Evaluating the Impact of Microfinance on Health Decisions

Robert Fluegge

Harvard University

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Abstract

This paper attempts to understand the impact that improved access to microfinance services has on health decisions for low-income communities in developing countries. Using data from a randomized trial in 104 slums of Hyderabad, India, regression-based investigation found no evidence that health decisions changed significantly for households in the communities after 15-18 months of improved access to microcredit. Specifically, there were no statistically significant differences between the treatment and control groups in the probability that a household purified their water or had health insurance of any kind. There was a statistically significant increase in the probability that a household uses a latrine in the treatment group, but the effect was quite small. Collectively, it appears that access to microfinance has little impact on health behaviors for members of low-income communities.

1 Introduction

Microfinance, here defined as small-scale lending typically provided to low-income women in developing countries, has gained enormous public popularity in the past decade as a potential tool development tool. Starting largely with the award of the 2006 Nobel Peace Prize to Grameen Bank, a non-profit microfinance institution based in Bangladesh, microfinance has been touted as an avenue towards the end of poverty around the world. The idea, largely pushed by popular economics publications like Muhammad Yunus' "Creating A World Without Poverty" (Yunus & Weber, 2014),

has caught the eye of the public and policymakers as an alternative to traditional humanitarian aid.

But with all of the hype surrounding microfinance, there is a surprising paucity of economic literature devoted to rigorous analysis of the economic and social impacts of access to credit for impoverished communities in developing countries. In particular, there is almost no evidence on the effects that access to microfinance can have on the health behaviors of members of these communities. It has been well established that individual and public health are an important indicators of the overall development of a country, as can be seen in the Millennium Development Goals published by the United Nations ("United Nations Millennium Development Goals," 2014). This paper attempts to address the lack of evidence surrounding microfinance using data from a randomized trial in India conducted from 2005-2007. Specifically, the goal is to determine how the health behaviors of households in a low-income community change with access to a microfinance program using regression analysis. The evidence can hopefully separate myth from fact in order better inform NGOs, policymakers, and the general public about the real effects of access to credit for low-income communities.

2 Literature Review

As previously stated, there is a surprising lack of evidence surrounding the health effects of access to microfinance. Of those academic publications that do exist, a majority focus on institutions that pair microfinance with other health services. For example, a study on microfinance paired with health education services found positive health changes across a number of indicators ("Leatherman & Dunford, 2014). However, these inquiries do little to isolate the effects of microfinance itself, which is critical to know because microfinance can be scaled far more easily and profitably if it is not paired with not-for-profit services. Another segment of the literature on the relationship between microfinance and health focuses on women's empowerment, particularly the reduction of domestic violence. Most of these publications are based on a study of microfinance and domestic partner violence in South Africa (Kim, 2014), which found that access to microcredit indeed can reduce

intimate partner violence significantly. While this is certainly an important result, this study fails to paint a picture of the effects of microfinance on more general health behaviors.

There are in fact a few studies on microfinance that mention the health effects of credit alone, but they do so in passing and without sufficient specificity. For example, the paper published by the designers of the Spandana trial in India in 2007, which is the data set that this paper uses, says simply that the authors did not find any health differences between treatment and control groups (Banerjee, 2014). Nowhere in the literature review undertaken for this paper is health behaviors or decision-making mentioned at all. That lack of analysis on the impact of microfinance on health behaviors and the superficial treatment of health in the microfinance literature in general forms the inspiration for this paper.

3 Conceptual Background

The economic rationale behind a credit market is simple. Credit allows people or organizations to smooth their consumption over time rather than consuming large amounts at some points and consuming little at other times. This is generally viewed as maximizing consumer utility. For example, a person buying a house will take out a loan and pay it back in small increments over time so that their expenditures do not change drastically at the time of the purchase. At its essence microfinance allows low-income consumers to do the same, although many institutions provide the loans for the explicit purpose of investing capital in a self-run business. Investing in a self-run business will ideally increase the income of the consumer as it will make the business more profitable and allow the business to grow in ways that were not possible with its previous revenue stream.

