



HOW IS DIGITAL CREDIT CHANGING THE LIVES OF KENYANS? EVIDENCE FROM AN EVALUATION OF THE IMPACT OF M-SHWARI

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Study finds that among a segment of new M-Shwari customers with low credit scores, digital loans help families pay for schooling and cope with emergencies, but impacts are not evident in their overall incomes or wealth.

Background

With its launch in 2007, M-PESA changed the way Kenyans transact with each other. In doing so, impact studies found that it significantly improved the ability of social networks to help people manage shocks¹. Six years later, the launch of M-Shwari (see Box 1) by the Commercial Bank of Africa (CBA) and Safaricom sought to change the way Kenyans save and borrow. Commercially, it quickly scaled: within three years of its launch approximately 10 million accounts were opened and 4.5 million people were using M-Shwari on a 90-day basis. Early M-Shwari adopters interviewed in 2012, cited the prospect of accessing credit was a key reason they opened an account². It wasn't long before competitors released their own

This brief features results from a study by Prashan Bharadwaj, William Jack & Tavneet Suri funded by FSD Kenya as well as recent national survey data from FSD Kenya, CGAP and Intermedia.

Bharadwaj, P., Jack, W. and Suri, T. (2018). "Can Digital Loans Deliver? Take Up and Impacts of Digital Loans in Kenya". Nairobi, Kenya: FSD Kenya.

Central Bank of Kenya; FSD Kenya; Kenya National Bureau of Statistics, 2016, "FinAccess Household Survey 2015", doi:10.7910/DVN/QUTLO2, Harvard Dataverse

Intermedia; Bill & Melinda Gates Foundation, "Financial Inclusion Insights Tracker survey", http://finclusion.org/data_fiinder/

1 See "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution", Tavneet Suri with William Jack, *American Economic Review*, 104 (1), 183-223.
2 Interviews with Kenya Financial Diaries respondents.



versions of the product and today Kenyan borrowers can access digital loans from over 20 providers from their mobile phones³.

The share of the mobile-owning, adult population actively using an M-Shwari account increased from 12.4 to 30.5 percent between 2013 and mid-2017 (Figure 1). Adoption grew fastest among mobile-owners belonging to the poorest 40% of the population, though usage of these accounts is still most likely among mobile owners in the wealthiest 20% of the population, among whom close to 1 in 2 use the service. By mid-2017, about 42 percent of the mobile owning population had used an M-Shwari account at some point in the past. Of this group, over two thirds had borrowed previously and one third were active borrowers⁴ corresponding to about 2.2 million adults nationwide (Figure 2).

Just as M-PESA had important effects – it is worth asking whether M-Shwari has produced any benefits or costs in the economic lives of its users. This research brief shares the results from a study that examined the impacts of access to M-Shwari loans on borrowing behaviour and on several welfare outcomes including consumption, asset ownership and ability to cope with unexpected shocks.



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Box 1: What is M-Shwari?

M-Shwari is a digital savings and loan banking product built on M-PESA and is offered through a partnership between the Commercial Bank of Africa and Safaricom. A major appeal of M-Shwari is that customers can access loans even if they do not have a banking or credit history.

The loans disbursed by M-Shwari do not require collateral, must be repaid within 30 days, and are charged a 7.5% facilitation fee. Loan approval is automated via a set of credit scoring rules that use the record of the applicant’s airtime and M-PESA transactions and the credit scoring process gives individuals a loan limit which increases on the timely repayment of loans. If a loan is not paid on time, the loan is extended for another 30 days with a 7.5% facilitation fee charged on the outstanding balance. After 120 days of non-payment, the borrower is reported to the credit bureau⁵.

M-Shwari savings earn interest of 7.35% per year, in line with the requirements of the 2015 Banking Amendment Act which requires bank deposits to earn a minimum interest rate of 70% the Central Bank Rate (CBR).

³ Kenya Commercial Bank (KCB) was the second digital lender with its KCB M-Pesa product which launched in 2015.

