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Impact of Microfinance on Rural Households in the Philippines

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Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

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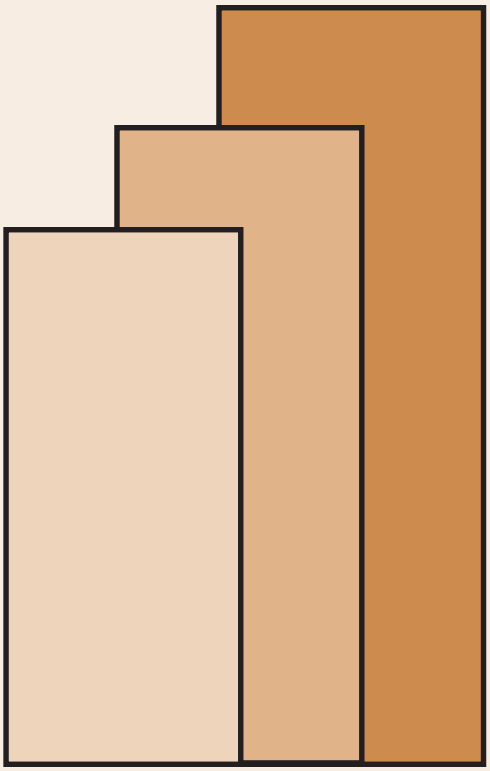

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IMPACT OF MICROFINANCE ON RURAL HOUSEHOLDS IN THE PHILIPPINES

Toshio Kondo, Aniceto Orbeta, Jr., Clarence Dingcong, and Christine Infantado

Abstract

This paper reports on the impact evaluation study of the Rural Microenterprise Finance Project (RMFP) in the Philippines. RMFP aimed to support efforts of the Government of the Philippines to strengthen rural financial institutions by assisting organizations that employed the Grameen Bank Approach (GBA) in providing credit to the poor. The project was implemented by the People's Credit and Finance Corporation (PCFC) and funded by the Asian Development Bank.

The evaluation uses a quasi-experimental design with incoming clients of randomly selected participating microfinance institutions as the comparison group. An important innovation in the study is the inclusion of the appropriate number of former clients among the treatment group. Qualified non-participating households provide the control for area effects. The impact estimation uses the difference-in-difference estimation technique which effectively controls for the known sources of biases namely: non-random program participation (sample selection), non-random program placement, and non-random drop-out. The survey enumerated some 2,200 households divided evenly between treatment and comparison areas. It covered 116 villages spread throughout the three groups of islands (Luzon, Visayas, and Mindanao) and 38 microfinance institutions consisting of three types - banks, cooperatives, and non-government organizations.

The survey results show the program appears to be hitting only a limited number of the intended target as majority of the existing clients and the incoming clients are found to be not poor according to official definition. The estimation results show a mildly significant positive impact on per capita income, per capita total expenditure and per capita food expenditure of loan availability. This impact, however, was found to be regressive – negative on poorer households and positive only for households in the richest quartile. The program has enabled participants to reduce dependence on presumably higher-priced non-program loans as well as increased the proportion of those having savings. It has also made program clients busier with larger number of enterprises engaged in and more workers employed in these enterprises. No significant impact, however, was found on assets and human capital investments.

The foregoing results led the authors to recommend that for microfinance programs to be effective as a poverty-alleviation tool there is a need to review and constantly monitor the effectiveness of the targeting procedures. In addition, it was pointed out that there maybe a need to assist the poor in selecting appropriate projects that not only ensure loan repayment but also generate ample profit as well.

Keywords: Microfinance, impact evaluation, quasi-experimental design, Philippines

IMPACT OF MICROFINANCE ON RURAL HOUSEHOLDS IN THE PHILIPPINES

Toshio Kondo, Aniceto Orbeta, Jr., Clarence Dingcong, and Christine Infantado[*]

I. INTRODUCTION

This paper reports on the impact evaluation study of the Rural Microenterprise Finance Project (RMFP) in the Philippines. RMFP aimed to support efforts of the Government of the Philippines to strengthen rural financial institutions by assisting organizations that employed the *Grameen Bank* Approach (GB) in providing credit to the poor. The objective of the project was to reduce poverty, create employment opportunities, and enhance the incomes of the poorest of the rural poor (the ultra poor) – the bottom 30% of the rural population as measured by income. Rural banks, cooperative rural banks, cooperatives, thrift banks and non-government organizations (NGOs) participated in the nationwide implementation of the project, which ended in December 2002.

II. FRAMEWORK, SURVEY DESIGN AND DATA, ESTIMATION PROCEDURE

II.1 Framework for Assessing Impact on Households

The key problem in evaluation is finding a valid counterfactual against which the treatment group is compared. The gold standard in impact evaluation is a randomized experiment where treatment and control groups are randomly determined. Since this study was conducted ex-post, i.e. evaluating an already completed project it could not employ a randomized experiment.

Moreover, the study also did not have the benefit of baseline data. Hence, the evaluation uses a one-time survey, employing a quasi-experimental pipeline design as used by Coleman (1999) in his study of microfinance in Thailand. The design is summarized in Table 1. Each "treatment" *barangay* (village) is matched to a different "comparison" *barangay*.[1] The importance of having a different *barangay* rather than say a new center in the same *barangay* had been explained in Coleman (1999). The treatment *barangays* are those where the *Grameen* Bank Approach Replicators (GBAR) program, particularly lending, have been going on for some time. The comparison *barangays*, on the other hand, are expansion areas where program clients have been identified and organized into groups but no loans have yet been released to them. In both the treatment and comparison *barangays* an equivalent number of qualified but non-participating households were also interviewed.

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[1] A *barangay* is a village, and is the smallest political unit in Philippines.

The innovation introduced in the study, not used by Coleman, is the inclusion in the group of client households former clients consisting of graduates and problem households. This was designed to address the attrition/drop-out problem in using new clients as comparison group, i.e., the new client group included would-be graduates and future problem clients (Karlan, 2001).

Table 1: Evaluation Strategy: Type of Household Respondent

Type of households (HH) / Area	**"Treatment" (Existing) Area**	**"Comparison" (Expansion) Area**
Participating HH	(A1) Existing clients (A2) Former clients (graduates; problem clients)	(C) New clients
Non-participating HH	(B) Qualified non-participating	(D) Qualified non-participating

From Table 1, impact is given by the expression:

(1) Impact = (A-B)-(C-D).

This is also known in the literature as the difference-in-difference (DID) method. To see how the DID method generate a clean measure of impact the cells in Table 1 can be filled by the factors that determine outcomes for each of the different household clients. This is shown in Table 2.[2]

Table 2: Evaluation Strategy: Factors Determining Outcomes

Type of households (HH) / Area	**"Treatment" (Existing) Area**	**"Comparison" (Expansion) Area**
Participating HH	(A) • Observable characteristics • Unobservable characteristics affecting participation • Area attributes (T) • Microfinance program	(C) • Observable characteristics • Unobservable characteristics affecting participation • Area attributes (C)
Non-participating HH	(B) • Observable characteristics • Area attributes (T)	(D) • Observable characteristics • Area attributes (C)

The new clients will not have the impact of the microfinance program because, even if they have already been identified as prospective clients, they have not yet received loans. Non-participating households will neither have the effect of unobservable characteristics affecting participation nor the impact of the microfinance program because they have not participated in the program. A process of elimination will give the explanation why the DID method described earlier will give the desired estimate of the impact of the microfinance program. The expression (A-B) will give the net effects of unobserved characteristics affecting participation plus the microfinance impact. Incidentally, this also highlights the effect of not controlling for sample selection bias. The expression (C-D), on the other hand, will give the net effect of the unobserved characteristics affecting participation. Thus, (A-B)-(C-D) will yield the net effect of the microfinance program. It is note worthy that if we don't enumerate non-participating households and compare say existing and new clients, (A-C) will give us the effect of the microfinance program plus the difference between the treatment area and comparison area effects which need not be identical, particularly if program placement is not random. Finally, if

[2] The identified factors are adopted from de Aghion and Morduch (2005).

the treatment group does not include the appropriate number of former clients (graduates and problem) the impact of both the observable characteristics and the unobservable characteristics will be different for the existing and new clients as well. This is called the attrition/drop-out bias.

The DID strategy described above is implemented in a regression framework. The advantage of using the regression framework is that it can account for the differences in household and community characteristics which can happen even with a well-designed sampling scheme in a quasi-experimental design. Specifically, the following equation was estimated:

$$(2) \qquad Y_{ij} = F(\beta_1 X_{ij} + \beta_2 V_j + \beta_3 M_{ij} + \beta_4 T_{ij} + \varepsilon_{ij})$$

where:

Y_{ij} = household outcome of interest
X_{ij} = household characteristics
V_j = village characteristics
M_{ij} = membership dummy; 1 if participant in existing and expansion areas; 0 otherwise
T_{ij} = treatment variable; 1 (or >0) if participant in treatment area[3]

The F() function can be linear or non-linear depending on the nature of the dependent variable of interest. This expression is identical to the formulation in Coleman (1999) and Montgomery (2005) had employed nearly identical evaluation strategy. As argued in Coleman (1999) and de Aghion and Morduch (2005), conditional on the other regressors, the coefficient of T_{ij} (β_4) measures the impact of microfinance operations on household outcomes Y_{ij}. Woodridge (2002) provides a discussion on the assumptions required for this result to extend to specific non-linear cases like such as binary and corner solution responses.

