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Does Participation in Microfinance Programs Improve Household Incomes: Empirical Evidence From Makueni District, Kenya.

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Abstract

Although microfinance has elicited different reactions from different stakeholders, there seems to be a general agreement that it is useful in reducing poverty. This study is an attempt to contribute in to the debate on the impact of microfinance on household incomes. We use a pooled data set collected from the south western part of Makueni district in Kenya to study the households' access to microfinance credit and how the credit affects their incomes. We control for household selection bias as well as endogenity problems in the sample. Cross sectional analysis fails to show any significant positive impact of microfinance on poverty reduction. Only after the inclusion of time dynamics in the study are we able to find a weak positive significance of microfinance on household incomes.

Keywords: household, incomes, Kenya, Makueni

Introduction

The 1997 Microfinance Summit called for the mobilization 0f $20 billion over a 10 year period to support microfinance. The United Nations proclaimed 2005 as the "Year of Micro-credit" while 2006 went a score higher to award a Nobel Peace Prize to the founder of modern microfinance Prof. Muhamad Yunus and the Bank he founded in the 1970s; the Grameen bank. The recent publicity accorded microfinance potentially creates an image of an institution that is all success, thus lacking critique. To justify such significant hype and investment in the name of poverty reduction compared to other alternative investments for the same cause in other programs; it is important that the proposition that "microfinance reaches and helps the poor most" be proven and not just assumed (Coleman 2000). The main objective of this study is to measure the impact microfinance has on household income.

Methodology

To address the empirical objective of this study we collected primary data in 3 cross sections in Makueni district Kenya. The data was collected for the same households after every six months for a period of 18 months; thus giving us a rich pooled primary data for analysis. The data was collected using questionnaires that focused on household access to microfinance, household uses of the credit, as well as household income over the period. To achieve a more accurate data about household incomes and expenditure and also to be able to capture any changes including marginal changes over the relatively short period, we used relative a measures of income. This measure mainly focused on household access and ownership of assets, and the fluctuations therein within the period. The study is designed as an experimental case study where we used 200 treatment households (participants of Microfinance programs) and 200 control households (non participants of microfinance programs) in every cross section.

Econometric Model

To take care of the problem of endogeneity with respect to village placement, we propose to use village level fixed-effects method with data from both microfinance participant and non participants. We adopt the model that was used by Coleman 1999 as follows:

$$Y_{ijt} = X_{ijt}\alpha + V_j\beta + M_{ij}\gamma + T_{ijt}\delta + \eta_{ijt} \ldots..1$$

Where Y_{ijt} is the individual household income, for household I that is residing in village j at time t, $X_{ij\,t}$ is a vector of individual household characteristics in village j at time t, V_j is a vector of village fixed effects; M_{ij} is a membership dummy variable equal 1 if household ij is selected in to the microfinance

program, and 0 otherwise; and T_{ij_t} is the number of times a household has borrowed from the microfinance institution at time t. We also use the membership dummy M_{ij} to proxy the unobservable characteristics that are relevant for households to self select in to the microfinance programs, and that might affect outcomes. The variable T_{ijt} is the variable whose coefficient measures the impact of microfinance on household income. In reality it captures the extent of the self selected households' participation in the microfinance programs. For the control households it equals zero while for participating members it is positive in varying amounts. The inclusion of non participants in the sample combined with the use of fixed effects, controls for the possible endogenous programme placement.