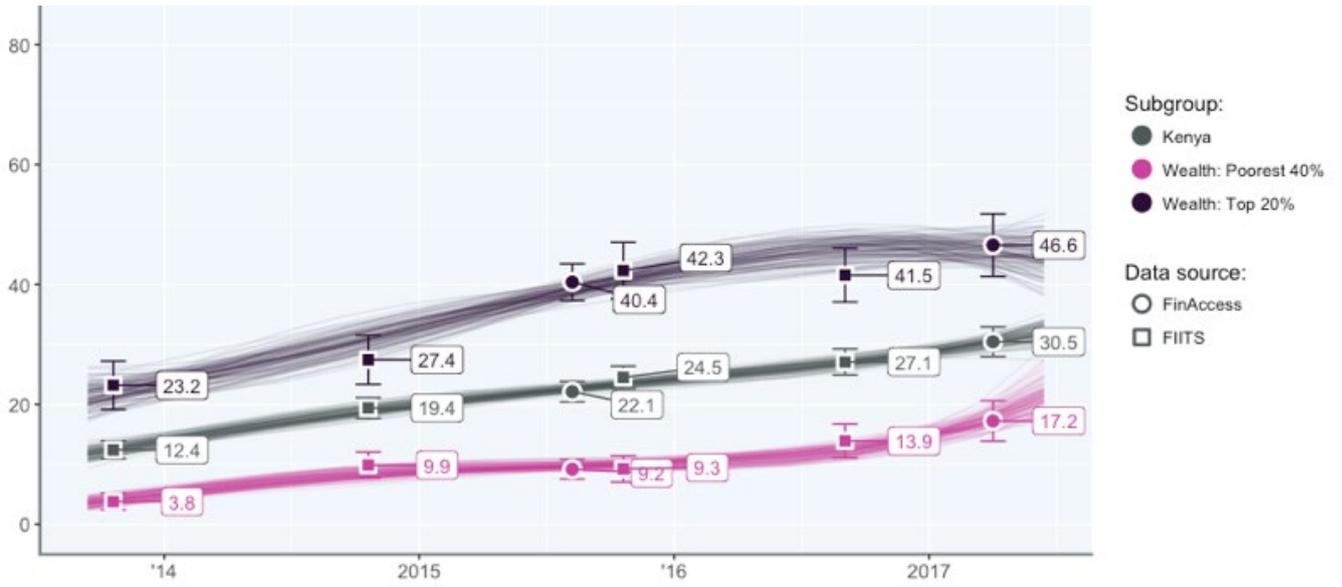
⁴ ‘Active’ borrowers denotes users of M-Shwari who had taken a loan from the service in the 90-days prior to their being interviewed.

⁵ See “How M-Shwari works, the story so far” by Tamara Cook and Claudia McKay for more details on M-Shwari.

Figure 1:

In just over 3 years, active usage of M-Shwari accounts almost doubled among mobile owners

The percentage of the adult [18+], mobile-owning, population that actively use M-Shwari (either savings or lending), overall and by wealth between late 2013 and mid 2017

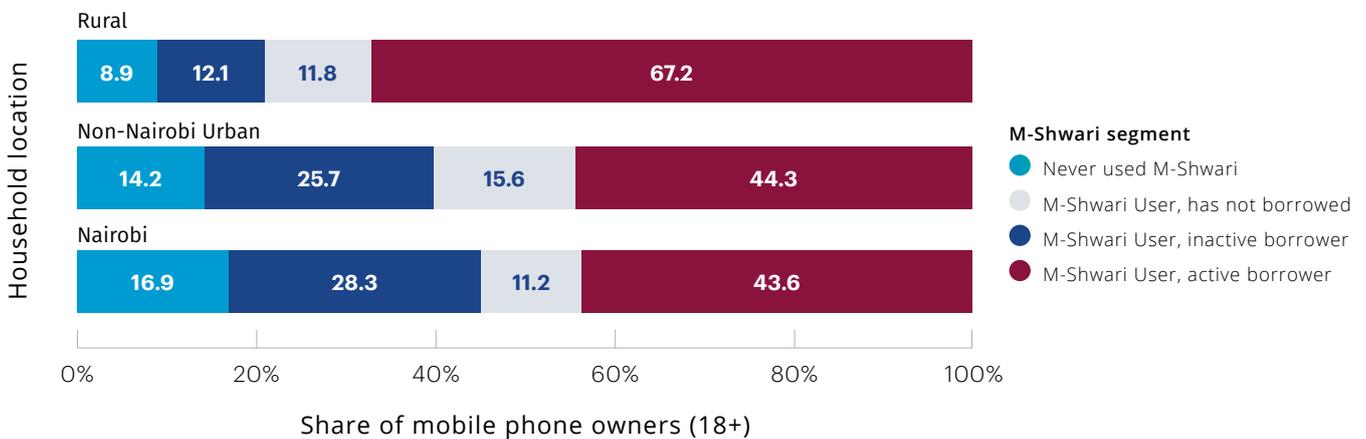


Source: FSD Kenya calculations based on FinAccess & Intermedia Financial Inclusion Insights Tracker Survey (FIITS) data. Notes: ‘Active users’ represents one of the following depending on the source of the data: (A) individuals who report they ‘currently use’ a service from a provider if the data source is FinAccess, (B) used a service in the last 90 days if the data source is FIITS. 100 simulation-based trends lines are displayed to show possible paths between data points in the evolution of M-Shwari over time.