This specification covers the three known sources of bias in evaluating the impact of microfinance services using new members as comparison group. Control for non-random program participation or sample selection is provided by using membership dummy M (Coleman, 1999). The literature (e.g. Coleman (1999) and Armendariz de Aghion and Morduch (2005)) has amply shown that not controlling for sample selection results in biased estimates of the impact of microfinance services. Non-random program placement, on the other hand, is controlled by village characteristics V_j or fixed effects estimation (Khandker, 1998). Finally, dropout bias is controlled for by including in the treatment group an appropriate number of randomly selected households who had dropped out of the program (both for reasons of graduation and problems with repayments) as recommended in Karlan (2001).

II.2 The Survey

The survey requires two types of areas. First, treatment or existing areas defined as areas where the program, particularly lending, has been ongoing for some time. In particular, existing clients considered for the survey are those who have been with the program for at least 3 years or have availed of loans for at least 5 loan cycles. This is designed to capture the impact of the subject project, i.e., the RMFP, the implementation of which was completed in 2002. Second, a corresponding set of expansion areas defined as areas where prospective program clients have been identified and organized into groups but no loans have yet been released to them. A

[3] This has also been rendered as $Y_{ij} = F(\beta_1 * X_{ij} + \beta_2 * V_j + \beta_3 M_{ij} + \beta_4 * M_{ij} * T_{ij} + \varepsilon_{ij})$ where T_{ij}=treatment variable; 1 (or >0) for treatment areas (cf. de Aghion and Morduch, 2005).

suitable expansion area should be one that is different from an existing area. In particular, a new center in a treatment area does not qualify as an expansion area.

The sampling design utilized the implementation structure of the RMFP. Participating MFIs submit regular reports to the executing agency (EA) - the People's Credit and Finance Corporation (PCFC). The records of the PCFC provide the number of clients actually served by each MFI at the *barangay* level. There was no comprehensive record on expansion areas. While most of the participating MFIs claimed to have expansion areas, a check with a few of the MFIs, however, revealed that some MFIs did not have the suitable expansion areas needed by the study. The sampling then used the list of existing barangays served as the sampling frame.

The sampling scheme considered the three island groups (Luzon, Visayas, Mindanao) and the type of MFI (cooperative banks/rural banks, cooperatives, and NGOs) as stratification variables. Based on existing program records, it was determined that the most practical primary sampling unit (PSU) is the *barangay*. It was also determined based on the estimates of the mean and variance of incomes from the Family Income and Expenditures Survey (FIES) in 2003 that a sample size of 2,200 households was sufficient for the study. For each barangay a sample of 10 client and 10 non-participating households were deemed sufficient. At this sampling rate per barangay, about 110 barangays or 55 treatment (existing) barangays and 55 corresponding comparison (expansion) barangays will be required to generate the needed sample size.

The number of *barangays* for each island and for each MFI type is selected randomly proportional to the number of client households served – or sampling proportional to size (PPS). For every treatment *barangay* selected, the MFI concerned is asked to identify a corresponding suitable expansion area. The selection of a particular treatment barangay for inclusion in the survey is contingent on the MFI being able to identify a corresponding suitable expansion barangay. When the MFI cannot identify a suitable expansion barangay, the treatment barangay is replaced with a new draw from the pool of treatment barangays for the same MFI type. This process is repeated until the required number of treatment-expansion barangay pairs are generated for each of the MFI types. The existing and new client households are drawn randomly from the list prepared by the MFI or from the centers' roster of members. The non-participating households are drawn randomly from the list of qualified non-participating households identified by MFI field personnel, center or barangay leaders.[4]

The total number of borrowers by island group and MFI type as of 30 June 2006 is given in Table 3. The corresponding allocation of the treatment *barangays* by island group and by MFI type is given in also given in the table. The survey covered 2,276 households in 116 *barangays* and 28 MFIs.

[4] The MFIs did not keep a record of eligible households in the communities they are operating. Thus there is no way of knowing whether the list of non-participating household is comprehensive or not without going into a listing operation. Household listing, however, was not done due to resource limitations. This should be considered as a limitation of the study.

Table 3: Sampling Allocation by Island Group and Type of MFI

Island Group	Total No. of Borrowers	%	Treatment Barangays
Grand Total	**1,648,052**	**100**	**55**
Luzon	**797,194**	**48**	**28**
Banks	485,984	61	18
Coops	70,461	9	2
NGOs	240,749	30	8
Visayas	**419,123**	**25**	**13**
Banks	67,125	16	2
Coops	69,046	16	2
NGOs	282,952	68	9
Mindanao	**431,735**	**26**	**14**
Banks	331,097	77	10
Coops	41,331	10	2
NGOs	59,307	14	2
Total	**1,648,052**	**100**	**55**
Banks	884,206	54	30
Coops	180,838	11	6
NGO	583,008	35	19

Source: PCFC

Three survey instruments were used in the study. One is the household survey questionnaire. The questionnaire is adopted from the Annual Poverty Indicators Survey (APIS) questionnaire conducted by the National Statistics Office. Added to the APIS questions are the detailed questions on loan accounts, enterprises and gender-related matters. Another instrument is the Barangay Profile Questionnaire. Finally, there is the MFI Profile questionnaire. These instruments were pre-tested prior to the actual field surveys.

II.3 Estimation Procedure

The estimation methodology considers the nature of the dependent variable and the treatment variable. It follows closely the estimation procedures described in Wooldridge (2002) for estimating the average treatment effects. Before discussing the estimation procedures, it is useful to discuss the nature of the treatment variables and the outcome variables considered in the study.

Outcome variables: Several outcome variables are considered in the study, namely: (a) basic household welfare measures such as per capita income, per capita expenditures, per capita savings, and food expenditures; (b) other financial transactions such as other (non-GBA) loans and personal savings stocks[5]; (c) household enterprises and employment; (d) household assets such as land, farm equipment, livestock and poultry, and household appliances; and (e) human capital investments such as education and health. Some of these variables are continuous such as per capita income, expenditure, savings, food expenditure, health expenditure per capita, and education expenditure per attending child. Others are binary such as having a savings account and availing of a non-GBA loan. Others are truncated such as value of household assets and other loans. Others are count variables such as the number of non-GBA loans, number of enterprises, and the number employed in those enterprises. Finally, others are proportions such as the proportion of school-age children attending school or proportion of those who are sick to sought treatment. Each of these different types of dependent variable requires different estimation methodology.

[5] This refers to savings (stocks) accounts held by the respondent in the program MFI or other MFIs and is different from the savings (flow) variables measured as the difference in income and expenditures.

Treatment variables: There are four possible treatment variables that can be used to assess the impact of microfinance on household welfare. These are: (1) availed program loan (1=yes, 0=otherwise); (2) number of months the program is available to the barangay (based on first loan released for the barangay); (3) value of loans (cumulative total amount of loans) availed and (4) number of loan cycles. The length of exposure to the program is expected to have an impact. Therefore treatment variables (2)-(4) are deemed better in representing program availability (Coleman, 1999). It should be realized, however, that these treatment variables have different implications for estimation. For instance, perhaps only the first two satisfy the ignorability of treatment[6] condition for treatment variables. Treatment variables (3) and (4) would fail the ignorability condition and would thus require instrumental variable estimation (Wooldridge, 2002).

Other Independent variables. The other independent variables used in the control functions are similar to those used in existing literature (e.g. Coleman 1999, Montgomery 2005). These include household characteristics such as age of the reference person (a.k.a. household head) or respondent; education of the reference person[7]; number of years in the barangay, and house size. Age is expected to be a factor because it is well-known that age-earning profile is not flat. Education, of course, is a known determinant of both earning capacity and productivity in non-market (home) production. The number of years in the barangay is a proxy for social capital. House size is a proxy for household wealth[8]. This is used because, among the household asset in the data, this is presumed to be the least volatile. For education and health equations, the variables indicating availability of relevant facilities are also added as explanatory variables.

Estimation method: The general estimation methodology can be labeled as control function approach. This approach uses other independent variables as elements of some control function in addition to the treatment variable. The functional form of the control function depends on whether the outcome of interest can be modeled linearly or not. For outcomes that can be modeled linearly (i.e., $y=x\beta$) such as continuous variables, the elements of the control function include the other independent variables, such as household characteristics, and the interaction of the treatment variable and the demeaned values of the other independent variables. For linear models, the coefficient of the treatment variable provides the estimate of the DID average treatment effect. For outcomes that require non-linear models (i.e. $y=F(x\beta)$) such as probit for binary outcomes, tobit for truncated outcomes or poisson for count outcomes, Wooldridge (2002) recommends that propensity score method is more appropriate. Under this method the propensity score, which is the predicted value of the regression of the treatment variable on the other independent variables, and the product the treatment variable and the demeaned values of the estimated propensity score are the elements in the control function. In non-linear models, the DID average treatment effect is given by the marginal effects of the treatment variable measured at the average values of the independent variables subject of course to satisfying the required assumptions. Note that the correction for sample selection is taken cared of by the inclusion of membership dummy among the explanatory variables. To take care of non-random program placement, fixed effects estimation is used[9]. However, in general, fixed effects

[6] Originally attributed to Rosenbaum and Rubin (1983). This is defined as conditional on observable characteristics, the treatment and outcome variables are independent. Practically, it means that the treatment variable must not be under the control of or exogenous to the respondent.

[7] Coleman (1999) prefers to use the highest educational attainment achieved by any member in the household.

[8] The ideal wealth variable would be household assets pre-dating the availability of the program. This was not available from the data set because of recall problems. Coleman (1999), for instance, used value of asset acquired five years ago.

