

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

By SHILPA AGGARWAL, VALENTINA BRAILOVSKAYA, AND JONATHAN ROBINSON*

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 mobile money rollout and 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 (2018), which randomizes mobile money access at the community level; Lee et al. (forthcoming), which offers mobile banking to rural-urban migrants in Bangladesh (to both the urban migrant and the sending rural household); and Wieser et al.

(2019), which randomizes the rollout 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 2017–2018, where usage of mobile money was still modest⁴ even though a nascent 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 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

*Aggarwal: Indian School of Business (email: shilpa_aggarwal@isb.edu); Brailovskaya: ID Insight (email: valentina.brailovskaya@idinsight.org); Robinson: UC Santa Cruz (email: jmrtwo@ucsc.edu). We thank Carly Farver, Gabriella Fleischman, Marble Karuu, Calvin Mhango, and David Park for overseeing this project; Naresh Kumar and Guanghong Xu for comments; Airtel Malawi for their collaboration; and the IPA Financial Inclusion Program, ISB, and UCSC for financial support. The research was approved by the Malawi NCRSH and the IRBs of UCSC and ISB. This trial is registered as AEARCTR-0002449.

[†]Go to <https://doi.org/10.1257/pandp.20201087> to visit the article page for additional materials and author disclosure statement(s).

¹Munyegara and Matsumoto (2016) replicates this design in Uganda.

²There have been a number of interventions that 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, Brailovskaya, and Robinson (2020).

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

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

⁵In our companion paper Aggarwal, Brailovskaya, and Robinson (2019), we also find evidence of effects on other outcomes but do not discuss those results in detail here and instead focus on primary outcomes.

⁶The 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, Brailovskaya, and Robinson (2020). For the purposes of this paper, we pool treatment groups given one and multiple mobile money accounts. Take-up of multiple mobile money accounts was modest due to logistical

the area, we sampled those businesses that met inclusion conditions related to firm size and 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

B. Study Design

In July 2017, treatment respondents received mobile money accounts with Airtel Malawi. Those who already had an account had an option of opening a new account or keeping their existing one. Since many people already had mobile money accounts⁹ and 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 percent in the absence of this waiver.¹¹ Second, in

challenges in using multiple SIM cards for mobile money on a single phone.

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

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

⁹Many respondents already had mobile money (56 percent had an account, and 32 percent reported using it to save)—see online Appendix Table 1. However, the average balance in mobile money was only about \$5 (out of \$120 in 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.

¹⁰It 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.

¹¹The schedule of withdrawal fees is included as online Appendix Table A2. The average fee for transactions observed in our sample would have been about 5 percent.

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 percent) 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.

C. Data

In addition to a baseline survey and a short intake survey, we fielded three surveys. First, for half the sample, we conducted two 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 three months for some variables).¹²

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

Withdrawal fees are determined using a step function: the fee for the maximum allowable withdrawal within a range would be about 4 percent, while the fee for a withdrawal at the bottom of the range can be as high as 10 percent (and even higher for very small withdrawals).

¹²All surveys can be found on the authors’ websites.

TABLE 1—TAKE-UP AND USAGE DURING STUDY PERIOD

<i>Panel A. Take-up and usage</i>	
Opened account (or enrolled existing account into experiment)	0.99
Made at least one deposit	0.73
Made at least two deposits	0.63
Made at least five 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)
<i>Panel B. Usage of mobile money for transfers and other transactions</i>	
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 US dollars. The value and number of deposits and withdrawals are winsorized at 5 percent.

II. Results

A. Take-up and Usage

The majority of people who were offered an account used it: 99 percent opened an account (or continued to use their own account), 73 percent made at least 1 deposit over the first 10 months, and 53 percent 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

TABLE 2—FIRST-STAGE EFFECT ON MOBILE MONEY USAGE

	Deposits into experimental mobile money account (1)	First stage	
		Total mobile money deposits (all accounts) (2)	=1 if deposited into any mobile money account (3)
<i>Panel A. HFPS</i>			
Mobile money	0.35 (0.06)	0.20 (0.07)	0.16 (0.04)
Observations	2,721	2,721	2,721
Businesses	232	232	232
Control mean	0.00	0.24	0.20
Control SD	0.00	0.68	—
<i>Panel B. Monitoring surveys</i>			
Mobile money	0.24 (0.03)	0.12 (0.04)	0.20 (0.05)
Observations	786	786	786
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 seven days in panel A and two 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 US dollars and winsorized at 5 percent. Standard errors clustered at individual level in parentheses.

\$9.50 respectively, compared to deposits worth \$90.¹³

In online 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 percent: a standard deviation increase in distance (0.2 hours) lowers deposits by approximately \$15.50 (on a mean of \$88). While distance is not exogenous, we take it as suggestive evidence of the importance of transactions costs.