Figure 2:

In 2017, close to 1 in 3 mobile owners who had used M-Shwari were active borrowers, corresponding to about 2.2 million adults. Mobile owners in urban areas are twice as likely to use M-Shwari than those in rural areas.

The percentage of the adult [18+], mobile-owning, population in different M-Shwari usage segments, by location (2017)



Source: 2017 FinAccess tracker, based on a sub-sample of 3,100 of the adults who participated in nationally representative 2016 FinAccess survey

Chapter 1 Methodology

To assess the impact of M-Shwari loans, the study compared new M-Shwari account holders who just barely qualified for loans to individuals who just barely missed qualifying for loans based on the credit scores they were assigned at the time of their enrolment. While loan access was not randomized in a controlled experiment, comparing people just above

and below the credit score required to qualify for a loan provides a good approximation to a randomized experiment. This is confirmed in the study by showing that people who just qualify and those who barely missed the credit-score cutoff are not statistically different across a range of observable characteristics (Table 1 displays a selection of these characteristics)⁶.

Table 1: Sample summary statistics from Safaricom transaction and survey data⁷

	Characteristic	Mean	Standard deviation
Household profile (survey data, N=4,136)	Household size (N)	4.4	2.4
	Girls in households (N)	1.02	1.2
	Boys in households (N)	0.92	1.1
	Adults in households (N)	2.5	1.3
	Age of household head (years)	37	12.7
	Education of household head (years)	10.8	3.7
	Education of household head's spouse (years)	10	3.6
Customer demographic profile (admin data, N=6,000)	Age of customer (years)	30.5	14.1
	Male (%)	48.3	50
Customer airtime, mobile money activity 6 months prior to M-Shwari account opening (admin data, N=5,000)	Total airtime top ups (KES)	4,670.5	4,478.5
	Total number of Okoa Jahazi loans (N)	16.8	41.4
	Days of airtime balance less than 2 KES (days)	103.6	54.3
	Total value of M-PESA transactions (KES)	4,047.2	11,607.5
	Average daily M-PESA balance in past 6 months (KES)	569.1	6,725.8
	Average daily M-PESA balance in past 1 month (KES)	607.2	6,638.1
	Unique recipients of M-PESA transfers from customer(N)	3.3	5.0
	M-PESA pay bill transactions (N)	3.0	13.3
	Unique billers paid (N)	0.45	0.99
	Transfers to/from linked bank accounts (N)	0.18	0.48
Customer physical assets (survey data, N=4,136)	Urban land owned (acres)	0.12	0.56
	Rural land owned (acres)	1.66	2.49

6 Only "pre-determined" characteristics are shown here, i.e. those that aren't likely to be affected by M-Shwari loans. For a full discussion of the balance between the treatment and control group please refer to the full report.

7 The study had access to full administrative data (credit-scores, M-PESA transactions and M-Shwari loan history) for the original 5,000 sampled individuals but not for 1,000 additionally sampled individuals that were drawn to make up for non-response.



A random sample of 6,000 individuals was drawn from all new M-Shwari account holders who enrolled between January and March of 2015 and whose assigned credit score was between -9 and 10, a narrow bandwidth around 0, the credit score cutoff which determines whether an account holder is eligible for loans (Figure 2).

Those individuals automatically assigned a credit score above 0 based on their transaction data (the 'treatment' group) were initially deemed eligible to borrow from M-Shwari and given a credit limit. Those individuals with a credit score at or below 0 (the 'comparison' group) were not initially eligible for borrowing⁸. Between September 2016 and January of 2017 all sampled individuals were called and asked to respond to a survey that collected information on consumption, assets, wealth, financial access, response to unexpected shocks and employment. Surveys were successfully completed with 69 percent of the sample⁹.

It is important to note that new M-Shwari account holders without access to loans when they enrolled may later qualify for a loan if they save in their accounts and those who initially qualify for loans do not necessarily borrow from M-Shwari. As it turned out, 21 percent of initially ineligible borrowers took at least one M-Shwari loan and 66 percent of initially eligible borrowers did not take an M-Shwari loan in the 18 month period after account opening.