The necessity of credit to grow a small business in a low-income area can be thought of as part of what economists term the poverty trap. The poverty trap usually describes the situation in which a low-income person does not have enough resources to invest. Investment in this context often describes investment into human capital, such as further education, which allows the individual to increase their income in the future. Without sufficient wealth or income to invest, a low-income person has no way to increase their human capital in order to generate more income, and thus

becomes trapped in their low-income state. In the context of a developing country like those that this paper investigates, the high prevalence of unofficial self-run businesses means that low-income individuals do not have the ability to invest either in their own human capital or in their business, and so their business is 'stuck' with extremely low profits and the individual remains with little income.

The other important economic theme of this paper is the link between wealth and health outcomes. It is clear from sources like the United Nations and the World Health Organization that country-level income is strongly correlated with a variety of public health indicators ("United Nations Millennium Development Goals," 2014). Furthermore, individuals with greater wealth tend to have better health outcomes across the world. However, the causal link is far less understood. Based on a review of the literature, it is generally assumed that causality extends in both directions. Greater wealth causes better health because wealth improves access to health services, and better health causes greater wealth because a healthy person is more productive and will often have a higher income as a result. In low-income settings like those discussed in this paper, the causality is likewise assumed to extend in both directions.

Microfinance might affect the health behaviors of those receiving the loan in two competing ways. First, since a microfinance institution is intended to increase the income of the individuals it serves, the changes in health behaviors depend on whether 'health' when viewed as a consumable good should be considered a normal good for this level of income. If a person in a low-income community tends to view health as a normal good, we should see an increase in behaviors associated with health consumption as income increases. Based on the fact that health generally increases with income, it is safe to assume that health is indeed a normal good. However, the analysis must also take into account the fact that loans allow people to smooth consumption even when buying a potentially expensive good. It might be the case that with a loan it is now possible for the person receiving the loan to buy a relatively expensive item, and that person buys the item by reducing the rest of their consumption over the period of time that they pay the loan back. This effect would tend to decrease the resources devoted to 'health' as a good because those resources would instead be devoted to repaying the loan. This effect will be particularly acute if the income of the individual

receiving the loan does not appreciably increase over the repayment period. Since these two effects act in opposite directions, it is difficult to tell from theory alone whether health behaviors will change with access to formal microfinance for low-income individuals in developing settings. This fact makes empirical analysis of the issue all the more important.

4 Methods

The data used in this regression analysis comes from a randomized controlled trial performed by researchers affiliated with the for-profit microlender Spandana in Hyderabad, the fifth largest city in India, from 2005-2007.[1] The researchers identified 104 "slums", also called "areas", that Spandana would be indifferent towards providing loans to. Each area contained between 46 and 555 households. The areas are characterized as "poor, but not the poorest of the poor" (Banerjee, 2014) and were non-adjacent to minimize spillover effects. The study purposely excluded areas with large densities of people that Spandana believed would be particularly profitable and areas that contained a large share of workers in migrant industries like construction because of difficulties tracking down migrant clients for repayment of the loan. Starting in 2005, Spandana began opening branches in 52 randomly selected areas out of the 104 total. In 2007, after between 15 and 18 months of the branch being opened, the researchers surveyed on average of 65 households per area for a total of about 6,850 households. The survey took between 1-2 hours to administer and contained questions on residents of the household, expenditures, business activities, and behaviors. Only people who had been living in the area since Spandana had introduced a branch in 2005 were surveyed. Because households in the treatment group were selected to be surveyed based on baseline data that Spandana had collected on the area in 2005, households in the treatment group were more likely to be Spandana clients. Therefore, the results from each area are weighted in the regression according to account for the increased probability of selection of Spandana clients. The data from each area are clustered to account for similar characteristics.