[9] Barangay variables could have been used, but the study experienced significant refusals for the Barangay Profile Survey (BPS) which would significantly reduce the number of observations if used. Eleven barangays did not

estimation will result in inconsistent estimates when a non-linear model is estimated (Wooldridge, 2002). Thus for these models, random effects estimation were used. Admittedly, random effects estimation is more restrictive than fixed effects because it imposes a structure on the village effects. This is, however, considered better than the inconsistent estimates from fixed effects estimation with non-linear models. Finally, as mentioned earlier, the nature of the treatment variable also determines the estimation procedure. When the ignorability of treatment cannot be assumed (such as those for treatment variable (3) and (4)) instrumental variables (IV) estimation is used (Wooldridge, 2002). For lack of better instruments, we will use treatment variable (2)[10] as instruments for all estimations using (3) and (4). The validity of the treatment variable (2) as an instrument emanate from the fact that whatever loans existing clients are able to get as well the number of loans cycles are all dependent on the number of months the program is available in the area. In addition, this variable is determined by the MFI and not within the control of the households.

III. ESTIMATION RESULTS

III.1 Respondent Characteristics and Outreach

When RMFP was completed in 31 December 2002, 618,906 clients were reached, of which 97% were women. When the survey design was being formulated in June 2006, records of the PCFC showed that program had served some 1.6 million borrowers. The survey showed that existing clients are, on average, on their 75th month in the program or about 6 years and 3 months (Table 4). They have, on average, cumulatively availed of some P70 thousand in loans and they are on their 7th loan cycle. It is also revealed that, on average, 9% of exiting clients are problem clients while 2% are graduates.

Table 4: Characteristics of Existing Clients

Characteristics	Values
Months since first loan	75.2
Total amount of loans, thousands	69.923
No. of loan cycles	7.2
Existing, %	89.1
Graduate, %	2.1
Problem, %	8.8

Source: Operations Evaluation Mission

Table 5 shows the demographic characteristics of all respondent households. It shows that the respondents are 44 years old on average. Fifteen percent of the reference persons[11] are female. In terms of education, below 1% have no education, 31% have some elementary

accomplish the BPS which would mean removal of about 220 household respondents if the barangay profile data is used.

[10] Other candidate variables would be barangay characteristics. However, as mentioned earlier, the study experienced significant refusal problem with this instrument. We are grateful to D. Levine for pointing out that using treatment variable (2) as instrument for treatment variables (3) and (4) will not be very different from using treatment variable (2) directly. Since these treatment variables did not turn out to be significant in the estimation results these were not used in subsequent discussions.

[11] Reference person is the person in the household with whom all relationships with other household members referenced with. This person is commonly known as the household head.

education, 46% have some secondary education and 23% have tertiary education. The respondents have lived in the barangay for about 19 years and the average size of the house is 63 square meters. About 92% of the respondents are female. Since for existing clients the respondents are the program clients, one can say that program clients are 95% female. Table 6 shows the basic household welfare indicators. Using the official poverty threshold in 2006[12], the table also shows that only 10% of the respondents are poor while 4% are subsistence poor[13]. This is quite revealing considering that the program was designed to reach poor households.

Table 5: Demographic Characteristics of Respondents

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Age of reference person (rp)	47	43	***	43	44		44
Female, rp	0.146	0.140		0.127	0.197	***	0.153
Less than elem, rp	0.008	0.009		0.009	0.004		0.007
Elementary, rp	0.337	0.273	*	0.293	0.347		0.312
Secondary, rp	0.442	0.452		0.484	0.442		0.455
Tertiary, rp	0.214	0.266	*	0.214	0.207		0.225
Years in barangay	21.2	17.6	***	17.6	18.0		19
House size, sq. m.	75.7	65.9	*	59.4	51.2	**	63
Female, respondent	0.953	0.926		0.905	0.911		0.923

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis
Source: Operations Evaluation Mission

Table 6: Basic Welfare Indicators of Respondents

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Per capita income	51,000	45,365	*	43,737	43,456		45,759
Per capita expenditure	36,153	34,357		30,674	31,898		33,195
Per capita savings 1	14,847	11,007	**	13,064	11,558		12,564
Per capita savings 2	18,425	14,508	**	15,454	14,210		15,580
Per capita food exp.	13,708	13,115		12,540	13,145		13,113
Poor \a	0.060	0.110	***	0.093	0.120		0.097
Subsistence poor \b	0.025	0.042		0.032	0.054		0.039

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis
Per capita savings 2 recognizes that the benefits of expenditure on education, health and durable furniture extends beyond the current reference period. Source: Operations Evaluation Mission

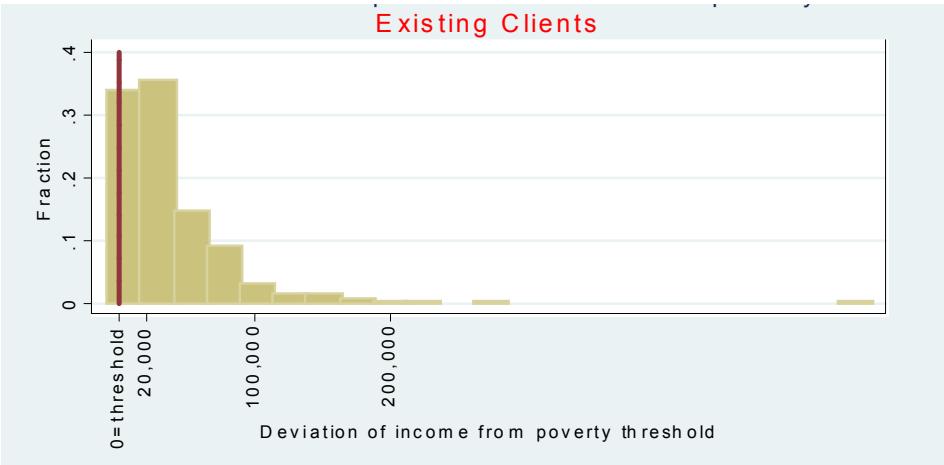
Given the intention of the program to serve poor households, the natural question to ask is "is the program reaching its intended target?" To answer this question the distribution of the difference between the respondents' per capita income and the official poverty threshold was plotted. As such, a value of zero would mean the household is on the poverty line, a negative value would mean the household is below the poverty line and a positive value would mean the household is above the poverty line. Figures 1-3 show the histograms of the deviation of per

[12] This is published in the National Statistics Coordination Board website (http://www.nscb.gov.ph). The national poverty threshold for rural areas is estimated to be 13,659 while the food threshold is 9,445 as of 7 March 2006.
[13] Defined as those below the food threshold.

capita income from the poverty threshold for existing clients, new clients, and non-participating households. The histograms reveal that while a large proportion of the respondents are around the poverty threshold more are on the non-poor side.

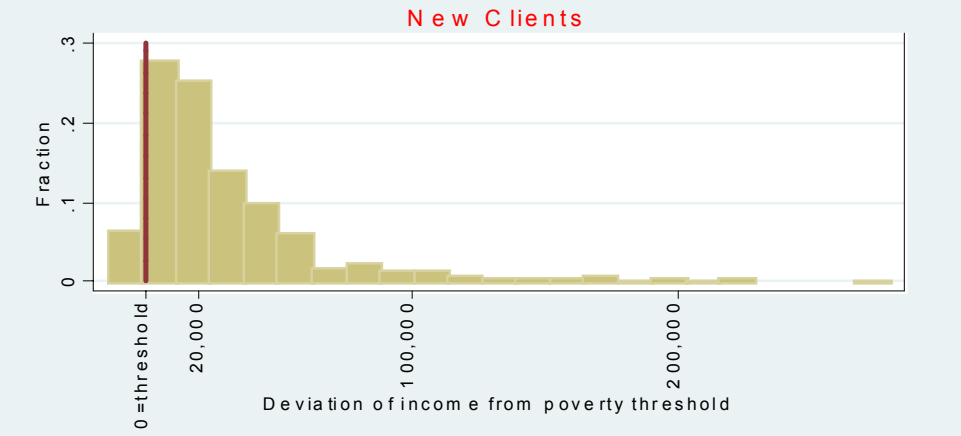
If one considers only existing clients, the histogram shows that the while a considerable proportion of the existing clients are around the poverty threshold, a larger proportion is on the non-poor side (Figure 1). One can argue that perhaps when they entered the program they were poorer than they are at the time of the survey. If one, however, looks at the profile of the new clients, one sees essentially the same distribution, i.e., larger proportions are on the non-poor side (Figure 2). Finally, the non-participating households, which are households people in the community considers as qualified for the program, also exhibit the same characteristics, i.e. most of them are not poor (Figure 3). These graphs reveal some very important pieces of information about the program. One, since existing and new program clients are supposed to have been screened using means-testing procedures, these procedures assuming they have been applied strictly, are not correctly identifying the poor clients per official definition. Two, since non-participating households are households referred to by either program field personnel, center leaders or *barangay* leaders as those who would qualify for the program, these stakeholders in the field are also pointing at possible clients that are not the intended clients of the program. These means that, in spite of the means-testing instruments used to identify the intended clients, all relevant stakeholders of the program in the field are not pointing to the intended clients – the poor – as the qualified clients of the program. This may indicate that perhaps the stakeholders are conveying the message that those considered as officially poor may not be the desired clients of microfinance programs.

