

**THE EFFECTS OF MICROFINANCE PROGRAM PARTICIPATION ON INCOME
AND INCOME INEQUALITY: EVIDENCE FROM GHANA**

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ABSTRACT

Microfinance programs are increasingly publicized as one of the most successful tools for development with the ability to positively affect its participant's economic and social status. Measuring this impact can be difficult, and the programs have been criticized for not reaching the poorest of the poor. This paper studies the effect of participation in microfinance programs on incomes using a regression model. The model found that there is a significant positive relationship between microfinance program participation and log income. It provides evidence that participation leads to 10% higher incomes in the participants. The change in standard deviation over time though shows that the change in standard deviation is highest for the participation group. A kernel density graph provides more insight into the income distribution, but the results are still unclear as to participation's effect. These results provide evidence that microfinance programs may lead to higher incomes, but also higher income inequality.

INTRO

Microfinance is becoming one of the most popular tools for development. It is important to understand the effects of microfinance programs are participants, but also its possible effects at reducing poverty and leading development. In order to understand this, I analyzed a dataset from Freedom from Hunger (FFH) to determine the effect on income and income distribution. I replicated FFH's results finding there are higher means for income among the group of participants vs. non participants and control groups between the baseline 1993 survey and the follow up 1996 survey. However, the participant group had the highest percentage increase in standard deviation of log income of 135% between the baseline and follow up surveys which provides evidence that microfinance programs may also change the income distribution of the group. Although no program is going to be successful in helping everyone, if microfinance is being publicized as a program that can help the poorest of the poor it is important for these programs to analyze who they are helping and by how much.

LITERATURE REVIEW

Microfinance is a term describing small savings and loans institutions or programs. Microcredit is the most popular type of microfinance programs which only provide lending services and no savings. In recent years, microfinance has gained popularity as a possible solution to this problem. The United Nations Capital Development Fund estimated that there are 7,000 Microfinance Institutes lending to over 16 million people while the market for microfinance may be as large as 400 to 500 million people. Institutions that practice microfinance generally aim to fill in the gap between commercial banks who lend to the wealthy or middle class and money lenders who lend to the poor at exorbitant interest rates. Many of the poor who lack credit and collateral have no access to financial markets, although they could benefit greatly from savings, investment and loans.

Microfinance has also been targeted as one of the few successful kinds of programs for developing countries. Recently, Muhammad Yunus won the Nobel Peace Prize jointly with the Grameen Bank, widely recognized as one of the first microfinance banks established (NYT, 2006). The Norwegian Nobel Committee 2006 believed that “Yunus and Grameen Bank have shown that even the poorest of the poor can work to bring about their own development”. If it were true that microfinance could provide financial access for the poorest of the poor, there is evidence to show that it would be very beneficial. Hernando de Soto 2000 argues that the poor are asset rich, but lack the means to convert these assets into investment and capital because of their inability to access the credit market. De Soto suggested property rights as a solution, but Galiani and Schargrotsky 2005 found that in a natural experiment in Argentina even with property rights the poor could not use this property as collateral to gain access to financial markets. Microfinance banks have been proposed to bridge the gap and provide the poor with small loans and savings.

There is a major debate though over whether microfinance is able to significantly help the poor access financial resources and break out of poverty. The results of serious studies in this area are mixed. Zaman 1998 found that microfinance is not reaching the poorest of the poor in his study using a dataset from Bangladesh. He found the greatest effects of microfinance could be seen only above a threshold of loans over 10,000 taka, about 100 dollars. Since the poorest of the poor are not able to reach this threshold they do not see as great of a positive impacts as other participants in the program. Murdoch and Armendariaz 2005 explain that the problem is often one of incentives since managers of microfinance institutions are expected to both be sustainable and help the poor. This means they have an incentive to avoid the poorest of the poor whom are costly to serve and target those closer to

the poverty line. Pretes 2002 argues for this claim as well saying microfinance can help people with diverse sources of income, but many of the poor may not be able to assume the risk necessary to take out loans to start businesses.

This is related to this issue of whether microfinance is the type of development tool that can reduce poverty or instead is only useful for those who already possess a certain degree of entrepreneurial talent and drive to succeed. Lazear 2004 found that entrepreneurs tend to be individuals who excel at a variety of skills rather than focus on one. However, the study also found that an endowment of broad skills sets could be matched by a human capital investment in a broad range of areas. This applies to microfinance in that it is possible that some people are not naturally suited to being entrepreneurs, however with the right human capital investment they may be able to gain the skills to succeed as one.

