mobile money, there are likely other evaluations currently ongoing.

[4] Twenty percent of people in Malawi had a mobile money account in the 2017 Findex.

mobile money agent network existed. Treatment was three-pronged: assistance in opening a mobile money account, training on how to perform basic transactions, and a withdrawal fee waiver.

We find that the majority of people opened accounts and used them extensively. We find strong evidence that treated respondents reallocated labor from business to agriculture, and we find more mixed evidence of an increase in expenditures.[5] In contrast to the existing literature, effects appear to be driven by using the accounts to save rather than to make transfers.

I. The experiment

A. Context and sampling

Our experiment took place with 480 small-scale entrepreneurs in the city of Blantyre, Malawi.[6] After a census of small businesses in the area, we sampled those businesses which met inclusion conditions related to firm size and about involvement in day-to-day business activities.[7] We stratified treatment by financial access (mobile money or bank account ownership) and a dummy for above or below median distance to the nearest mobile money agent. Two-thirds of the sample received a mobile money account and one-third served as control.[8]

[5] In our companion paper Aggarwal et al. (2020), we also find evidence of effects on other outcomes, but do not discuss those results in detail here and instead focus on primary outcomes.

[6] The mobile money treatment is part of a larger experiment with 801 microentrepreneurs. In addition to the mobile money treatment, the experiment also provided lockboxes, and varied the number of accounts given to respondents. The results of the combined experiment are described in Aggarwal et al. (2020). For the purposes of this paper, we pool treatment groups given one and multiple accounts. Take up of multiple mobile money accounts was modest due to logistical challenges in using multiple sim cards for mobile money on a single phone.

[7] We excluded businesses with more than 2 employees (6%), businesses in which the owner worked less than 5 days a week (9%), and businesses which planned to shut down within 6 months (16%). We also excluded any business that was also a mobile money agent (3%). Finally, we excluded illiterate business owner (20%) and owners who could not read written text due to poor eyesight (10%).

[8] Web Appendix Table A1 shows that the treatment and control groups were largely balanced on covariates at baseline.

B. Study design

In July 2017, treatment respondents received mobile money accounts with Airtel Malawi. Those who already had an accounts had an option of opening a new account or keeping their existing one. Since many people already had mobile money accounts[9] and because mobile money was widely available, it may seem surprising that our treatment would change behavior. However, there are three channels through which we could have induced more usage than in the status quo.

First, to minimize transaction costs associated with usage, we reimbursed withdrawal fees for the duration of the project.[10] The average withdrawal fee would have been about 5% in the absence of this waiver.[11] Second, in pilot work we found that respondents had limited knowledge of the basic features and fees of mobile money. Therefore, we developed and administered training modules at the time of account-opening (note that such a training is supposed to be provided by agents, but this has not been common practice). Third, we encouraged the treatment group to set goals for their accounts and to use the accounts to save. While we view each of these interventions as relatively light-touch actions that could easily be implemented by the telco absent our involvement, it is nevertheless the case that our treatment differed from as-is mobile money.

While most respondents (94%) already had a cell phone, many of these phones were in poor condition, so we gave out feature phones (worth $12) to all respondents, making it possible to conduct phone surveys.

[9] Many respondents already had mobile money (56% had an account, and 32% reported using it to save) – see Appendix Table 1. However, the average balance in mobile money was only about $5 (out of $120 total cash savings). The rate of mobile money usage is higher than the Malawi average in the 2017 Findex, suggesting that microentrepreneurs are positively selected relative to the average Malawian.

[10] It was not technologically possible to waive these fees directly; instead, we received the set of transactions at the end of the week and reimbursed respondents the following week.

[11] The schedule of withdrawal fees is included as Appendix Table A2. The average fee for transactions observed in our sample would have been about 5%. Withdrawal fees are determined using a step function: the fee for the maximum allowable withdrawal within a range would be about 4%, while the fee for a withdrawal at the bottom of the range can be as high as 10% (and even higher for very small withdrawals).

C. Data

In addition to a baseline survey and a short intake survey, we fielded 3 surveys. First, for half the sample, we conducted 2 rounds of high-frequency phone surveys (which we call the HFPS). The first round occurred in September-October 2017 (with twice-per-week surveys) and the second in February-March 2018 (with once-per-week surveys). The HFPS measured business outcomes, labor supply, expenditures, transfers, savings, credit, and shocks (at the daily or weekly level, depending on the outcome). Second, for the entire sample, we collected two rounds of "monitoring surveys" in January and March 2018 (also via phone), measuring outcomes over a longer recall period (up to 3 months for some variables).[12]

Finally, we have access to Airtel's administrative data on all transactions from account opening until August 2019 (about 2 years later). Appendix Figure A1 presents a timeline.