As a result, the estimates of impact reported in the study represent intent to treat (ITT) effects: all sampled individuals initially eligible for borrowing (regardless of whether they actually used an M-Shwari loan) are compared to all sampled individuals initially ineligible for borrowing (regardless of whether they later became eligible and used an M-Shwari loan). From a methodological standpoint this ensures that the groups differ only with respect to their access to M-Shwari loans at the time they opened their accounts, ensuring unbiased, though possibly conservative, estimates of impact.

8 The use of 'treatment' and 'comparison' group is used here as a convenient shorthand, even though the borrowing status of the sample was not assigned deterministically by the researchers.

9 While just over 30 percent of the sample was lost to attrition, the attrition was not systematically different across the group just below and just above the credit score cut off. Or in other words, members of the sample who were eligible for M-Shwari loans at the time of their enrolment, were not more likely to not respond to the phone survey than those who were not eligible for loans.

Figure 2: M-Shwari impact study methodology to obtain 'treatment' and 'comparison' groups.

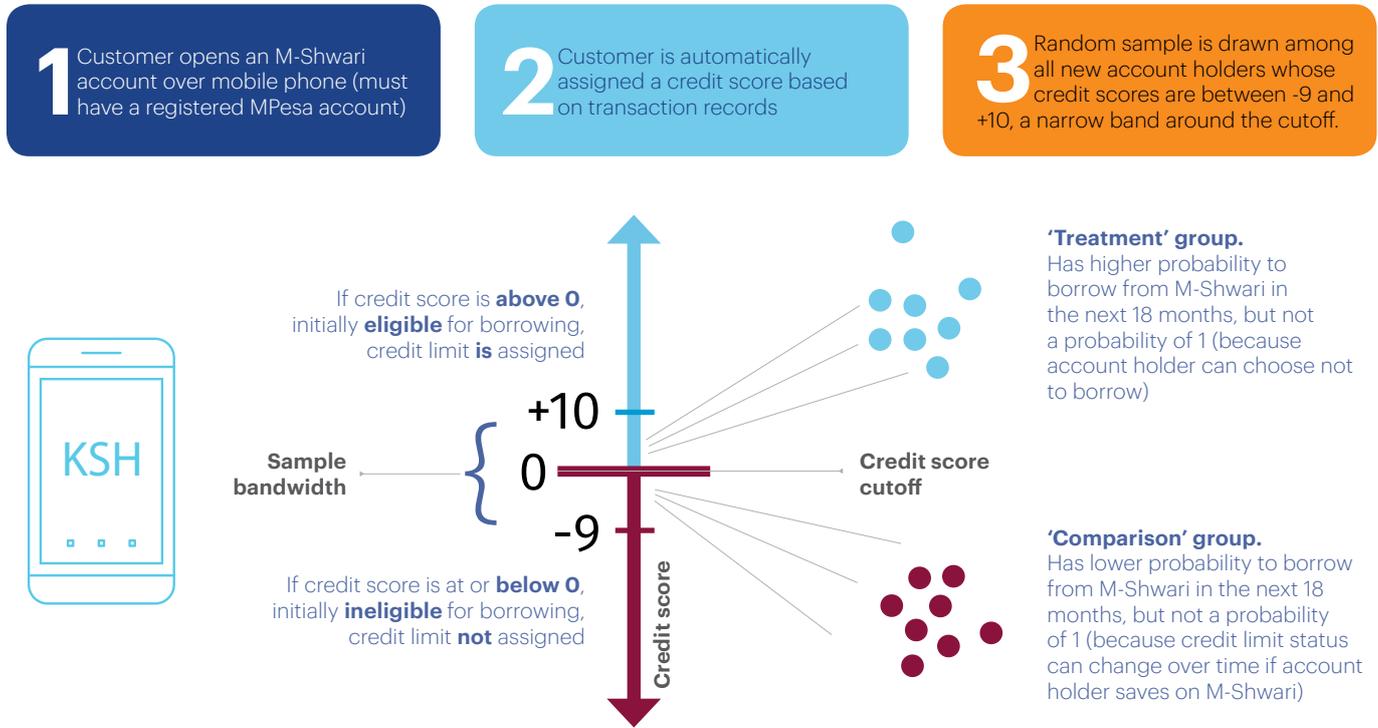
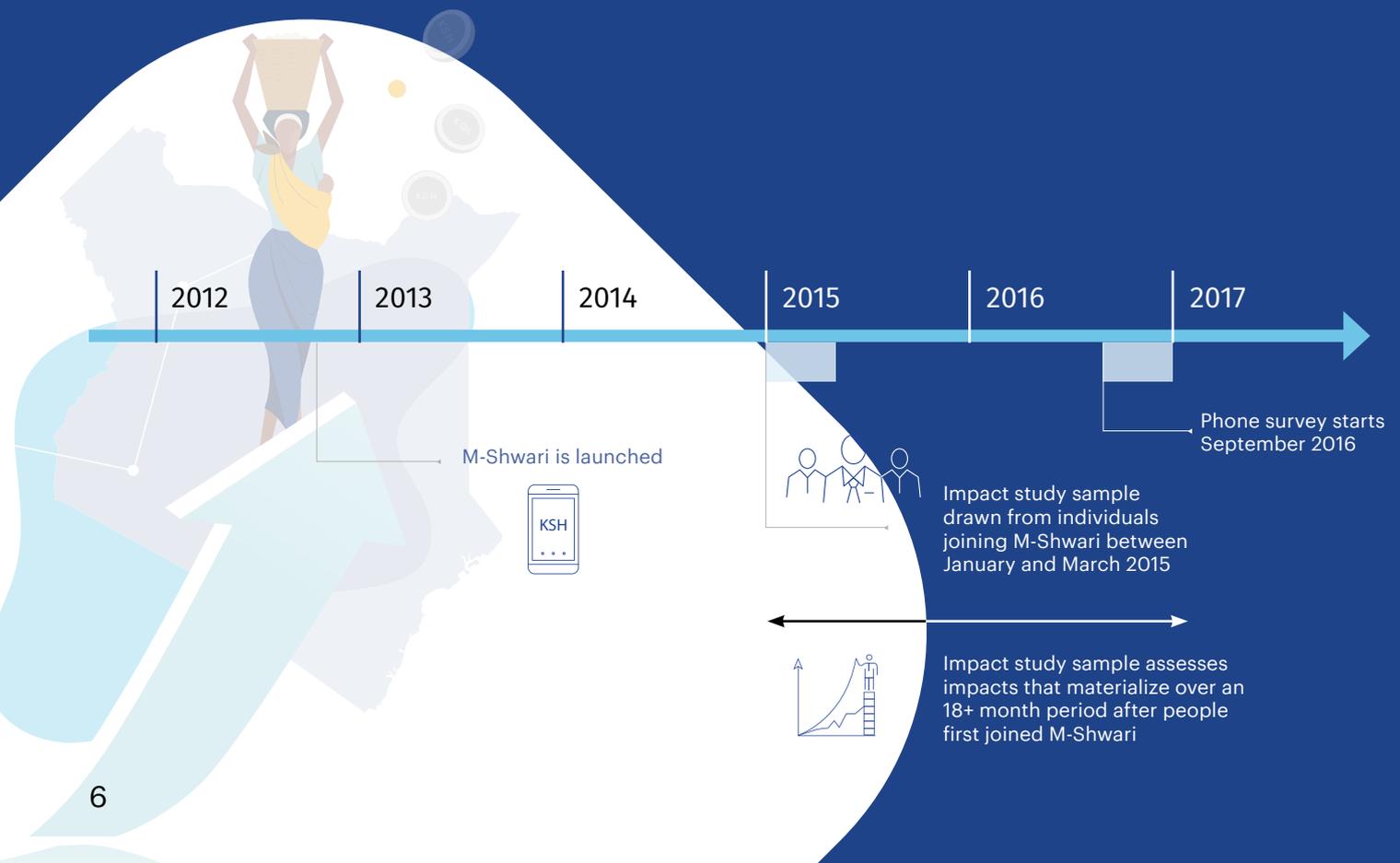