Another major issue though in judging whether microfinance can make a difference in poverty is difficulty in measuring impact. Many of the programs are not designed in a way that lends itself to credible research and lack control groups. Anecdotal evidence is plentiful in describing the stories of the poor turning into budding entrepreneurs starting grocery stores, handicraft shops, and other businesses as a result of microfinance loans (Business Week, 2006). However, as Armendariz and Morduch 2005 explain, anecdotes highlight the most successful stories of participants and cannot give an overall picture of the program's impact. (The Economics of Microfinance, 2005, p.199). The issue of problems in evaluating impact is well illustrated by Khandker 2003 and Morduch 1998 who used the same data from microfinance programs in Bangladesh and found opposing results. Khandker 2003 found a positive result in reduction of poverty among program participants as well as a positive spillover effect on the program community. Murdoch 1998 found no significant results on

poverty reduction between control and participant groups using a difference-in-difference method of statistical analysis. Thus, measuring impact of programs on poverty reduction is an ongoing problem.

There are also several other criticisms of microfinance including serious questions about sustainability of the programs and the role of subsidies, the imbalance of gender participation in programs in favor of females, and the issue of whether these institutions can or should make a profit (Murdoch 2005, McKernan 2002). There are also other benefits of microfinance which include empowerment of women, positive effects on children of participants, and increases in incomes of participants (Murdoch 2005, UNCDF, 2006, McNelly 1998). Many microfinance programs couple their loans and savings with education on business or nutritional training. There is a need for more research aimed at discovering the impacts of the variety of microfinance programs to determine the best type of structure.

METHODOLOGY

To apply this theoretical model I will be using a dataset from Freedom from Hunger (FFH) which was conducted in Ghana during the period of 1993-1996. The program follows a quasi-experimental design which is useful for research. There are three major groups among the program sample: participants, non participants, and control. The participant and non-participant groups were in villages or towns which were randomly selected by FFH to receive the program at the beginning of the time of research. In these communities there were two surveys conducted in 1993 and 1996. The control group never received the program during the time of research. The program's aim was to target the nutritional effects of microfinance, thus the program sample was randomly selected from comprehensive lists of village women with children under 1 year old in 1993 and with children under 3 years old in

1996. Limiting the sample in this way means the 1996 follow up survey observations are different people than in the 1993 baseline survey. The 1993 baseline survey participants were reclassified as “future participants” or “future non-participants”. The microfinance institutions were started in program communities soon after the 1993 baseline survey.

The survey instrument asked over 300 questions on a variety of issues including business, health, attitude, and demographics. The variables of particular interest for this paper are those concerning income. In the 1998 impact report MckNelly analyzed the indicators included in the survey using a comparison of means test across the different groups: participant, non-participant, and control. The results showed a significant increase on the log average monthly income variable the participant group and the control and the participant group and the non participant group, but not the non-participant group and the control group. There was also a significant difference between the future participant group and the participant group. The future participant group is used to reduce the problem of self-selection bias, as we assume the entrepreneurial drive, business acumen, and general ability are the same on average between both groups which eventually participated. These results are strong evidence for the positive effects of microfinance on income.

I provide a more comprehensive look at the effects of microfinance on income by replicating Freedom from Hunger’s results comparison of means test and using a regression model. I also examine its effects on the income dispersion and inequality within groups. My hypothesis is that participation in microfinance programs can lead to higher incomes but also higher income inequality among participants.

MODEL

To determine whether there are significant effects of introducing program on the income inequality level among participants I replicated the results of the comparison of means test and ran the following regression model. Using a simple linear regression I tested for the relationship between log of income and participation controlling for demographic and situational factors such as literacy, age, asset value and marriage. There are several other factors which could affect the results of microfinance participation, however these models are a good approximate.

$$(1) \text{ Log Income}_i = a + B_1 \text{Participation} + B_2 \text{Total Family size} + B_3 \text{Asset Value} + B_4 \text{Age} + B_5 \text{Height} + B_6 \text{School} + B_7 \text{Literacy} + B_8 \text{LiveKids} + B_9 \text{TotKids}$$

My hypothesis is the sign of the B_1 participation variable will be positive and significant indicating that participation increases income.

RESULTS

In the data analysis, I found significant results indicating that participation has a positive effect on income and log income in the follow up group in 1996 but not for the baseline group in 1993. Participation as an independent variable in the 1993 baseline survey refers to “future participation”. There was no significant relationship between future participation and income. There was a .10 coefficient for participation in 1996. This provides evidence participation in the program led to a 10% increase in income. Since the entrepreneurial spirit and other self-selection characteristics should be similar between the “future participant” group and the “participant” group these results provide evidence that it the program that increases incomes rather than just that people who choose to participate in the programs already have higher incomes or ability. This corroborates with Freedom from Hungers results

comparison of means test and my replication of their test both of which indicate that participation in the program had a significant effect on incomes of participants.