Figure 1: Distribution of Sample Existing Client Household Around the Poverty Line



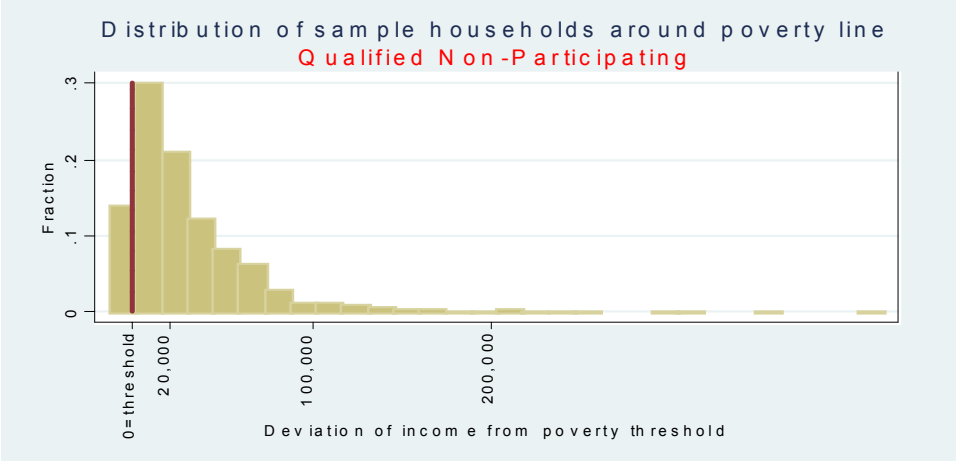
Source: Operations Evaluation Mission.

Figure 2: Distribution of Sample New Client Households Around the Poverty Line



Source: Operations Evaluation Mission

Figure 3: Distribution of Sample Qualified Nonparticipating Households Around the Poverty Line



Source: Operations Evaluation Mission

III.2 Estimation Results - Impact of Microfinance

Impact on per capita income, expenditure, savings, and expenditure on food

The primary measures of household welfare are, of course, per capita income, expenditure, total and food, as well as savings. These variables are continuous, hence, the estimation procedures uses linear fixed-effects model. The control function variables include other independent variables, such as household characteristics, and the interaction of the treatment variable with the other independent variables (expressed as mean deviations). As mentioned in Section III.3, four treatment variables can be used in the study, namely: (1) availed program loan (1=yes, 0=otherwise); (2) number of months the program is available to the barangay (based on first loan released for the barangay); (3) value of loans (cumulative total amount of loans) availed and (4) number of loan cycles. Estimation results show that among the four only the availed program loan treatment variable turned out significant and this is only true for per capita income, per capita consumption and per capita food consumption while it is insignificant

for the two savings definitions. The F-test on whether the fixed-effects coefficients are all equal zero is rejected, which lends support to the hypothesis of non-random program placement. For detailed estimation results please see Annex Table A1-A5.

Table 7 shows the summary of the impact of availing of program loans on per capita income, per capita expenditures, on two definitions of per capita savings and per capita food expenditures. The table shows a mildly statistically significant (significance level 10%) positive impact on per capita income of the availed program loan treatment variable. The other treatment variables did not show significance even at 10% level. The estimated parameter says availing of program loan means higher income by about P5,222 compared to those who have not availed of the loans. Translating this into impact on per loan availed requires some calculation. The dependent variable is average annual per capita income. Considering that on average households have availed a cumulative P70 thousand in loans in 6 years or about P11,000 per year, this means that every P100 loan availed income increase by P47.

Table 7, also shows that per capita expenditure is also positively affected by access to program loans. The estimate puts this at about 4,136 pesos. Using the same calculation employed earlier this would mean 38 pesos increase in per capita consumption per every 100 pesos loan availed.

These estimates on the impact on income and consumption are higher than the well known estimate of 18% percent (Pitt and Khandker 1998) and 10% (Khandker, 2003). Of course, both used consumption as the dependent variable. Zeller et al. (2001) using data also from Bangladesh generated similar higher estimate of the impact - an annual average of about 37% - with per capita income as the dependent variable. They used access to credit, rather than loans, as the treatment variable like in this study. They have explained the difference by noting that in using access to credit rather than loans they have captured not only the benefits of loans but also other indirect benefits from the ability to borrow if needed which would include, for instance, reduced cost of consumption smoothing such as decrease in distress sale and increase risk-bearing capacity favoring more profitable production and investment portfolios. Of course, one needs to add that the precision of the estimates is lower in this study.

Savings, in its two definitions[14], is not significantly affected. Finally, per capita expenditure on food is also positively affected. The estimate is about P1,333 higher compared to those who did not avail of program loans or about P12 per every P100 peso loan availed.

Table 7: Impact on per capita income, expenditures, savings, food

Outcome variables	Estimated Coefficient	Sig. Level
Per capita income	5,222	0.099
Per capita expenditures	4,136	0.077
Per capita savings 1\a		ns
Per capita savings 2\b		ns
Per capital food exp	1,333	0.072

a=Income-Expenditure
b=Income-Expenditure+Educ+Health+Dur. Furniture
Source: Operations Evaluation Mission

[14] One definition is income minus expenditures. The second definition adds back expenditures on education, health, and durable furniture because these are not expected to be consumed in one period (see for instance Bautista and Lamberte, 1990).

Since only the loan availability/access treatment variable was found to be statistically significant on primary measures of welfare, such per capita income and expenditure, subsequent discussions will be limited to this treatment variable.

Impact on Other Loans and Personal Savings

Besides household income and expenditures, it is also important to look at the impact of the program on the other financial transactions of the household. Among the important financial transaction of household are other loans and maintaining savings account of program clients. The savings referred to here are accounts maintained in the program MFI and other MFIs and thus can be considered stock rather than flow savings variable discussed earlier.

About one-fourth of the respondents have availed of non-GBA loans in the last two years (Table 8). About 20% of existing clients have availed of non-GBA loans while a higher proportion (26%) of new clients and non-participating household have availed of non-GBA loans. The amount of non-GBA loans, however, is higher for existing clients (P20 thousand) compared to new clients (P9 thousand) and non-participating households (P17 and 12 thousand). In terms of the number of loans contracted, the existing clients have a higher number (1.6) compared to new (1.2) and non-participating households (1.2).

Table 8: Non-GBA loans

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Availed non-GBA loans	0.201	0.261	**	0.258	0.268		0.248
Among those with non-GBA loans:							
Amount of other loans, thousands	20.335	17.754		8.776	12.357		14.328
Number of other loans	1.648	1.263	***	1.179	1.151		1.280

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

To determine the impact of the program on the financial transactions of households, models are estimated on three variables: (a) availed non-GBA loans; (b) amount of these other loans; and (c) number of loans transacted. The availed non-GBA loan decision was estimated as a binary choice using the Probit model. The amount of non-GBA loans decision was estimated as a truncated variable using Tobit model. Finally, the number of non-GBA loans transacted was estimated as a count variable using Poisson regression. All of these are non-linear models. Thus, as mentioned in III.3, the control function uses the propensity score method. The results show that the treatment variable - availed of program loan – is significant in the availed non-GBA loan variable and insignificant in the amount and number of non-GBA loans contracted. Details of the estimation results are provided in Table A6-A7.

Table 9 provides the summary of the estimates on the impact on non-GBA loans. The estimates show that availability of program loans significantly, albeit mildly (significance 6 percent), reduced the use of non-GBA loans. The estimated coefficient shows that compared to non-program respondents the non-GBA loans contracted in the last two years was reduced by about 5%[15]. As mentioned earlier, in terms of loan amount and the number of non-GBA loans contracted, however, the impact is statistically insignificant.

[15] This used a non-linear probit model so the coefficient does not provide the marginal effects on the probability of contracting an non-GBA loan of availing of program loans.

Table 9: Impact on non-GBA loans

	Marginal Effects	Sig. Level
Availed non-GBA loans	-0.0530	0.056
Amount of non-GBA loans		ns
Number of non-GBA loans		ns

Source: Operations Evaluation Mission

In terms of personal savings[16] (stocks), about two-thirds of the respondents maintain personal savings accounts either in the program or non-program MFIs (Table 10). This is higher for existing clients (86%) compared to the new clients (66%) and non-participating (54% and 52%) households. In terms of balances, about 70% of household have 1 to 5,000 pesos, 15% have 5,000 to 10,000 pesos and the proportion with more than 10,000 pesos.

Table 10: Saving accounts in program and other MFIs

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Have personal savings account	0.859	0.535	***	0.657	0.521	***	0.637
Among those with personal savings:							
Personal savings 1-5,000	0.653	0.652		0.794	0.663		0.697
Personal savings 5,000-10,000	0.181	0.154		0.128	0.139		0.149
Personal savings 10,000+	0.166	0.194		0.078	0.198	***	0.154

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

To determine the impact of the program on personal savings, models on decision to maintain a savings account and the balances on those accounts were estimated. The decision to maintain a savings account is estimated as a Probit model while the modeling for the savings balances uses an Ordered Probit model considering the three ordered categories of savings balances mentioned earlier. Again these are non-linear models so propensity score method was used for the control function. The estimation results are given in Table A8. The results show that both maintaining personal savings accounts and the amount of balances are significantly affected by availing of program loans.

Table 11 shows the summary of the estimation results indicating that the impact of the program is positive and highly statistically significant (significance less than 1 percent) both in terms of having a personal savings account as well as on the amount of savings. The estimates shows that compared to those who are not program clients, as much as 23% more of those who have availed of program loans have maintained savings account. In terms of the amount of savings, those with 0 to 5 thousand is lower by 12%, those will 5-10 thousand is higher by 4% and those with 10 thousand or more is higher by 9% compared to those who have not availed of program loans.

[16] The respondents were asked about their savings accounts both in program MFI as well as other MFIs.