Figure 3: M-Shwari impact study time line



Chapter 2 Results

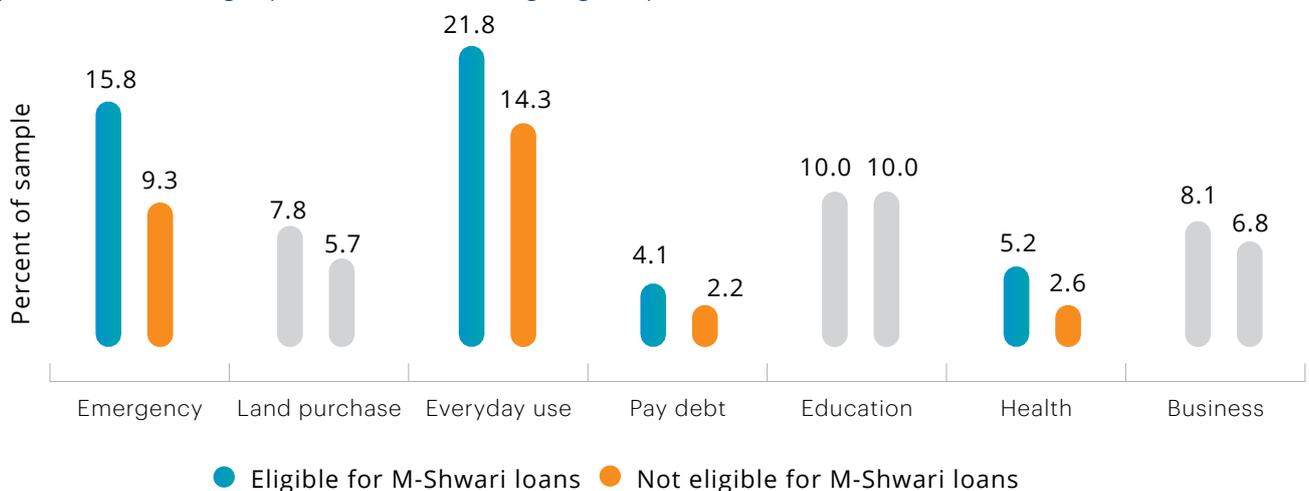
The study finds that 34 percent of the individuals eligible for M-Shwari loans end up borrowing from M-Shwari at least once in the subsequent 18 months and are nearly 11 percentage points more likely to receive loans from any source - a large impact given that 46% of the comparison group have any loans. Not only are individuals in the treatment group more likely to borrow, but they are also more likely to have taken out a larger number of loans over the 2 years prior to the survey (about 0.3 more loans than the comparison group, which had taken 0.8 loans per person on average)¹⁰. As expected, these additional loans are from M-Shwari and not from other providers, like ROSCAs, SACCOs or MFIs. Since individuals in the treatment group are more likely to borrow (and when they do, borrow more frequently) than individuals in the comparison group, they also hold larger total debt, though this impact is noisier, probably because the amount loaned by M-Shwari is ultimately small¹¹.

Individuals in the treatment group were statistically more likely than those in the comparison group to self-report having loans for emergency purposes and everyday use (and to a lesser extent to pay off other debts and for health purposes) but show similar levels for purchasing large assets, covering education costs or for a business (Figure 3). However, earlier literature



has found that the reasons people give for taking a loan are not very accurate as money is largely fungible and often loan recipients may want to report the loans being used for socially desirable purposes.

Figure 4: Individuals with greater access to M-Shwari loans are more likely to report having a loan for emergency and everyday consumption purposes
Purpose of loan-taking, by M-Shwari borrowing eligibility status at time of enrollment



¹⁰ The use of 'treatment' and 'comparison' group is used here as a convenient shorthand, even though the borrowing status of the sample was not assigned deterministically by the researchers.

¹¹ While just over 30 percent of the sample was lost to attrition, the attrition was not systematically different across the group just below and just above the credit score cut off. Or in other words, members of the sample who were eligible for M-Shwari loans at the time of their enrollment, were not more likely to not respond to the phone survey than those who were not eligible for loans.

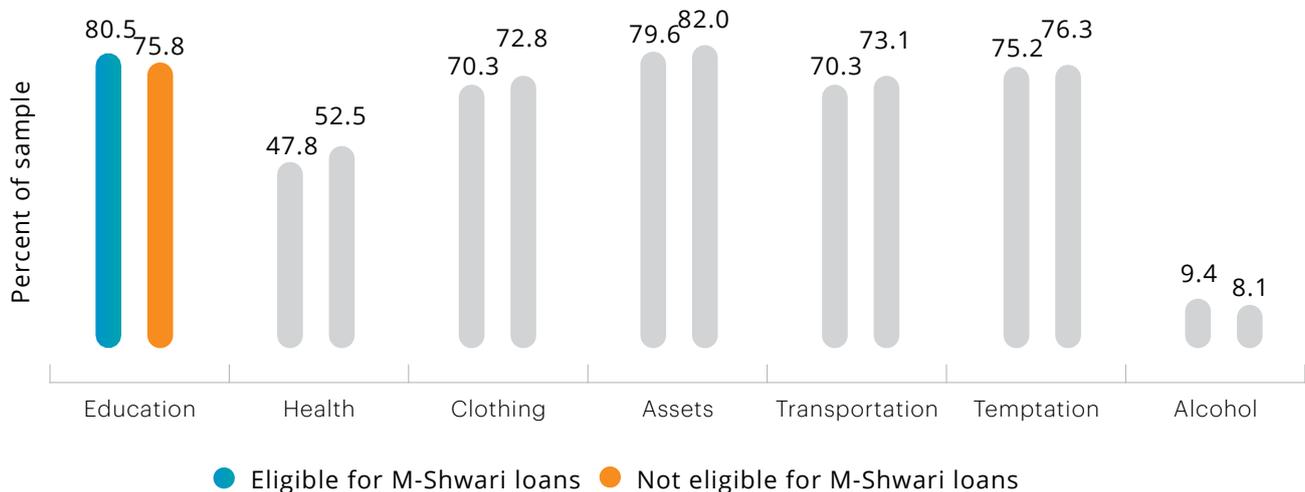
There was no evidence that M-Shwari loans increased household savings or wealth. No significant differences emerged between the treatment and comparison group in the number of savings instruments used by the household, whether households had any savings in the last month, in their current savings balance, in the total value of assets and in the value of productive assets¹².