The structure of the loans was based on a group model developed at Grameen Bank. Spandana

[1]The methods outlined in the section are described fully in Banerjee, Duflo, Glennerster & Kinnan, but also briefly in references Banerjee, Karlan, & Zinman and "Primary Menu."

lent to women aged 18-55 who had lived in the area for at least a year. Each received about Rs. 10,000, which is equivalent to $200 at the 2007 exchange rate or $1000 adjusted for purchasing power parity. The interest rate was approximately 12%, to be paid back over 50 weeks. The recipients of the loans were required to form groups of 6-10 on their own, and each group was responsible for the loans all its member. This grouping tends to select for women who are more likely to repay their loans, or at least selects for women whose peers view them as more likely to repay their own loan. A collection of 25-45 groups formed a center, and each center met periodically to discuss and conduct repayment. The Spandana loan is slightly different from loans provided by most other microfinance institutions in that it does not require the women to own or start a business, although the explicit expectation of Spandana executives was that the loan recipients would indeed use the money for business purposes. From the point of view of the researchers who designed the study, this type of loan allows for analysis of the effects of access to credit alone without the interfering effects of additional services or requirements.

5 Relevant Prior Results

The authors of the original paper based on the study make several notes that are important for this paper's analysis of the data. First and most importantly, there were other lenders and microfinance organizations operating in both the treatment and control groups both at the start and throughout the trial. At the time of the survey, a full 89% of households had an outstanding loan of some kind. Although the usage of formal microfinance programs was only 18.4% in the control group (8.4 percentage points lower than the treatment group), analysis cannot hinge on access or lack of access to credit. Instead, regression demonstrates the "intent-to-treat" effect of putting a branch into the area and actively attempting to expand microcredit to the residents (Banerjee, 2014), which did in fact increase the ease and availability of microcredit products for the area. It is also possible that the characteristics of the people who already had microfinance may be different than the characteristics of those who utilize the service when access is easier, which tempers the analysis somewhat.

Second, it is important to keep in mind that this trial was carried during a period of extremely rapid economic growth in Hyderabad. From 2005-2008, real average household consumption increased by more than 100% (Banerjee, 2014). While level of growth might certainly be realistic for many of the communities in which institutions have an interest in establishing microfinance services, the trial will be less useful when trying to understand the effects of microfinance in a stagnant or low-growth setting.

Third, it is important when analyzing effects from this trial to note that the uptake of microcredit services was relatively small and in some cases took the place of other lenders. It appears that no more than 35% of this eligible population will actually utilize microfinance at a given time, which is a far cry from the 80% expected utilization and is lower than the uptake seen in the few other randomized trials of this type (Banerjee, Karlan, & Zinman, 2014). This means that any intent-to-treat effects will not show up as strongly in the data as it would if the uptake were higher. However, it is still true that microfinance utilization was 8.4 percentage points higher in the treatment group than in the control group (26.7% to 18.4%) so there is certainly a statistically significant intent-to-treat effect. It appears that often official microfinance institutions will take the place of existing community lenders rather than provide credit where there was none before. The number of consumers who borrow from informal sources decreased in the treatment group, and there was no statistically significant effect on overall amount borrowed (Banerjee, Duflo, Glennerster & Kinnan, 2014).

The original study also produced relevant results with respect to income and female empowerment that we might expect to prefigure our results. In the treatment group there was not a large increase in business profits, but profits did increase markedly for businesses that were already profitable, specifically those above the 95th percentile of profitability (Banerjee, Duflo, Glennerster & Kinnan, 2014). Furthermore, there were more businesses created but they tended to be smaller and less profitable than average. This may be due to the fact that the treatment likely had the biggest effect on the marginal clients: many of those who could put a loan to good use may have already gotten a loan from somewhere before treatment, which leaves only those who will take a loan if the cost is low but not if the cost is high (cost here being the economic cost including finding a

loan, traveling outside the neighborhood if necessary, etc). After treatment, businesses were slightly more likely to be female-run but no more people were employed by businesses than before (Banerjee, Duflo, Glennerster & Kinnan, 2014). Finally, labor supply in treatment groups increased, with the household head and their spouse contributing on average about 3 more hours per week to self-run businesses. With these results in mind, this paper will now examine the intent-to-treat effect on health behaviors.