Table 11: Impact on savings in program and other MFIs

	Marginal Effects	Sig. Level
Have personal savings	0.230	0.000
Amount of personal savings		
0 - 5,000	-0.124	0.003
5,000 -10,000	0.038	0.001
above 10,000	0.086	0.005

Source: Operations Evaluation Mission

Impact on the Number of Enterprises and Employment

Another important impact of microfinance is what it does to the enterprises the respondent households are engaged in. The survey asked respondents about the enterprises and employment in these enterprises of program clients as well as other household members.

Table 12 shows that about 93% of the existing client respondents have household enterprises. This is higher compared to new clients (87%) and non-participating households (78%). Among those with household enterprises, the number of enterprises is about 1.8 and the total number of employed people is about 2.4. For existing clients this is about 2.1 enterprises employing about 3 individuals, for new clients this about 1.8 enterprises employing 2.4 individuals and for non-participating households in treatment and expansion areas this is 1.6 enterprises employing 2.4 and 2.0 individuals, respectively.

Table 12: Household enterprises and employment

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
With household enterprise	0.926	0.777	***	0.871	0.779	***	0.836
Among those with household ent.:							
Total number of enterprises	2.07	1.63	***	1.82	1.63	***	1.79
Employed family members	2.31	1.62	***	1.68	1.66		1.82
Employed non-family members	0.63	0.78		0.68	0.33		0.61
Total employed	2.95	2.40	**	2.36	2.00		2.43

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

Since substitutions can happen between program clients' enterprise and those of other household members, the analysis is focused only on total enterprise and total employment. The modeling of the number of enterprises and number of employees considered these variables as counts and were estimated using Poison regression. Since this is a non-linear model, propensity score method was used for the control function. The estimation results show that the availing of program loans significantly affect the number of enterprises households have as well as the number employees in these enterprises. Details of the estimation results are provided in Tables A9-A10.

The estimates show that the impact of the program on both the number of enterprises as well as the number of employed persons in these enterprises is a very significant positive. Table 13 shows that compared to non-program households, the number of enterprise households with

program clients is higher by 20%[17]. The table also shows that households with program clients have 17% more employed person than non-program clients.

Table 13: Impact on enterprises and employment

	Incidence Rate	Sig Level
Total number of enterprises	1.20	0.009
Total number of employees	1.17	0.006

Source: Operations Evaluation Mission

Impact on Assets

It is very likely that microfinance will affect the acquisition of assets of households. The respondent households were asked about the current value of the assets they have. The standard question asked about assets is "if someone wants to buy a particular asset owned how much would the price be?" The assets include land, equipments, livestock and poultry and household amenities.

Table 14 shows that about 20% of the respondents have land assets with an average current value of P557 thousand. It also shows about 15% of the respondents own farm equipment with an average current value of P55 thousand. About 53% of the respondents have livestock and poultry assets with an average current value of 46 thousand. Finally, almost everyone (97%) have some household appliances with current value of 73 thousand.

The value of total assets household was estimated as a truncated variable (having only positive values) using Tobit model. In fact, as Table 14 shows, substantial proportion of households does not have specific assets. Since this is a non-linear model, propensity score method was used for the control function. The estimations did not show significant impact of the program in the total household assets. Details of the estimation results are provided in Tables A11-A12.

Table 14: Household assets

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
With agriculture and comm land	0.198	0.179		0.231	0.190		0.199
Among those with ag and comm land:							
Agri and commercial land, cur. value	468,338	581,081		580,559	590,688		557,332
With farm equipment	0.117	0.124		0.194	0.167		0.151
Among those with farm equipment:							
Farm equipment, cur. value	27,588	34,108		110,645	24,885		55,365
With livestock and poultry	0.586	0.490	***	0.565	0.472	***	0.527
Among those with livestock and poult.:							
Livestock and poultry, cur. value	20,419	18,556		83,484	58,183		46,028
With household appliances	0.981	0.973		0.968	0.958		0.970
Among those with household appl.:							
Household appliances, cur. value	59,547	66,689		121,606	44,252		73,311

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

[17] Since this is a Poisson regression, incidence rate (exp(coefficient)) is given. This is given in the column labeled as IRR.

Impact on human capital investments (education and health)

Any change in income or expenditure does not necessarily translate into changes in human capital investments. The education variables examined are school attendance proportion for school-age children (6-12 years, 13-16 years, and 17-24 years) as well as the education expenditure per school attending child. For health, the variables examined are the proportion of household members who are ill or injured, proportion of those ill or injured who sought medical treatment, proportion of children 0 to 5 year who are fully immunized and per capita health expenditures.

Table 15 shows that about 95 percent of children 6-12 years old, 87 percent of children 13-16 years, and 31 percent of children 17-24 years old are attending school. It also shows that the average expenditure per attending school-age child is about 7,239 pesos. In terms of health indicators, Table 16 shows that the proportion of either sick or injured in the past 6 months preceding the survey is about 9 percent. The proportion of households with at least one ill/injured member is about 23%. The proportion of those ill/injured who sought treatment is 69%. The proportion of children 0-5 years old who are fully-immunized is about 69%. The average per capita expenditure for health is about 740 pesos.

Table 15: Education outcomes

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
With children 6-12 years old	0.502	0.499		0.576	0.472	***	0.512
Among those with children 6-12:							
Proportion attending school, 6-12	0.970	0.959		0.944	0.927		0.950
With children 13-16 years old	0.416	0.345	**	0.393	0.326	**	0.369
Among those with children 13-16:							
Proportion attending school, 13-16	0.881	0.915		0.869	0.817		0.871
With children 17-24 years old	0.490	0.372	***	0.426	0.439		0.430
Among those with children 17-24:							
Proportion attending school, 17-24	0.344	0.319		0.306	0.278		0.312
Educ exp per school age child	5,931	6,301		4,615	4,525		5,312
Educ exp per attending child	8,241	8,313		6,300	6,128		7,239

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

Table 16: Health outcomes

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Proportion of members ill/injured	0.097	0.072		0.101	0.091		0.090
With illness/injured members	0.255	0.181	***	0.269	0.213	**	0.229
Among those ill/injured members:							
Proportion who seek treatment	0.700	0.685		0.696	0.657		0.686
With children 0-5 years old	0.323	0.430	***	0.444	0.394		0.399
Among those with children 0-5 years old:							
Proportion fully-immunized	0.717	0.666		0.719	0.659		0.689
Per capita medical exp	645	954		560	791		740

***, **, * - significant at 1%, 5% and 10%, respectively; two-tailed hypothesis

Source: Operations Evaluation Mission

Two types of variables were considered in modeling the impact of the program on education variables, namely: (a) proportion of school-age children attending school and (b) expenditure per attending child. The proportion of school-age children attending school was used to in order to be closer to the notion of a household decision variable.[18] With a proportion as a dependent variable, the fractional logit model[19] was used to estimate it. In the case of expenditure per attending child this was estimated using linear fixed-effects model because this is a continuous variable. In terms of the control function, the fractional logit model, being a non-linear model, used propensity score while the expenditure per attending child used the interaction between the treatment variable the demeaned values of the other independent variables. The estimation results show that availing of program loan is not significant for school attendance for all age groups as well as for expenditure per attending child. Details of the estimations results are given in Tables A14-A15.

In the case of health, four variables are used, namely: (a) proportion ill or injured, (b) proportion who seek treatment if ill or injured, (c) proportion of fully immunized children 0-5 years old, and (d) per capita medical expenditures. Similar to the treatment of the school attendance variables, variables (a) to (c) were modeled as proportions using fractional logit model. Per capita medical expenditures, on the other hand, was modeled as continuous variable using linear fixed-effects. The results show that availing of program loan does not significantly affect for all health variables under consideration. Details of the estimation results are provided in Tables A15-A16.

Impact on Hunger Incidence and Reduction in Food Consumption

Hunger incidence as well the reduction in food consumption in the last three months was likewise studied as well. Table 17 shows that hunger incidence is about 2% in the respondent population. The reduction in food consumption in the last three months, on the other hand, is found in 11 percent of the respondent households.

Hunger incidence was modeled as binary outcome using the Probit model. Since this a non-linear model, propensity score method was used for the control variables. The estimation results show that availing of program loan did not significantly affect the incidence of hunger. Details of the estimation results are provided in Tables A17-A18.

Table 17: Hunger and reduced food consumption incidence

Variables	Existing Areas			Expansion Areas			Total
	Participating	Non-Participating	Sig.	Participating	Non-Participating	Sig.	
Hunger incidence	0.023	0.032		0.019	0.014		0.017
Reduced food incidence	0.113	0.124		0.110	0.105		0.107

Impact by Different Socioeconomic Groups

The evaluation of the program was also designed to test whether the impact of access to microcredit differed across socioeconomic groups. While the poor/nonpoor distinction is useful, a better picture is given by dividing the sample households into per capita income quartiles.

[18] This can also be estimated as an individual-based decision model, i.e. attendance of each school-age child is treated independently. This, however, may not capture the idea that the attendance of all school-age children in the household are jointly decided on by parents.

[19] Adopting method used in Papke and Wooldridge (1996).