Similarly, the study finds no effects on total expenditures,

food expenditures, and expenditures on basics¹³. However, the study did find a statistically significant impact on the propensity to spend on education¹⁴ (but no impacts on the propensity to spend on health, clothing, assets, transport, temptation goods¹⁵, and alcohol and cigarettes). Individuals in the treatment group are 4.7 percentage points more likely than those in the comparison group to report positive expenditure on education compared to households just below the cutoff (Figure 4).

Figure 5: Access to M-Shwari increases the likelihood that households spend on education

Propensity of consumption, by category and M-Shwari borrowing eligibility status



Notes: Propensity to consume is defined as the percentage of the sample that reports positive spending in a specific category. Only differences that are statistically different are shown in colour

The survey also collected data on how households responded to negative events. Households with individuals above the M-Shwari credit-score cutoff are less likely to report that expenses were foregone, in particular for all expenses and medical expenses (Figure 6). This indicates that M-Shwari loans are likely useful for mitigating the effects of shocks. However, looking at other adjustments households may have made in response to negative shocks, in particular

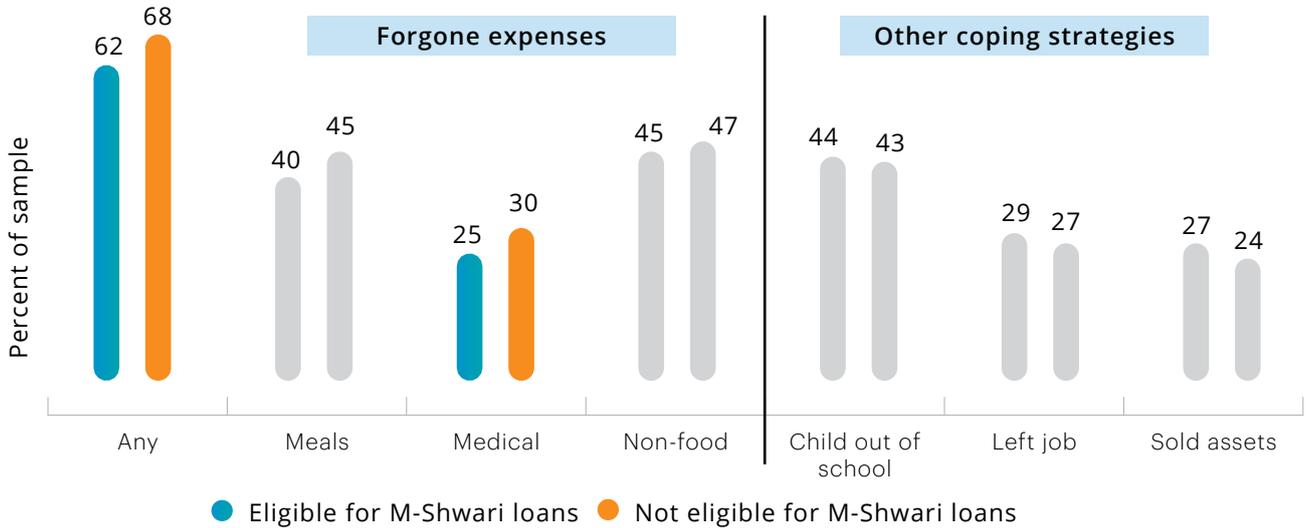
whether they removed a child from school, whether they left a job or whether they sold any assets, the study finds no statistically significant effects of M-Shwari.

Finally, the study looked at the employment status and the main sector of employment for the individual who received the M-Shwari loan, but finds no evidence that access to M-Shwari loans influences these labour market outcomes.