Table 2 shows the first stage, that is, the effect of the accounts on total mobile money activity. Perhaps surprisingly, even though accounts were commercially available and 56 percent already

¹³Online Appendix Figure A2 shows the distribution of amounts deposited—while a minority never used the account, a sizable fraction of respondents deposited large sums.

had them, we find a strong first stage—the likelihood of making any deposit went up by 55–80 percent and the value of daily deposits increased by 67–83 percent, depending on the survey.

B. *Effects on Downstream Outcomes*

Table 3 shows effects on key downstream outcomes, specifically labor supply, expenditures, and interpersonal transfers.¹⁴ We find that treatment respondents worked less in their primary business¹⁵ 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 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), which finds that providing credit to smallholder farmers decreases off-farm labor and increases own-farm labor, and Callen et al. (2019), which finds that deposit collection allowed Sri Lankan households to transition from self-employment to wage work.

Why was mobile money effective? The two most likely candidate explanations are that mobile money allowed people to save or that it 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 increase in values of transfers given but a negative effect on the value of transfers received.¹⁷

Debriefing surveys conducted at end-line (online 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 percent for storing money for a short period of time.

III. Conclusion

This paper represents one of the first RCTs of access to 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 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 online 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

¹⁴Online Appendix Table A4 shows mixed effects on our primary measure of savings (deposits). We therefore rely on the downstream effects as our primary evidence. Aggarwal, Brailovskaya, and Robinson (2019) includes a fuller discussion.

¹⁵We also find a reduction in business profits, but the coefficient is omitted for space. See Aggarwal, Brailovskaya, and Robinson (2019) for more detail.

¹⁶A 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.

¹⁷In online 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.

TABLE 3—TREATMENT EFFECTS ON DOWNSTREAM OUTCOMES

	Labor supply				Total expenditures (5)	Transfers (value)	
	Main business		Farming			Given to others (6)	Received from others (7)
	=1 if worked (1)	Hours (2)	=1 if farmed (3)	Hours (4)			
<i>Panel A. HFPS</i>							
Mobile money	-0.07 (0.03)	-0.49 (0.42)	0.02 (0.02)	0.23 (0.10)	0.32 (0.29)	0.02 (0.08)	-0.04 (0.13)
Observations	18,883	18,883	2,724	2,724	2,727	2,727	2,727
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
<i>Panel B. Monitoring surveys</i>							
Mobile money	-0.05 (0.03)	-0.62 (0.38)	0.01 (0.04)	1.02 (0.58)	0.64 (0.37)	0.07 (0.04)	-0.03 (0.06)
Observations	5,502	5,502	786	785	786	784	786
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 seven days before the survey. All regressions control for strata and baseline controls and are probability weighted. All monetary variables are expressed in US dollars and winsorized at 5 percent. Standard errors clustered at individual level in parentheses. In panel B, this variable is the proportion of days worked over the seven days prior to the survey.

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 toward providing access to more sophisticated financial products.

REFERENCES

- Aggarwal, Shilpa, Valentina Brailovskaya, and Jonathan Robinson.** 2020. "Saving for Multiple Financial Needs: Evidence from Lockboxes and Mobile Money in Malawi." <https://people.ucsc.edu/~jmrtwo/ABRSavingNeeds.pdf>.
- Batista, Catia, and Pedro C. Vicente.** 2018. "Is Mobile Money Changing Rural Africa? Evidence from a Field Experiment." NOVAFRICA Working Paper 1805.
- Callen, Michael, Suresh de Mel, Craig McIntosh, and Christopher Woodruff.** 2019. "What Are the Headwaters of Formal Savings? Experimental Evidence from Sri Lanka." *Review of Economic Studies* 86 (6): 2491–2529.
- Fink, Günther, B. Kelsey Jack, and Felix Masiye.** 2018. "Seasonal Liquidity, Rural Labor Markets and Agricultural Production." NBER Working Paper 24564.
- Jack, William, and Tavneet Suri.** 2014. "Risk Sharing and Transactions Costs: Evidence from Kenya's Mobile Money Revolution." *American Economic Review* 104 (1): 183–223.
- Lee, Jean N., Jonathan Morduch, Saravana Ravindran, Abu Shonchoy, and Hassan Zaman.** Forthcoming. "Poverty and Migration in the Digital Age: Experimental Evidence on Mobile Banking in Bangladesh." *American Economic Journal: Applied Economics*.
- Munyegera, Ggombe Kasim, and Tomoya Matsumoto.** 2016. "Mobile Money, Remittances, and Household Welfare: Panel Evidence from

- Rural Uganda.” *World Development* 79: 127–37.
- Suri, Tavneet, and William Jack.** 2016. “The Long-Run Poverty and Gender Impacts of Mobile Money.” *Science* 354 (6317): 1288–92.
- Suri, Tavneet.** 2017. “Mobile Money.” *Annual Review of Economics* 9: 497–520.
- Wieser, Christina, Miriam Bruhn, Johannes Kinzinger, Christian Ruckteschler, and Soren Heitmann.** 2019. “The Impact of Mobile Money on Poor Rural Households: Experimental Evidence from Uganda.” World Bank Policy Research Working Paper 8913.