There are a couple of ways of estimating the impact on different subgroups. One is estimating a separate equation for each subgroup. Another is to jointly estimate the impact in a single equation using the interaction of subgroup and treatment variables, i.e., using the coefficient of the interaction between the availability treatment variable and corresponding quartile dummy variables to measure the impact for each quartile. Orr (1997) argues that the latter approach has two advantages: (i) it usually provides more power because it uses the full sample to estimate the coefficients; and (ii) it allows one to test whether there are statistically significant differences in impact among the subgroups taken as a set (rather than between pairs of subgroups). Given these considerations, the joint estimation method was adopted for this study. The survey respondents were divided into four quartiles, i.e., those (i) with annual per capita incomes less than P21,480; (ii) from P21,481 to P34,428; (iii) from P34,429 to P56,167; and (iv) over P56,167. For comparative purposes, it is useful to mention that the poverty line in the Philippines is equivalent to an annual per capita income of P14,405 and for rural households this is P13,659.[20]

The results show that the program had a regressive impact (Table 18). A significant positive impact was evident only for the households in the top quartile while there was a negative impact on the poorer households. For instance, per capita income for the participating households in the poorest quartile was P23,000 lower than the nonparticipating households. However, the impact for the top quartile was positive and resulted in a P45,000 increase in annual income compared with the nonparticipating households in the same income group. The results were similar for the per capita expenditure, savings, and food expenditure. It is worth noting that the impact on savings is significant for all except the third quartile in contrast to the insignificant impact for the whole sample. Table A19 provides the details of the estimation results.

Table 18: Impact on Household Outcome by Per Capita Income

	Per Capita Income		Per Capita Expenditure		Per Capita Savings 1		Per Capita Savings 2		Per Capita Food Expenditures	
	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.
Quartile 1	-23,214.0	0.000	-9,459.7	0.007	-13,754.2	0.000	-14,567.2	0.000	-3,476.9	0.002
Quartile 2	-13,903.1	0.001	-6,752.6	0.034	-7,150.6	0.006	-7,680.6	0.005	-1,408.5	0.164
Quartile 3	-1,212.2	0.764	1,849.6	0.548	-3,061.8	0.228	-3,010.6	0.251	1,382.1	0.159
Quartile 4	45,113.7	0.000	23,915.6	0.000	21,198.1	0.000	23,928.6	0.000	6,659.9	0.000

Coeff. = Coefficients, Sig. Lev.. = Significance Level
Source: Operations Evaluation Mission.

There are several possible reasons explaining why the impact on the lower income households is lower (or negative). These include: (i) the problem clients are concentrated among the poorer households; (ii) the average size of loans may be smaller for poorer households; (iii) there may be a preponderance of diversion of loan proceeds from production to consumption among poorer households; and (iv) if there is no diversion, the projects of poorer households may be less productive. In this study, there is empirical evidence only for (i) and (ii).

Indeed, the average loan size for poorer households is smaller (Table 19). This prevents them for venturing into more productive activities that would require more capital. In Table 20, it is shown that there are more problem clients among the bottom three quartiles. While the average proportion of problems in the sample is about 2%, the bottom three quartiles have each a little over 2% that are problem clients while the highest per capita income quartile group had only less than 1% as problem clients.

[20] Estimates as of 7 March 2006 from the National Statistics Coordination Board website. Available: http://www.nscb.gov.ph

Table 19: Distribution of Average Loan Size by Per Capita Income Quartile

Quartile	Mean Cumulative Loans (P'000)	Total Number of Cycles	Average Loan Size (P'000)
Lowest	45.031	6.1	7.392
Lower middle	57.540	6.9	8.280
Upper middle	64.290	7.1	9.087
Highest	99.168	8.2	12.166
Total	**69.923**	**7.2**	**9.721**

Source: Operations Evaluation Mission

Table 20: Distribution of Type of Clients by Per Capita Income Quartile (%)

Quartile	Existing	Graduates	Problem	New	Non-Participating	Total
Lowest	14.96	0.55	2.37	27.01	55.11	100
Lower Middle	18.43	0.54	2.68	26.30	52.06	100
Upper Middle	21.34	0.54	2.17	27.49	48.46	100
Highest	27.50	0.36	0.89	21.61	49.64	100
Total	20.59	0.50	2.03	25.59	51.31	100

Source: Operations Evaluation Mission

The regressive relationship provides further evidence that microfinance projects should not target the ultra poor. Additional debt may make their lives worse, not better. Coleman (2006), using data from Thailand, qualified the earlier "no significant impact on consumption" result in Coleman (1999) with a positive impact for the center leaders, which are also the more well-off segment of the membership. The insignificant impact on poorer members was confirmed. On the other hand, Hulme and Mosley (1996)—using data from Indonesia, India, Bangladesh, and Sri Lanka—found a positive impact on income on average but like Coleman (2006) also found a larger impact for the better-off members. Thus, the regressive result of this study is consistent with some of the findings reported in the literature. This indicates that among poorer borrowers, the availability of microcredit loans is not sufficient to ensure that the ultra poor invest in sufficiently productive activities that can generate the income necessary to repay the loans and earn them some profit.

It can be argued that the use of income quartile to determine the impact across socioeconomic grouping done in the preceding analyses may be problematic because income is affected by the treatment variable.[21] To avoid the endogeneity problem, we re-estimated the above equations using the education attainment of the reference person which is known to be directly related to socioeconomic status and presumably acquired prior to the program. The summary of estimation results are given in Table 21 (see Table A20 for the full estimation results). The results substantially replicated the regressive impact. While the table shows that for those with at most elementary education the impact on per capita income is negative, this is not statistically significant. But the impacts for those with secondary and elementary education are significantly positive and rising with higher education attainment.

[21] We are grateful to D. Levine for pointing this out.

Table 21: Impact on Household Outcome by Education Status of Reference Person

Education status	Per capita income		Per capita expenditure		Per capita sav 1		Per capita sav 2		Per capita food exp.	
	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.	Coeff.	Sig. Lev.
At most elementary graduate	-5,864	0.154	-1,511	0.619	-4,353	0.083	-4,904	0.060	-45	0.962
Secondary	9,727	0.009	7,302	0.008	2,425	0.288	3,521	0.138	1,567	0.074
At least some tertiary	9,805	0.034	4,206	0.218	5,600	0.047	6,353	0.030	2,254	0.037

Coeff. = Coefficients, Sig. Lev.. = Significance Level
Source: Operations Evaluation Mission.

IV. SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study used a quasi-experimental design (due to Coleman (1999)) to control for non-random program participation and fixed-effects estimation to correct of non-random program placement. In addition, it included former clients to correct for non-random attrition/drop-out problems which were not considered in the original Coleman (1999) design. It also used recommended estimation procedures for estimating average treatment effects described in Wooldridge (2002).

The survey results indicates that majority of the existing clients, the new clients, and the non-participating households which are deemed qualified for the program are not poor according to the official definition. This is in sharp contrast to the other studies which indicated that majority of the microfinance program clients are poor. Khandker (2003), for instance, indicates that 90% of the microfinance program participants in Bangladesh in the 1991/92 survey and 70% in the 1998/99 survey are poor. Montgomery (2005) found that 70% of microfinance clients of the Khushhali Bank in Pakistan are poor. Given these findings there is a need to re-examine the targeting approach of the microfinance implementers in the Philippines. It could be that the targeting approaches have the potential of identifying the desired clients but these are not just implemented strictly. Another factor that needs to be looked at is whether there is enough motivation for the implementers to seek poor clients. These have important implications on the design of the microfinance programs.

The impact of the availability of program loans on per capita income is shown to be positive and mildly significant. This is also true for per capita total expenditure and per capita food expenditure. But it was also found that this impact is regressive, that is negative or insignificant for poorer households and becomes only positive and increasing with richer households. This negative or insignificant impact for poorer households and positive impact for richer households provides some explanation of the mild significance of the coefficient for the total sample. It is worth mentioning that this is not the only study that found a regressive impact. Coleman (2006) using data from Thailand qualified the earlier no significant impact on consumption result in Coleman (1999) with the finding of a positive impact for the center leaders which are also the richer segment of the membership and that the insignificant impact is confined to poorer members. Hulme and Mosley (1996) using data from Indonesia, India, Bangladesh and Sri Lanka, on the other hand, found positive impact on income on average but in addition like Coleman (2006) also found larger impact for better-off members. Thus the regressive result of this study may not be entirely surprising but is certainly disturbing. This indicates that among poorer borrowers the cost of and availability of program loans appears to be not sufficient to prod them into selecting more productive activities that will not only pay the cost of borrowing but also earn them some profit. One can also view this as the result of MFIs not screening projects enough to have the desired results. This implies that attention to project selection must also be an important component program design.

The program has enabled participants to reduce dependence on presumably higher priced non-GBA loans. In addition, it has increased the proportion of those having savings accounts in program and other MFIs. It has also increased the amounts saved in those accounts. Together these imply better consumption smoothing capabilities.

Another significant impact of the program is making program clients busier with larger number of enterprises engaged in. This likewise resulted in bigger number of employed workers in these enterprises. Given the thrust of the program to cater to micro-entrepreneurs, this result is hardly surprising.

Finally, the study also found no significant impact on household assets as well as on human capital investments such as health and education. It appears that the mild impact on income and expenditures were not sufficient to drastically change either accumulation of household assets or human capital investments.

In summary, the microfinance program has kept program clients economically active with more enterprises and more employees. It has also improved consumption smoothing capabilities with lesser dependence on presumably higher priced non-GBA loans and increased savings in both program and non-program MFIs. Nonetheless, the impact on per capita income, total expenditures and food expenditures is only mildly significant but with regressive features.

Considering the foregoing, for microfinance to be an effective poverty-alleviation tool there is a need to review targeting procedures to know whether these are correctly identifying the intended beneficiaries. There is also a need to regularly assess the economic status of clients to avoid the drifting away from the focus on the poor and low income households. This cannot be overemphasized considering that MFIs may not have sufficient motivation to seek out poor clients. Finally, considering the regressive impact on income, there is a need to assist the poor in improving the selection of projects so that these do not only ensure the payment of the loans but also generate ample profit as well. Again in project selection the concern of the MFIs may be limited to just ensuring repayment and not generating profits for their clients.