12 Productive assets include phones and accessories, livestock, computers and all types of vehicles.
 13 Basics includes expenditures on water, rent, electricity, any form of firewood, fuel, gas and electricity.
 14 This is defined as whether the individual reported positive household expenses in education as well as other spending categories.
 15 Temptation goods includes food consumed outside the household (whether purchased by the household or gifted), and alcohol and tobacco expenditures (both own expenditures as well as gifts). The study did not ask respondents about spending on gambling. With the rise of sports betting in Kenya, however, an open question is the degree to which easy digital credit encourages betting. Data from FSD Kenya's recent FinAccess tracker suggests that of the adult population who were either currently using a digital loan or used one in the past, the share who report using their most recent loan for betting is 2.7% (among urban 18-30 year olds the rate is 5.7%). If the most recent loan was M-Shwari, the likelihood of using the loan for betting increases somewhat: 2.8% overall and 6.2% for urban youths (male or female). So the FinAccess data suggests that overall about 1 in 35 M-Shwari borrowers are using the loans to finance betting. (The highest rate is for male, urban youths - close to 1 in 10 report using M-Shwari for betting). Given this data is based on self-reporting on the purpose of the loan, it is likely that the survey is under-estimated the true degree of betting with digital loans.

Figure 6: Access to M-Shwari decreases the likelihood that households forego medical expenses in the aftermath of a negative shock

Risk coping strategies in response to any negative shock in the past 6 months, by M-Shwari borrowing eligibility status



Notes: The sample in this analysis is restricted to the 90% who reported to have faced a negative shock. Negative shocks include the death or illness of a household member, accidental injury, loss of employment, failure or loss of business, death of livestock, crop disease, theft, fire, draught or flood. Only differences that are statistically different are shown in colour.

Conclusions

Overall, these results show that M-Shwari has high take up rates among those who are eligible and helps people to cope with shocks.

The high take-up rate of M-Shwari loans among a population with very low rates of adoption for other types of credit (around 5% of the study’s sample had loans from banks or ROSCAs and less than 2% had loans from MFIs) is striking. By comparison, loan take-up rates in 3 of 4 randomized evaluations of micro-credit were between 13 and 17%¹⁶ suggesting that loans that are convenient, private and short-term in nature are meeting a demand for credit that other formal providers have not been able to satisfy.



¹⁶ Banerjee, Abhijit, Esther Duflo, Rachel Glennerster, and Cynthia Kinnan. 2015. “The Miracle of Microfinance? Evidence from a Randomized Evaluation.” *American Economic Journal: Applied Economics*, 7(1): 22-53.

At least for users lower in the credit-score distribution, M-Shwari loans appear to be largely used to pay for schooling and for emergency purposes and not for consumption goods or the purchase of productive assets. Given the relatively low value and short-term nature of these loans, it is perhaps not surprising that the study finds no impacts on other measures of welfare like assets, wealth, or consumption. This is more salient given that the impact outcomes were measures 18 months after these individuals joined M-Shwari. So, while these are not truly long term effects, they are also not short term effects.

A valid concern at the outset of M-Shwari was that it would simply act as a substitute for other loan sources and that this might not increase the total amount of credit households have access to. However, this study finds that access to M-Shwari increases the number of loans held by households while not reducing the likelihood of borrowing from other formal or informal sources.

In summary, the primary impacts of M-Shwari documented here are

twofold: access to instant, low-value loans over a mobile phone enhanced people's ability pay for education (those who qualify for M-Shwari are approximately 5 percentage points more likely to have spent on education) and to smooth shocks (those who qualify for M-Shwari are nearly 5 percentage points less likely to forego medical expenses).

The study does not find impacts on other outcomes such as savings, employment and consumption which suggests that for users that are just above the cutoff for qualifying for M-Shwari, it has primarily helped households manage liquidity and bridge cash shortfalls in their finances rather than to invest and build assets that might lead to improvements in incomes and wealth.

Whether and how digital loans (perhaps of larger size or targeted for productive investments) can be more supportive of longer-run improvements in welfare, without placing undue debt stress on borrowers, is a question going forward for digital lenders, policymakers and researchers.



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About FSD

The Kenya Financial Sector Deepening (FSD) programme was established in early 2005 to support the development of financial markets in Kenya as a means to stimulate wealth creation and reduce poverty. Working in partnership with the financial services industry, the programme's goal is to expand access to financial services among lower income households and smaller enterprises. It operates as an independent trust under the supervision of professional trustees, KPMG Kenya, with policy guidance from a Programme Investment Committee (PIC). Current funders include the UK's Department for International Development (DFID), the Swedish International Development Agency (SIDA), and the Bill and Melinda Gates Foundation.



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