In this study we shall first use the differencing method as proposed by Aghion and Morduch (2005). The variables in equation (1) were measured again after a time period t and we can therefore re-specify the model as follows:

$$Y_{ijt+1} = X_{ijt+1}\alpha + V_j\beta + M_{ij}\gamma + T_{ijt+1}\delta + \eta_{ijt+1} \ldots\ldots 2$$

We are interested in estimating the value of δ, which is the coefficient of the extent of household participation in microfinance programs. T is measured by the number of times a household has already borrowed from the microfinance institution. Unlike the amount borrowed, the number of times borrowed is exogenous to the household in that it mainly depends on the other group members and the microfinance institution. The number of times borrowed (T) is positive and varying for the treatment group and zero for the control group. For the difference method we shall need to subtract equation 2 from 1 to obtain:

$$\Delta Y_{ij} = \Delta X_{ij}\alpha + \Delta T_{ij}\delta + \Delta\eta_{ij} \ldots\ldots\ldots 3$$

Where Δ indicates the difference in the variables between period t and t+1. In this equation the village dummies drop out as do the fixed (and unobservable) individual specific characteristics. Equation 3 measures the changes in household income due to the impact of microfinance and household characteristics.

Given the sensitivity to instruments used to measure impact of microfinance, there are compelling reasons to use alternative approaches to confirm the results. For this purpose we propose to introduce time dynamics in the forgoing estimate and estimate a pooled data regression model with fixed village and individual effects. The main reason for using pooled data over cross-sectional data in impact assessment is because cross-sectional results may not be robust. In this model we assume that Current household income depends on both current and past characteristics, including access to loans. We then specify the model as follows:

$$Y_{it+1} = X_{it}\alpha + X_{it+1}\varphi + S_{it}\sigma + S_{it+1}\kappa + V_j\beta + T_{it}\delta + T_{it+1}\phi + M_i\gamma + \eta$$

Where Y_{it+1} is the current individual household income (X_{it}) is the previous vector of individual household characteristics, X_{it+1} is a vector of current household characteristics, S_{it} is the previous total loan size that the household acquired in the previous period, S_{it+1} is the current loan size that the household has acquired from the microfinance institution, V_j is the village effects, T_{it} is the variable whose coefficient measures the impact of microfinance on household income in the previous period., T_{it+1} is the variable whose coefficient captures impact in the current period.

T is as previously explained and justified and η is the error term. We use a participation dummy M to control for unobserved and unmeasured household characteristics that determine household income. $\alpha, \varphi, \sigma, \kappa, \beta, \delta, \phi, \gamma$ are coefficients to be estimated.

Results

The following table shows the regression results of the first cross sectional analysis of the impact of microfinance on household income. The initial period runs up to a period of 9 months since the household started participating in the microfinance program.

Where $\ln Y_t$ is the dependent variable and it is the log of household income, age is the age of head of house hold in years, agesq is the squared age of the head of household, size is the number of household members, sizesq is the squared number of household members, edu is the number of years spent in acquiring formal education by the head of household, sex is the gender of the head of household, mrkt is a proxy for household market access.

M is microfinance participation dummy, 1 for participating households, zero otherwise, T is number of times borrowed which is zero for the control household and varies for the participating households, amount is the total amount of loan in Kenya shillings accessed within that period, employ is a dummy variable which is 1 if the head of household or spouse has any paid employment, zero otherwise.

The results indicate that there exists a significant positive relationship between the size of household and household income up to a certain maximum threshold. Beyond this threshold larger households have a significant negative relationship with household income. Education level of head of household is also positively related to household income. Female headed households tend to have lower incomes than male headed households. Households that have a closer access to the market have significantly more income than households that are located far from the market. The results also show that households participating in joint liability borrowing had significantly lower incomes than non parting households, and that the amount of loan borrowed in the initial period has a significant positive relationship with household income. However in this study we fail to show that microfinance has significant positive impact on household income.

The same estimation was repeated again in 18 months with the following results All variables are defined as before. Just like in the previous period, there is a significant positive relationship between the size of household and household income up to a certain threshold after which larger households have a significant negative relationship with household income. Education level of head of household is also positively related to household income. Female headed households tend to have lower incomes than male headed households. Households that have a closer access to the market have significantly more income than households that are located far from the market. Once again we fail to show positive significant impact on household income due to participation in microfinance programs.