In order to get a more comprehensive look at the income effects of participation I examined the change in income dispersion over time with in groups. A high change in income dispersion in the participant group would provide evidence that some people were helped enormously by the program while others stayed in the same level of poverty. The participant group in 1996 had the highest percentage change in standard deviation for income and log income as compared to the group of non participants and control over the 1993 to 1996 time period.

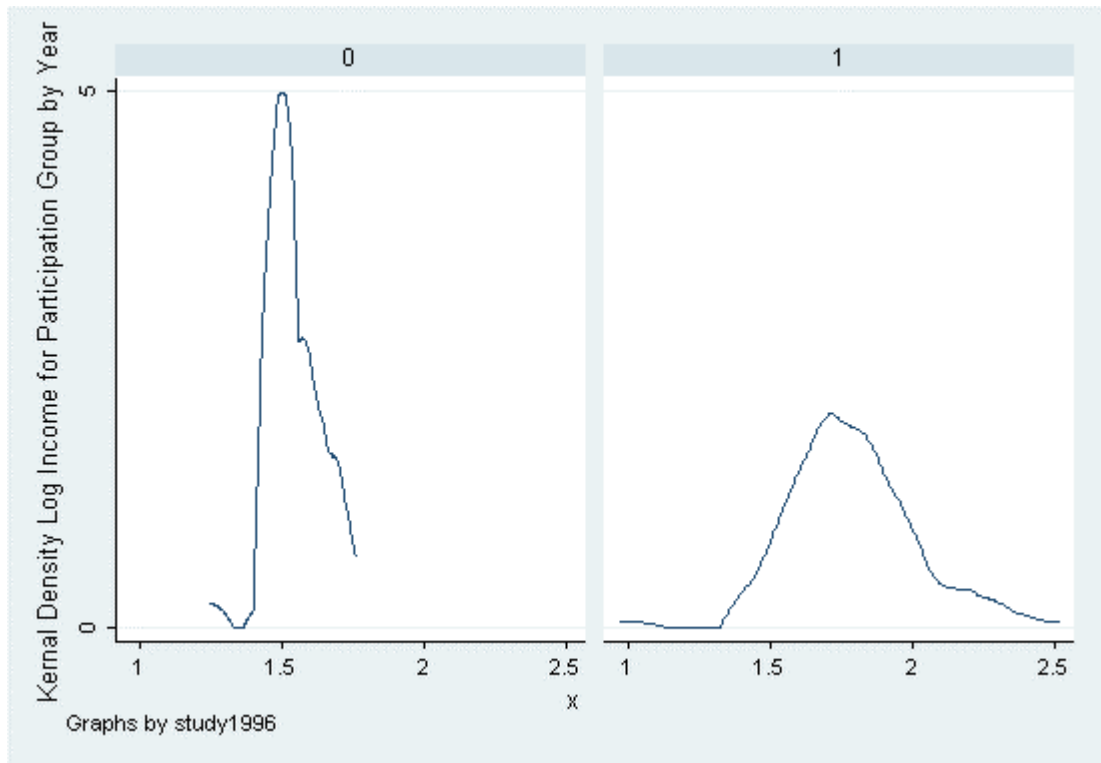
STANDARD DEVIATION OF INCOME, BY GROUP

	Participants	Non Participants	Control
St. Dev. 1993	8.148	9.006	11.104
St. Dev. 1996	46.045	42.387	51.809
% Change	465 %	371%	367%

STANDARD DEVIATION OF LOG INCOME, BY GROUP

	Participants	Non Participants	Control
St. Dev. 1993	.096	.109	.127
St. Dev. 1996	.227	.226	.210
Change	135%	108%	65%

Another way to analyze the distribution of income is to look at a kernel density graph of the groups by year. This shows how the distribution of income has changed over time.



This graph illustrates that for the participation group in 1993 most of the group was making around the same level of income, however in 1996 after the program the distribution of income is flatter with longer tails. This may indicate that these loans greatly helped some people in the right end of the tail while the rest stayed the same or decreased in income. Although it is not possible to draw definite conclusions from these graphs, they provide evidence that participation does change the distribution of income and may only be helping some individuals while leaving many in their same state.