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Annex – Estimation Results

Table A1: Impact on per capita income
Estimation: Fixed-effects regression

Variables	Treatment variable							
	Availed Loan (1=Yes)		Months program available		Total Loans ('000)		No. of loan Cycles	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Member	-9.89	0.00	1087.43	0.51	749.49	0.33	804.41	0.35
Availed loan	5221.98	1.65						
Age, reference person (rp)	-898.72	-1.92	-795.13	-1.72	-820.93	-1.80	-799.90	-1.73
Age square, rp	13.93	2.72	12.84	2.55	12.69	2.55	12.79	2.53
Female, rp	15180.70	5.58	16775.15	6.32	15959.82	6.09	16711.22	6.25
Elementary, rp	9488.92	0.8	9428.64	0.79	4567.34	0.39	10509.13	0.89
Secondary, rp	15328.07	1.29	16412.28	1.38	9984.43	0.85	16762.23	1.42
Tertiary, rp	27422.61	2.29	27261.75	2.28	20929.58	1.77	28313.50	2.38
Years in village	57.27	0.76	75.16	1.02	-19.42	-0.27	21.11	0.29
House size	78.60	4.39	71.34	4.24	62.13	3.86	75.55	4.51
Availed loan*(demeaned\a age)	757.41	0.61						
Availed loan*(demeaned\a age square)	-7.62	-0.58						
Availed loan*(demeaned\a female rp)	3797.82	0.65						
Availed loan*(demeaned\a elementary rp)	-27335.59	-1.11						
Availed loan*(demeaned\a secondary rp)	-16851.55	-0.68						
Availed loan*(demeaned\a tertiary rp)	-28631.67	-1.15						
Availed loan*(demeaned\a years in vill.)	-91.43	-0.62						
Availed loan*(demeaned\a house size)	-39.15	-1.46						
Months program available			38.98	1.01				
Mos prog avail*(demeaned\a age)			2.21	0.14				
Mos prog avail*(demeaned\a age square)			-0.01	-0.06				
Mos prog avail*(demeaned\a female rp)			-35.85	-0.54				
Mos prog avail*(demeaned\a elementary rp)			-310.79	-1.07				
Mos prog avail*(demeaned\a secondary rp)			-220.76	-0.76				
Mos prog avail*(demeaned\a tertiary rp)			-319.36	-1.09				
Mos prog avail*(demeaned\a years in village)			-2.33	-1.30				
Mos prog avail*(demeaned\a house size)			-0.32	-1.02				
Total loans availed (000)					20.25	0.38		
Tot. loans av.*(demeaned\a age)					11.48	0.77		
Tot. loans av.*(demeaned\a age square)					-0.07	-0.46		
Tot. loans av.*(demeaned\a female rp)					11.06	0.16		
Tot. loans av.*(demeaned\a elementary rp)					-159.88	-0.32		
Tot. loans av.*(demeaned\a secondary rp)					38.64	0.08		
Tot. loans av.*(demeaned\a tertiary rp)					-38.99	-0.08		
Tot. loans av.*(demeaned\a years in village)					3.52	2.01		
Tot. loans av.*(demeaned\a house size)					-0.04	-0.22		
Number of loan cycles							425.83	0.85
No. loan cyls*(demeaned\a age)							25.23	0.17
No. loan cyls*(demeaned\a age square)							-0.03	-0.02
No. loan cyls*(demeaned\a female rp)							-442.53	-0.61
No. loan cyls*(demeaned\a elementary rp)							-4821.63	-1.27
No. loan cyls*(demeaned\a secondary rp)							-3395.11	-0.90
No. loan cyls*(demeaned\a tertiary rp)							-4762.92	-1.25
No. loan cyls*(demeaned\a years in village)							5.02	0.27
No. loan cyls*(demeaned\a house size)							-4.00	-1.58
Constant	30650.25	1.97	27756.76	1.79	37483.58	2.45	28099.96	1.83
Model Statistics								
Sample	2018		2013		2013		2013	
F on Ho: u_i=0	3.649		3.62		3.54		3.586	
Overall R-square	0.099		0.098		0.114		0.103	

\a=variable-mean(variable)

Table A2: Impact on per capita expenditure
Estimation: Fixed-effects regression

Variables	Treatment variable							
	Availed Loan (1=Yes)		Months program available		Total Loans ('000)		No. of loan Cycles	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Member	-2245.97	-1.37	-1392.94	-0.89	-1656.46	-0.99	-1604.32	-0.95
Availed loan	4135.51	1.77						
Age, reference person (rp)	-599.17	-1.73	-571.02	-1.67	-547.01	-1.62	-587.04	-1.72
Age square, rp	8.75	2.31	8.65	2.32	8.32	2.26	8.82	2.36
Female, rp	8709.82	4.34	9790.94	4.99	8781.84	4.51	9552.95	4.83
Elementary, rp	5809.69	0.66	6000.83	0.68	2723.40	0.31	6304.99	0.72
Secondary, rp	9608.48	1.09	10542.87	1.20	7145.72	0.82	10700.61	1.23
Tertiary, rp	19907.30	2.25	19893.05	2.25	15989.76	1.82	19962.39	2.27
Years in village	49.74	0.89	55.49	1.02	-4.20	-0.08	24.74	0.46
House size	79.15	5.99	73.49	5.91	61.85	5.18	76.51	6.18
Availed loan*(demeaned\a age)	453.59	0.50						
Availed loan*(demeaned\a age square)	-4.04	-0.42						
Availed loan*(demeaned\a female rp)	5071.44	1.18						
Availed loan*(demeaned\a elementary rp)	-14956.79	-0.82						
Availed loan*(demeaned\a secondary rp)	-9469.61	-0.52						
Availed loan*(demeaned\a tertiary rp)	-22679.89	-1.23						
Availed loan*(demeaned\a years in vill.)	-73.88	-0.68						
Availed loan*(demeaned\a house size)	-57.10	-2.88						
Months program available			31.34	1.10				
Mos prog avail*(demeaned\a age)			3.71	0.31				
Mos prog avail*(demeaned\a age square)			-0.04	-0.29				
Mos prog avail*(demeaned\a female rp)			12.24	0.25				
Mos prog avail*(demeaned\a elementary rp)			-170.34	-0.79				
Mos prog avail*(demeaned\a secondary rp)			-132.93	-0.62				
Mos prog avail*(demeaned\a tertiary rp)			-261.81	-1.20				
Mos prog avail*(demeaned\a years in village)			-1.47	-1.11				
Mos prog avail*(demeaned\a house size)			-0.61	-2.62				
Total loans availed (000)					28.79	0.72		
Tot. loans av.*(demeaned\a age)					7.52	0.68		
Tot. loans av.*(demeaned\a age square)					-0.07	-0.58		
Tot. loans av.*(demeaned\a female rp)					82.87	1.59		
Tot. loans av.*(demeaned\a elementary rp)					-122.18	-0.33		
Tot. loans av.*(demeaned\a secondary rp)					-75.32	-0.20		
Tot. loans av.*(demeaned\a tertiary rp)					-146.74	-0.39		
Tot. loans av.*(demeaned\a years in village)					2.36	1.81		
Tot. loans av.*(demeaned\a house size)					-0.14	-1.00		
Number of loan cycles							371.66	1.01
No. loan cyls*(demeaned\a age)							52.92	0.48
No. loan cyls*(demeaned\a age square)							-0.51	-0.44
No. loan cyls*(demeaned\a female rp)							203.62	0.38
No. loan cyls*(demeaned\a elementary rp)							-2604.32	-0.93
No. loan cyls*(demeaned\a secondary rp)							-2104.61	-0.75
No. loan cyls*(demeaned\a tertiary rp)							-3335.44	-1.18
No. loan cyls*(demeaned\a years in village)							2.05	0.15
No. loan cyls*(demeaned\a house size)							-5.76	-3.08
Constant	24014.61	2.09	22545.69	1.97	27587.03	2.43	23135.17	2.03
Model Statistics								
Sample	2018		2013		2013		2013	
F on Ho: u_i=0	3.776		3.759		3.659		3.728	
Overall R-square	0.097		0.095		0.103		0.097	

\a=variable-mean(variable)

Table A3: Impact on percapita savings (Income-Total Expenditure)
Estimation: Fixed-effects regression