6 Results

This analysis uses regression to determine the effects of improved access to microfinance services on health behaviors. There were 4 variables of interest: use of latrines, purification of water for adults, purification of water for children aged 0-2, and purchase of health insurance. The use of latrines and purification of water are general measures of health behavior that might prevent disease and are influenced by the Millennium Development Goals ("United Nations Millennium Development Goals," 2014). Purchase of health insurance includes both traditional health insurance as well as medical/accident insurance. Summary statistics for these dependent variables can be found in Table C. The regression used, which is the same format as the original paper from this data set (Banerjee, Duflo, Glennerster & Kinnan, 2014), was set up as follows:

$$y_{ia} = \alpha + \beta * Treat_{ia} + X'_{ia}\gamma + \epsilon_{ia} \tag{1}$$

Where y is an indicator variable for presence of behavior in household i and area a, Treat is an indicator variable denoting whether or not the household was in a treatment area, β is the intent-to-treat effect, $X'_{ia}\gamma$ is the control variables and their coefficients, and ϵ_{ia} is the error term.

This analysis used several control variables, some at the area level and some at the household level. At the area level the regression controlled for number of households in the area, probability that an adult in the area was literate, probability that the head of a household was literate, and the number of resident run businesses. At the household level the regression controlled for number of people in the household and ownership of cell phones and a fridge, both of which are proxies for

the wealth of the household because no income data was collected. The summary statistics of all the control variables can be found in Table B.

The regressions found no statistically significant changes in either water purification variable or in the health insurance variable, but did find a statistically significant increase in the use of latrines among households in the treatment group. The effect on latrine usage was quite small: a resident of a treatment area was about 2% more likely to use a latrine than not use a latrine, with a 95% confidence interval of approximately (.008,.031). There were no statistically significant effects at all when the regressions were run without control variables. The R-squared values for the controlled regressions were quite low, with most in the range .02-.05. This was expected because health behaviors vary wildly from person to person with little explanation, and will be difficult to fully explain using only the variables available. However, this paper argues that even with relatively small R-squared values the regressions do explain enough of the variation to be useful. A full list of the results from the regressions can be found in Table A.

The control variables in the regression were chosen to account for various differences between both households and areas that might affect health behaviors. At the area level, the analysis controlled for number of households, proportion of adults who are literate, proportion of heads of households who are literate, and the number of businesses. A larger number of households might increase the likelihood that households split the cost of health goods like latrines, and therefore might be more likely to use a latrine. A higher proportion of literate adults and literate heads of households generally means a more educated community and leadership, which might be more knowledgeable about positive health behaviors. The number of businesses in a given area might indicate the amount of time or resources that residents put into their businesses, which might take the place of other health behaviors.

At the household level the regressions controlled for number of people in the household and ownership of cell phones and a fridge. The number of people in a given household might change the amount of resources that the household is able to devote to each person, and could potentially affect the investment into health-producing goods. Ownership of a cell phone or a fridge is used here as a proxy for the wealth of the household because neither income nor wealth data was collected.

7 Discussion

It appears based on regression analysis that access to microcredit does not significantly impact the health behaviors of households in a low-income community. This might have been expected from the relatively modest changes in business profitability observed in the previous study based on this data (Banerjee, Duflo, Glennerster & Kinnan, 2014), but is an important result in its own right. Since average business profits did not change appreciably for most businesses as a result of the trial, most residents did not see a large increase or decrease in income as a result of the loan. The relatively small change in income for most people means that few clients have extra resources to devote to health-related activities. Those that did profit from the loan tended to already control profitable businesses before the loan was provided and in all probability already had 'good' health behaviors.

The probability that a household uses a latrine was the only health behavior that increased in the treatment group compared to the control group. This is an interesting result that does not seem to have a clear explanation, but it is important to point out that this behavior is different from the other health behaviors in potentially significant ways. Out of the four dependent variables studied, use of a latrine might be the most instantly rewarding behavioral change because there is often a level of shame or repulsion involved with not using a latrine. And unlike the other indicators, use of a latrine may not require a significant financial investment because they can be built by community members using pooled resources. Ultimately, however, the change in probability of using a latrine, while statistically significant, is not particularly important in this case because the coefficient in the regression is so low. An increase of 2% in the number of residents who use a latrine is not cause for celebration and in reality will have little effect on the disease burden that the community faces.

All of these conclusions add further evidence to the notion that microfinance alone is not the 'cure' for poverty. Without a significant change in the health behaviors of a low-income community in a developing country, that community will struggle grow economically and socially as fast as it might otherwise. These results support the general consensus found in academic microfinance literature that microfinance does not have the incredible benefits its proponents once believed it to.