CONCLUSIONS

Microfinance is a promising tool for development, and the literature on the subject is vast. However, due to an incentive problem and difficulties in obtaining reliable data with clear controls there have been few studies that evaluate the impact of programs. A major criticism of microfinance is that the poor cannot take on the risk of loans, and in these programs many

greatly succeed but many also fail causing the average to show a positive impact. The purpose of this paper was to examine the question of whether microfinance programs do increase the incomes of their participants but also the income inequality among the participants. One of the largest issues with using this dataset is that FFH did not follow the same people in the follow up study but rather used a randomized new sample with unique observations. However, the reclassification of the baseline survey into future non-participants, future participants, and control has allowed for a credible comparison among the matched groups of future non-participants, future participants and control. An ideal study would use this idea but also include a longitudinal study. However, in the world of development economics nothing is more true than the fact that the ideal is constantly elusive. Another issue to address is the correlation and causation issue. This data cannot be used to prove causation that participation does cause incomes to increase. It shows that there is a correlation between the two. The question of causation is even more complicated concerning income inequality. There are many other factors which may lead participation to increase income dispersion within the group of participants besides the program itself. It may be because only some people are suited to being entrepreneurs and those highly benefit while the others do not from these types of programs. However, it could also be related to events in the country, inflation, weather and many other factors. This question could be better answered by using a longitudinal dataset and examining the movement between income quartiles of participants. The results of this paper do support the hypothesis that participation in microfinance may lead to increases in both income. The question of whether participation also leads to increase income inequality within the group of participants is inconclusive in

my findings. This area would welcome more research in order to continue to find better measure for the impact of these microfinance programs.

APPENDIX

MODEL 1, LOG INCOME (dollars) AND PARTICIPATION, by YEAR:

$$(1) \text{Logdny}_i = a + B1\text{part9396} + B2\text{famtot} + B3\text{dolass} + B4\text{age} + B5\text{momht} + B6\text{school} + B7\text{letter} + B8\text{livekid} + B9\text{totkid}$$

Log income is the log of income for individual I, a is the intercept, B1 is the coefficient for the dummy variable participation (1, individual participated in program, 0 individual did not participate in program), B2 is the coefficient for the variable measuring total members of a family, B4 is the coefficient for the variable age measuring age in year, B5 is the coefficient for the variable height measured in cm, B6 is the coefficient for the variable measuring school in years, B7 is the coefficient for the dummy variable measuring literacy (1, individual can read a letter, 2, individual cannot read a letter), B8 is the coefficient for the variable measuring number of children alive, B9 is the coefficient for the variable number of children born

TABLE 1: LOG INCOME AND PARTICIPATION, 1993 BASELINE SURVEY

N = 288 R-squared = 0.0794
Adj R-squared = 0.0496 Root MSE = .1109

Log income	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Participation (dummy)*	.0058194	.0185882	0.31	0.754	-.0307722	.042411
Household member total	.000798	.002683	0.30	0.766	-.0044835	.0060795
Asset Value (\$)	.0003939	.0001276	3.09	0.002	.0001427	.0006451
Age (years)	-.0001535	.001533	-0.10	0.920	-.0031713	.0028643
Height (cm)	-.0011118	.0013024	-0.85	0.394	-.0036756	.0014521
School (years)	.0024689	.0023932	1.03	0.303	-.0022422	.00718
Literacy (dummy)	-.0228939	.0231564	-0.99	0.324	-.068478	.0226903
Children alive	.008786	.0081366	1.08	0.281	-.0072312	.0248031
Total children born	-.0044875	.0075942	-0.59	0.555	-.0194369	.0104619
_cons	1.7129	.2117382	8.09	0.000	1.296086	2.129714

*B1 is not significant for part9396 at the 5% level

TABLE 2: LOG INCOME AND PARTICIPATION BASELINE, 1996 FOLLOW UP SURVEY

Number of obs = 296 R-squared = 0.2815
Adj R-squared = 0.2589 Root MSE = .20021

Log Income	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Participation (dummy)*	.1017416	.0279238	3.64	0.000	.0467794	.1567038
Household member total	.0063693	.0062256	1.02	0.307	-.0058846	.0186232
Asset Value	.0011107	.0001885	5.89	0.000	.0007397	.0014818
Age	.0080885	.0027132	2.98	0.003	.0027482	.0134288
Height (cm)	.0020005	.0021327	0.94	0.349	-.0021974	.0061984
School (years)	.0098699	.004668	2.11	0.035	.000682	.0190578

Literacy (dummy)		.0354618	.0441253	0.80	0.422	-.0513898	.1223133
Children alive		.0258605	.0166778	1.55	0.122	-.0069664	.0586874
Total children born		-.0279405	.0145929	-1.91	0.057	-.0566635	.0007826
_cons		.9451826	.3516342	2.69	0.008	.2530633	1.637302

*B1 is significant for part9396 at the 5% level

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