II. Results

A. Take-up and usage

The majority of people offered an account used it: 99% opened an account (or continued to use their own account), 73% made at least 1 deposit, and 53% made at least 5 deposits (see Table 1). The average respondent made 11 deposits amounting to $90, a substantial sum in this context in which daily profits average about $2.50. Fifty-two percent of people used the accounts to make transfers and the average (unconditional) value of transfers sent and received over the study period was $11 and $9.50 respectively, compared to deposits worth $90.[13]

[12] All surveys can be found on the authors' websites.

[13] Appendix Figure A2 shows the distribution of amounts deposited - while a minority never used the account, a sizeable fraction of respondents deposited large sums.

Table 1. Take-up and usage during study period

Panel A. Take-up and usage	
Opened account (or enrolled existing account into experiment)	0.99
Made at least 1 deposit	0.73
Made at least 2 deposits	0.63
Made at least 5 deposits	0.53
Total value of deposits	90.31
	(139.86)
Number of deposits	10.83
	(13.89)
Total value of withdrawals	97.29
	(160.04)
Number of withdrawals	11.91
	(16.33)
Panel B. Usage of mobile money for transfers and other transactions	
Made or received a transfer	0.52
Value of transfers sent	10.83
	(23.54)
Value of transfers received	9.45
	(26.29)
Used mobile money to pay bills or make merchant purchase	0.55
Value of transactions	7.74
	(15.24)

Notes: N = 320. Administrative data from telco from July 2017-May 2018. All monetary values in USD. The value and number of deposits and withdrawals are winsorized at 1%.

In Appendix Table A3, we examine predictors of usage and find that people who live farther away from the agent use accounts less frequently. The magnitude is large and significant at 10%: a standard deviation increase in distance (0.2 hours) lowers deposits by approximately $15.5 (on a mean of $88). While distance is not exogenous, we take as suggestive evidence of the importance of transactions costs.

Table 2 shows the first stage, i.e. the effect of the accounts on total mobile money activity. Perhaps surprisingly, even though accounts were commercially available and 56% already had accounts, we find a strong first stage – the likelihood of making any deposit went up by 55-80% and the value of daily deposits increased by 67%-83%, depending on the survey.

B. Effects on Downstream Outcomes

Table 3 shows effects on key downstream outcomes, specifically labor supply, expenditures, and inter-personal transfers.[14] For a fuller analysis of the combined experiment, see Aggarwal et al. (2020). We find that treatment respondents worked less in their primary business[15], and more on their farm (we also find some evidence of an increase in hours in other occupations in our companion paper). We also find a marginally significant effect on total expenditures.

A possible explanation for the labor supply result is that farm labor has a higher expected marginal return, but that the delay in realizing these returns (until after harvest), or the risk of shocks such as bad rain, induces people to instead work in their primary business in which returns are more immediate and/or more certain. The provision of mobile money may allow households a tool to overcome these constraints. This result is related to several recent papers, including Fink, Jack, and Masiye (2018), who find that providing credit to smallholder farmers decreases off-farm labor and increases own-farm labor, and Callen et al. (2019), who find that deposit-collection allowed Sri Lankan households to transition from self-employment to wage-work.

[14] Appendix Tables A4 shows mixed effects on our primary measure of savings (deposits). We therefore rely on the downstream effects as our primary evidence. Aggarwal et al. (2020) includes a fuller discussion.

[15] We also find a reduction in business profits but the coefficient is omitted for space. See Aggarwal et al. (2020) for more detail.

Table 2. First stage effect on mobile money usage

	(1)	(2)	(3)
		First Stage	
	Deposits into experimental mobile money account	Total mobile money deposits (all accounts)	=1 if deposited into any mobile money account
Panel A: HFPS			
Mobile money	0.35***	0.20***	0.16***
	(0.06)	(0.07)	(0.04)
Observations	2721	2721	2721
No. businesses	232	232	232
Control Mean	0.00	0.24	0.20
Control SD	0.00	0.68	-
Panel B: Monitoring Surveys			
Mobile money	0.24***	0.12***	0.20***
	(0.03)	(0.04)	(0.05)
Observations	786	786	786
No. businesses	429	429	429
Control Mean	0.00	0.18	0.36
Control SD	0.00	0.38	-

Notes: All results are converted to daily averages. Deposits were measured over 7 days in Panel A and 2 months in Panel B. All regressions in Panel A control for a measure of the dependent variable during the intake survey, calendar date fixed effects and a binary indicator for winning an experimental lottery. All regressions in Panel B control for participation in HFPS and a survey date fixed effect. All regressions control for strata and baseline controls, and are probability weighted. All monetary variables are expressed in USD and are winsorized at 5%. Standard errors clustered at individual level in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%.