As such, it is limited as a development tool (Banerjee, Karlan, & Zinman, 2014).

It is important to note that while health behaviors did not appreciably increase, they also did not decrease. As discussed in the Conceptual Background section, the changes in consumption that accompany loans might very well reduce investment in health-producing activities. An individual receiving a loan might decide to reduce their consumption of, for example, water filters in order to pay back a loan that they took out from a microfinance institution. The regressions here show no statistically significant evidence of such an effect. One might argue, however, that while there was only one statistically significant result, each of the coefficients on the other 3 variables were negative. It is possible that with more power or in a different set of circumstances such effects might be significant, and it is certainly true that the topic merits further investigation.

There are several potential limitations to the analysis conducted based on these regressions, most of which have been alluded to already. First, the fact that there were a number of informal lenders and a few microfinance organizations operating in both the treatment and control groups throughout the process means that we cannot make a definite conclusion about the effects of absolute access to microfinance products. Instead, we can only look at the intent-to-treat effect in the population.

Second, the trial was conducted during a period of strong economic growth in Hyderabad, so the conclusions drawn from the data may not reflect the effects of improved access to microfinance in low-growth situations. It seems likely, however, that many applications of microfinance will be in similarly high-growth contexts, and this analysis is useful for those contexts. Furthermore, because the regression attempts to control for household wealth using indicators like ownership of a cell phone or fridge, the results may generalize to stagnant or low-growth situations as well as high growth ones. However, since the controls are imperfect measures of wealth, generalizations to low-growth settings should be made cautiously.

Third, as discussed in the Prior Relevant Results section uptake of microfinance products in the treatment areas was relatively low compared to similar randomized trials. This means that the power of the regressions is reduced.

Fourth, this trial only investigated the effects of pure access to credit, and does not draw conclusions on microfinance programs that are paired with other development initiatives like educational

programs or requirements to start a business. It seems likely based on some preliminary studies that microfinance does not interfere with the effects of humanitarian programs ("Leatherman & Dunford, 2014), but more research into specific health behaviors is needed in this area before definitive conclusions can be drawn. It is also important to realize that the timeframe analyzed was only 15-18 months after introduction of the branch, and it is possible that changes in health effects will take hold after a longer period of time. It seems likely that if microfinance does in fact increase income in the long term, development indicators like health behaviors will change as well. This paper's analysis is limited to the short term effects of improved microfinance access on health behaviors.

Finally, since every person in the sample population was living in the same city and was presumably part of the same 'culture,' there might be problems when generalizing these results to other countries with other cultures. Comparisons of results in the original paper published on this data to the results of other randomized trials across the developing world are similar, which lends some confidence to the idea that results on health behaviors is likely also consistent, but it is important to keep in mind that behavioral reactions to microfinance might differ across different cultures. As such, attempts to generalize these conclusions worldwide must be undertaken with a healthy caution.

8 Conclusions and Implications

As a whole, the evidence from this trial indicates that improved access to microfinance does not appreciably encourage or discourage health-related behaviors. The explicit aim of this paper is to provide private entities, policymakers, and the general public with a greater understanding of the true effects that access to microcredit has, and the information should inform both private decisions and policy debates. It appears that, consistent with analyses of other development indicators in microfinance trials, microfinance alone will not solve poverty or health problems. Microfinance as a development tool should be shown for what it is: an imperfect but probably positive part of the solution. It is also abundantly clear that the evidence on the health effects of microfinance

is simply too sparse to make any truly conclusive statements about causality. Further research must be undertaken, in different cultures and circumstances and for longer periods of time, before a verdict can be reached. This paper's most ardent recommendation is increased funding of trials like the one discussed here so that the question can be more fully explored. Until then, no definitive statements can be made.