However after 18 months the following statistical changes have occurred within the same households. In the second cross section we fail to show that participants are significantly poorer than non participants. At this stage we can not make concrete claims to explain why this change has occurred but there are at least two possible explanations. The first is that it could be possible that non participants of microfinance programs have become poorer or that the participants of microfinance programs have increased their incomes. To satisfy the readers' curiosity at this point, I disclose that later in this same study we show that the latter has happened, that there was an increase in household incomes for microfinance participants. Further, the results indicate that access to microfinance loans is no longer significantly related to household income unlike in the previous period. This could be explained from the organizational dynamics of group lending. Initially during group formations participants select each other depending on the ability to repay loans.

The loan amounts they initially sign for each other depend on the same criteria. After sometime in the microfinance programs, each group member has accumulated some forced savings with the microfinance institution which they could borrow against. Also unlike in the previous period, age of head of household has a significant positive relationship with household income; however it is not the case that households headed by older heads are significantly poorer than the rest of the population. This finding is puzzling to some extent, but as already explained it is not possible that the rest of the population has become poorer. To explain this finding it may be worthwhile to investigate further, one suggestion would be to look further in to the issue of spill over effects which is beyond the scope of this study.

The next step in our impact analysis is to use the difference indifference method to isolate the impact of microfinance on household income. This we do by subtracting equation two from equation one as explained under the econometric method. In this case the individual fixed effects drop out, so does the village fixed effects. It is then possible to measure the changes in household income due to the impact of microfinance and changes in household characteristics.

Where ΔY_t is the dependent variable and it is the change in household income, ΔT is the change in number of borrowings by households and $\Delta Amount$ is the change in amount borrowed. We are interested in the coefficient of the change in the amount borrowed which is the isolated impact of microfinance after controlling for individual and village effects.

Table iii: Impact of microfinance on household income (difference in difference)

Variable	Coefficient	Std.error	T
ΔY_t			
ΔT	.6826694	.4805827	1.42
$\Delta Amount$	.0000379*	.000017	2.23
constant	1.481129**	.5586783	2.65

R Squared: 0.0249, Adjusted R squared: 0.0201, Prob>F: 0.0062, Key:*** Significant at %, ** Significant at 5%, * Significant at 10%

The results fail to show that changes in household income are significantly determined by the impact of microfinance. Rather they are due to changes in household characteristics. So far, cross sectional analysis has constantly failed to show any significant positive impact of microfinance on household income. Given the sensitivity to instruments used to measure impact of microfinance, there are compelling reasons to use alternative approaches to confirm the results. For this purpose we propose to introduce time dynamics in the forgoing estimate and estimate a pooled data regression model with fixed village and individual effects. The main reason for using pooled data over cross-sectional data in impact assessment is because cross-sectional results may not be robust. Using pooled cross sectional data instead of single cross sections is very important given that pooled data has a time component and is therefore dynamic, making it possible to discover new information concerning the impact of microfinance on household income. Where $\ln Y_t$ is the dependent variable and it is the log of household income, age is the age of head of household in years, agesq is the squared age of the head of household, size is the number of household members, sizesq is the squared number of household members, edu is the number of years spent in acquiring formal education by the head of household, sex is the gender of the head of household, mrkt is a proxy for market access as measured by the distance to the nearest main shopping centres along the highway. IT is the number of times borrowed in "initial" period, IT is zero for the control household and varies for the participating households. CT is the number of times borrowed in the "later period" It is zero for the control households and varies for the participating households. IA is the quantity of loans borrowed in the "initial Period" it is Zero for the control households and varies for the participating households. CA is the quantity of loans borrowed in the "later period" it is also Zero for the control households while it varies for the participating households. employ is a dummy variable which is 1 if the head of household or spouse has any paid employment, zero otherwise. CM is a dummy variable for "persistence in active participation in microfinance programs" where it is 1 for households that did not drop out of the borrowing programs over the study period 0 for those households that either dropped out or never participated in the programs at all. The results show that there is a significant positive relationship between the size of household and household income up to a certain maximum threshold after which larger households begin to have a significant negative relationship with household income. A similar relationship also exists between age of household head and income; Education level of head of household is also positive and significantly related to household income. Female headed households tend to have significantly lower incomes than male headed households. Households that have closer access to the market have significantly more income than households that are located far from the market. Participating households still tend to have a significantly lower incomes than the rest of the population. We however are able to capture new information from the pooled data regression analysis. The impact of microfinance on household income in the "later period" is positive and significant. While in the "initial period" we fail to show significant negative impacts. The emerging story is that microfinance will attract the relatively poorer in society though not the poorest. If impact of microfinance on household income was to be measured within a relatively very short period, there is a possibility to report negative impacts. However given time it is possible for households to experience positive impacts from microfinance as long as they still find it worthwhile to continue participating in the microfinance programs.