Why was mobile money effective? The two most likely candidate explanations are that mobile money allowed people to save or that mobile money facilitated interpersonal transfers.[16] To explore this, in Table 3, Columns 8-9, we show effects on the value of transfers. In the HFPS, coefficients are small and insignificant; in the monitoring surveys, we find a marginally significant

[16] A third possible channel is that mobile money facilitated other transactions such as remote bill paying or merchant purchases. Table 1 shows that the average value of transactions was less than $8 on average (and of this, $3.25 was for airtime top-ups – result not shown). We view it as unlikely that reducing the transaction costs of such payments was a primary driver of downstream effects.

Table 3. Treatment effects on downstream outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Labor supply					Transfers (Value)	
	Main Business		Farming		Total expenditures	Given to others	Received from others
	=1 if worked	Hours	=1 if farmed	Hours			
Panel A. HFPS							
Mobile money	-0.07**	-0.49	0.02	0.23**	0.32	0.02	-0.04
	(0.03)	(0.42)	(0.02)	(0.10)	(0.29)	(0.08)	(0.13)
Observations	18883	18883	2724	2724	2727	2727	2727
Number of Businesses	233	233	232	232	232	232	232
Control Mean	0.82	8.27	0.06	0.21	3.91	0.73	0.76
Control SD	-	4.64	-	1.21	2.86	1.18	1.77
Panel B. Monitoring surveys							
Mobile money	-0.05	-0.62*	0.01	1.02*	0.64*	0.07*	-0.03
	(0.03)	(0.38)	(0.04)	(0.58)	(0.37)	(0.04)	(0.06)
Observations	5502	5502	786	785	786	784	786
Number of Businesses	429	429	429	429	429	427	429
Control Mean	0.75	7.41	0.24	2.07	4.88	0.26	0.42
Control SD	-	5.06	-	5.78	3.49	0.39	0.72

Notes: All outcomes are daily averages, other than labor supply in farming and other occupations (which are weekly). All regressions in Panel A control for a measure of the dependent variable during the intake survey, calendar date fixed effects and an indicator for winning an experimentally induced lottery. All regressions in Panel B control for participation in HFPS and date of the survey fixed effect. Labor supply in Panel B (columns 1 and 2) is measured over the past 7 days before the survey. All regressions control for strata and baseline controls, and are probability weighted. All monetary variables are expressed in USD and are winsorized at 5%. Standard errors clustered at individual level in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%.

[1]In Panel B this variable is the proportion of days worked over the 7 days prior to the

increase in values of transfers given, but a negative effect on the value of transfers received.[17]

Debriefing surveys conducted at endline (Appendix Table A6) support the notion that people used the accounts to save. Eighty-three percent of respondents reported that they used the accounts for long-term savings and 12% for storing money for a short period of time.

III. Conclusion

This paper represents one of the first RCTs of mobile money. We find that people actively used mobile money accounts, and that mobile money had several important downstream effects, including on labor supply. However, unlike much of the literature on mobile money, results appear

[17]In Web Appendix Table A5, we look at the results in somewhat more detail, and find an effect on the extensive margin for giving transfers but no effect on receiving.

to be driven by people using the accounts to save, rather than to lower the cost of interpersonal transfers. The relatively modest effect on transfers is likely because our experiment was at the individual level, providing mobile money to individuals and not to whole communities, so the intervention would have had a minimal effect on the risk-sharing networks of treated respondents.

Why do we find such robust demand for mobile money as a savings vehicle? One possibility may be that the withdrawal fee waiver played a large role. However, in Appendix Figure A3, we document substantial usage even after the waiver was removed. We take this as evidence that, at least once people started using the accounts, the fee may not have been the determining factor. However, it is possible that an introductory fee waiver was effective in encouraging initial usage. We leave this question for future research to explore.

Our results may also be unique to Malawi, a country where banking access is particularly limited; or to the fact that our sample is composed of microentrepreneurs, who have high cash turnover and may have greater value for safe and easy ways to store money. Nevertheless, the results grant credence to the notion that mobile money can be used as a vehicle for facilitating savings and not just as a method of transferring money or making transactions. This insight can be particularly useful as mobile money evolves from simply being a safe and cheap means to send and store money towards providing access to more sophisticated financial products.

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