Table A: Regression on Health Behaviors by Household

Dependent Variables (binary, household):	Household has Health Insurance		Household uses a Latrine		Water Treated for Adults		Water Treated For Children Aged 0-2	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Controls	No Controls	Controls	No Controls	Controls	No Controls	Controls	No Controls
Independent Variable:								
Treatment Group (binary, household)	-0.0267	-0.00215	0.0199***	0.00920	0.00507	0.00592	-0.00252	-0.000364
	(0.0564)	(0.0592)	(0.00588)	(0.0223)	(0.0233)	(0.0279)	(0.00429)	(0.000690)
Controls:								
At least 1 child ages 0-2 (binary, household)							0.486***	0.484***
							(0.0312)	(0.0318)
Treatment/Child interaction (binary, household)							-0.00729	-0.00600
							(0.0399)	(0.0406)
Household owns a cell phone (binary, household)	0.0470***		0.0463***		0.0966***		0.0233***	
	(0.0120)		(0.00617)		(0.0138)		(0.00621)	
household owns a fridge (binary, household)	-0.0142		0.0337***		0.192***		0.0334***	
	(0.0161)		(0.00765)		(0.0164)		(0.00827)	
number of households (area)	-0.000245		0.000115***		2.02e-05		-6.66e-05**	
	(0.000232)		(2.21e-05)		(8.69e-05)		(2.84e-05)	
Proportion of adults who are literate (area)	-0.194		0.278***		0.0311		0.0821	
	(0.593)		(0.0638)		(0.238)		(0.0830)	
Proportion of household heads who are literate (area)	-0.0699		0.0614		0.434**		0.0762	
	(0.495)		(0.0535)		(0.219)		(0.0699)	
Number of businesses (area)	0.00372*		-0.00163***		-0.000311		4.08e-05	
	(0.00201)		(0.000193)		(0.000586)		(0.000224)	
Residents in each household (household)	0.00138		0.000829		-0.00454		0.000936	
	(0.00276)		(0.00136)		(0.00293)		(0.00202)	
Constant	0.311	0.217***	0.685***	0.933***	0.00358	0.391***	-0.113***	0.000784
	(0.227)	(0.0450)	(0.0240)	(0.0145)	(0.0962)	(0.0228)	(0.0318)	(0.000548)
Observations	6,790	6,791	6,787	6,788	6,789	6,790	6,790	6,791
R-squared	0.028	0.000	0.052	0.000	0.056	0.000	0.429	0.420
Number of Clusters	104	104	104	104	104	104	104	104

Notes

(a) This table presents the results of the regressions on all four outcomes both with controls and without controls

(b) Variables marked with a (binary) tag are binary variables, all dependent variables are binary

(c) Variables marked with an (area) tag are averages over each area, variables marked with a (household) tag pertain to each individual household, all dependent variables are defined by household

(d) Each regression uses the same controls except for the regression on whether the household treats the water that children ages 0-2 drink, which controls for whether or not there is a child in that age range and includes a an interaction term that is the product of the independent variable and the presence of a child in that age range

(e) Robust standard errors in parentheses

(f) *** p<0.01, ** p<0.05, * p<0.1

Table B: Control Variables Summary

Area Variables	**Mean**	**Std. Dev.**	**Min**	**Max**
Number of Households	309.9	147.2	46	555
Proportion of Adults who are literate	0.65	0.09	0.4	1
Proportion of Heads of Households who are Literate	0.69	0.11	0.4	1
Number of Business in the Area	36.1	18.1	4	97
Household Variables				
Does the Household Treat Water for Adults (binary)	0.52	0.5	0	1
Does the Household Have a Child Aged 0-2 (binary)	0.21	0.41	0	1
Does the Household Own a Cell Phone (binary)	0.65	0.48	0	1
Does the Household Own a Fridge (binary)	0.18	0.38	0	1
House Many People Live in the Household	5.61	2.12	1	26

Notes (a) This table provides summary statistics for all of the control variables used, grouped by whether they are measured by area or by household (b) Variables noted with the tag (binary) are binary variables

Table C: Dependent Variable Proportions by Treatment Group

	Mean		Std. Dev	
Dependent Variables:	Treatment	Control	Treatment	Control
Latrine Usage	0.94	0.93	0.24	0.25
Treat Water for Adults	0.39	0.39	0.49	0.49
Filter Water for Children Ages 0-2	0.99	0.1	0.3	0.3
Have Insurance	0.2	0.22	0.4	0.41

Notes (a) All outcomes are treated as binary in the regression so numbers in the table refer to proportions of the population that exhibit this behavior

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