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Table i: Impact of microfinance on household income (first cross section)

Variable	Coefficient	Std.error	Z
Ln Y_t			
Age	0.0161776	0.01427	1.13
Agesq	-0.0000115	0.0001786	-0.06
Size	0.1525696***	0.0383012	3.98
Sizesq	-0.0100133***	0.0034889	-2.87
Edu	0.0246523***	0.0078954	3.12
Sex	0.113181**	0.048827	2.32
Mrkt	-0.2271299***	0.0471366	-4.82
M	-0.9184083*	0.5520232	-1.66
T	0.0014682	0.0318898	0.05
lnAmount	0.0933021*	0.0556059	1.68
Employ	0.0135485	0.0480091	0.28
Constant	2.603476***	0.2780794	9.36

R Squared: 0.2808, Adjusted R squared: 0.2600, Prob>F: 0.0000 **Key :***** Significant at 1 %, ** significant at 5%, * Significant at 10%

Table ii: Impact of microfinance on household income (second crossection)

Variable	Coefficient	Std.error	T
Ln Y_t			
Age	0.0245318*	0.0139324	1.7
Agesq	-0.0001587	0.0001748	-0.91
Size	0.1296524***	0.0375018	3.46
Sizesq	-0.0082168**	0.0034177	-2.40
Edu	0.0147896*	0.0078069	1.89
Sex	0.0934801*	0.0479336	1.95
Mrkt	-0.2160787***	0.0463472	-4.66
M	-0.4775297	0.5419591	-0.88
T	0.0251584	0.0206003	1.22
lnAmount	0.043944	0.0549016	0.80
Employ	0.0023608	0.0475067	0.05
Constant	2.712935***	0.2724612	9.96

R Squared: 0.2514, Adjusted R squared: 0.2300, Prob>F: 0.0000, **Key:** *** Significant at 1 %, ** Significant at 5%, * Significant at 10%

Table iv: Impact of microfinance on household income (pooled data analysis)

Variable	Coefficient	Std.error	T
Ln Y_t			
Age	.02719*	.0139424	1.95
Agesq	-.0001916	.0001745	-1.10
Size	.1289926***	.037953	3.40
Sizesq	-.0082905**	.0035068	-2.36
Edu	.0142186*	.0078653	1.81
Sex	.0899966*	.0482221	1.87
Employ	.0064539	.047417	0.14
IA	-.0844438	.074908	-1.13
CA	.1997418**	.0699403	2.86
Mrkt	-.2261517***	0465774	-4.86
M	-.178806**	.5842735	-2.02
IT	-.0385077	.0396536	-0.97
CT	.0482254*	.0261307	1.85
CM	.2211252**	0868596	2.55
Constant	2.675824***	.2726416	9.81

R Squared: 0.2751, Adjusted R squared: 0.2482, Prob>F: 0.0000, **Key:** *** Significant at 1 %, ** Significant at 5%, * Significant at 10%