Variables	Treatment variable							
	Availed Loan (1=Yes)		Months program available		Total Loans ('000)		No. of loan Cycles	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Member	2236.09	1.64	2480.37	1.91	2405.95	1.74	2408.72	1.71
Availed loan	1086.47	0.56						
Age, reference person (rp)	-299.55	-1.04	-224.11	-0.79	-273.93	-0.98	-212.86	-0.75
Age square, rp	5.18	1.64	4.19	1.35	4.37	1.43	3.96	1.27
Female, rp	6470.88	3.86	6984.20	4.28	7177.98	4.44	7158.27	4.35
Elementary, rp	3679.23	0.50	3427.81	0.47	1843.94	0.25	4204.14	0.58
Secondary, rp	5719.60	0.78	5869.42	0.80	2838.71	0.39	6061.62	0.83
Tertiary, rp	7515.31	1.02	7368.70	1.00	4939.82	0.68	8351.10	1.14
Years in village	7.53	0.16	19.67	0.43	-15.21	-0.35	-3.63	-0.08
House size	-0.55	-0.05	-2.15	-0.21	0.28	0.03	-0.96	-0.09
Availed loan*(demeaned\a age)	303.82	0.40						
Availed loan*(demeaned\a age square)	-3.57	-0.44						
Availed loan*(demeaned\a female rp)	-1273.61	-0.36						
Availed loan*(demeaned\a elementary rp)	-12378.80	-0.81						
Availed loan*(demeaned\a secondary rp)	-7381.94	-0.49						
Availed loan*(demeaned\a tertiary rp)	-5951.78	-0.39						
Availed loan*(demeaned\a years in vill.)	-17.56	-0.19						
Availed loan*(demeaned\a house size)	17.94	1.09						
Months program available			7.64	0.32				
Mos prog avail*(demeaned\a age)			-1.50	-0.15				
Mos prog avail*(demeaned\a age square)			0.03	0.25				
Mos prog avail*(demeaned\a female rp)			-48.09	-1.17				
Mos prog avail*(demeaned\a elementary rp)			-140.45	-0.78				
Mos prog avail*(demeaned\a secondary rp)			-87.83	-0.49				
Mos prog avail*(demeaned\a tertiary rp)			-57.55	-0.32				
Mos prog avail*(demeaned\a years in village)			-0.86	-0.78				
Mos prog avail*(demeaned\a house size)			0.29	1.49				
Total loans availed (000)					-8.54	-0.26		
Tot. loans av.*(demeaned\a age)					3.97	0.43		
Tot. loans av.*(demeaned\a age square)					0.00	-0.04		
Tot. loans av.*(demeaned\a female rp)					-71.81	-1.65		
Tot. loans av.*(demeaned\a elementary rp)					-37.70	-0.12		
Tot. loans av.*(demeaned\a secondary rp)					113.95	0.37		
Tot. loans av.*(demeaned\a tertiary rp)					107.76	0.35		
Tot. loans av.*(demeaned\a years in village)					1.16	1.07		
Tot. loans av.*(demeaned\a house size)					0.10	0.85		
Number of loan cycles							54.17	0.18
No. loan cyls*(demeaned\a age)							-27.70	-0.30
No. loan cyls*(demeaned\a age square)							0.48	0.49
No. loan cyls*(demeaned\a female rp)							-646.14	-1.45
No. loan cyls*(demeaned\a elementary rp)							-2217.31	-0.95
No. loan cyls*(demeaned\a secondary rp)							-1290.50	-0.55
No. loan cyls*(demeaned\a tertiary rp)							-1427.48	-0.61
No. loan cyls*(demeaned\a years in village)							2.97	0.26
No. loan cyls*(demeaned\a house size)							1.77	1.13
Constant	6635.64	0.69	5211.08	0.55	9896.54	1.05	4964.79	0.52
Model Statistics								
Sample	2018		2013		2013		2013	
F on Ho: u_i=0	2.027		2.005		2.024		2.002	
Overall R-square	0.033		0.035		0.043		0.036	

\a=variable-mean(variable)

Table A4: Impact on percapita savings (Income-Total Exp+Educ+Health+Dur. Fur.)
Estimation: Fixed-effects regression

Variables	Treatment variable							
	Availed Loan (1=Yes)		Months program available		Total Loans ('000)		No. of loan Cycles	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Member	1666.10	1.17	1925.45	1.42	1736.91	1.21	1761.29	1.20
Availed loan	1626.08	0.80						
Age, reference person (rp)	-221.99	-0.74	-125.61	-0.42	-166.51	-0.57	-116.60	-0.39
Age square, rp	5.16	1.57	3.94	1.22	4.00	1.26	3.72	1.15
Female, rp	6461.64	3.71	7189.74	4.24	6994.08	4.17	7190.84	4.21
Elementary, rp	3950.23	0.52	3615.23	0.48	1617.78	0.21	4512.22	0.60
Secondary, rp	6514.62	0.86	6749.56	0.89	3187.02	0.42	6999.33	0.93
Tertiary, rp	9577.25	1.25	9451.53	1.24	6525.52	0.86	10497.16	1.38
Years in village	16.86	0.35	30.55	0.65	-14.76	-0.32	3.94	0.08
House size	7.19	0.63	4.15	0.39	7.42	0.72	7.83	0.73
Availed loan*(demeaned\a age)	480.18	0.61						
Availed loan*(demeaned\a age square)	-5.70	-0.68						
Availed loan*(demeaned\a female rp)	41.22	0.01						
Availed loan*(demeaned\a elementary rp)	-12821.71	-0.81						
Availed loan*(demeaned\a secondary rp)	-6660.57	-0.42						
Availed loan*(demeaned\a tertiary rp)	-6814.94	-0.43						
Availed loan*(demeaned\a years in vill.)	-30.88	-0.33						
Availed loan*(demeaned\a house size)	19.74	1.15						
Months program available			14.23	0.58				
Mos prog avail*(demeaned\a age)			-0.79	-0.08				
Mos prog avail*(demeaned\a age square)			0.02	0.14				
Mos prog avail*(demeaned\a female rp)			-43.30	-1.01				
Mos prog avail*(demeaned\a elementary rp)			-142.93	-0.77				
Mos prog avail*(demeaned\a secondary rp)			-81.83	-0.44				
Mos prog avail*(demeaned\a tertiary rp)			-70.21	-0.37				
Mos prog avail*(demeaned\a years in village)			-1.17	-1.02				
Mos prog avail*(demeaned\a house size)			0.35	1.76				
Total loans availed (000)					0.72	0.02		
Tot. loans av.*(demeaned\a age)					3.87	0.41		
Tot. loans av.*(demeaned\a age square)					-0.01	-0.05		
Tot. loans av.*(demeaned\a female rp)					-40.97	-0.91		
Tot. loans av.*(demeaned\a elementary rp)					-17.05	-0.05		
Tot. loans av.*(demeaned\a secondary rp)					150.83	0.47		
Tot. loans av.*(demeaned\a tertiary rp)					126.77	0.39		
Tot. loans av.*(demeaned\a years in village)					1.51	1.34		
Tot. loans av.*(demeaned\a house size)					0.12	1.02		
Number of loan cycles							154.39	0.48
No. loan cyls*(demeaned\a age)							-24.89	-0.26
No. loan cyls*(demeaned\a age square)							0.43	0.42
No. loan cyls*(demeaned\a female rp)							-503.39	-1.09
No. loan cyls*(demeaned\a elementary rp)							-2288.08	-0.94
No. loan cyls*(demeaned\a secondary rp)							-1238.19	-0.51
No. loan cyls*(demeaned\a tertiary rp)							-1571.55	-0.64
No. loan cyls*(demeaned\a years in village)							1.63	0.14
No. loan cyls*(demeaned\a house size)							1.64	1.01
Constant	4909.24	0.49	3030.73	0.31	8276.83	0.85	2743.90	0.28
Model Statistics								
Sample	2018		2013		2013		2013	
F on Ho: u_i=0	2.123		2.095		2.114		2.09	
Overall R-square	0.048		0.049		0.061		0.052	

\a=variable-mean(variable)

Table A5: Impact on percapita food expenditure
Estimation: Fixed-effects regression

Variables	Treatment variable							
	Availed Loan (1=Yes)		Months program available		Total Loans ('000)		No. of loan Cycles	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Member	-618.85	-1.19	-382.19	-0.77	-434.77	-0.82	-446.90	-0.83
Availed loan	1332.99	1.80						
Age, reference person (rp)	-342.24	-3.12	-328.97	-3.04	-316.48	-2.96	-334.18	-3.09
Age square, rp	4.39	3.66	4.31	3.65	4.15	3.55	4.36	3.69
Female, rp	2565.08	4.03	2710.60	4.37	2635.84	4.27	2748.78	4.39
Elementary, rp	199.15	0.07	229.19	0.08	-335.95	-0.12	419.52	0.15
Secondary, rp	1773.31	0.64	1962.27	0.71	1504.31	0.54	2153.23	0.78
Tertiary, rp	4461.22	1.59	4422.55	1.58	3739.61	1.34	4428.32	1.59
Years in village	-16.19	-0.92	-12.78	-0.74	-17.38	-1.03	-17.40	-1.01
House size	8.84	2.11	8.07	2.05	5.20	1.37	7.74	1.97
Availed loan*(demeaned\a age)	446.99	1.55						
Availed loan*(demeaned\a age square)	-4.78	-1.56						
Availed loan*(demeaned\a female rp)	1843.03	1.36						
Availed loan*(demeaned\a elementary rp)	-3213.50	-0.56						
Availed loan*(demeaned\a secondary rp)	-3022.67	-0.52						
Availed loan*(demeaned\a tertiary rp)	-4966.67	-0.85						
Availed loan*(demeaned\a years in vill.)	6.22	0.18						
Availed loan*(demeaned\a house size)	-13.10	-2.09						
Months program available			12.09	1.35				
Mos prog avail*(demeaned\a age)			4.63	1.24				
Mos prog avail*(demeaned\a age square)			-0.05	-1.36				
Mos prog avail*(demeaned\a female rp)			19.13	1.22				
Mos prog avail*(demeaned\a elementary rp)			-35.83	-0.53				
Mos prog avail*(demeaned\a secondary rp)			-42.77	-0.63				
Mos prog avail*(demeaned\a tertiary rp)			-55.73	-0.81				
Mos prog avail*(demeaned\a years in village)			-0.14	-0.33				
Mos prog avail*(demeaned\a house size)			-0.16	-2.13				
Total loans availed (000)					13.55	1.07		
Tot. loans av.*(demeaned\a age)					4.46	1.27		
Tot. loans av.*(demeaned\a age square)					-0.05	-1.37		
Tot. loans av.*(demeaned\a female rp)					26.11	1.58		
Tot. loans av.*(demeaned\a elementary rp)					-43.94	-0.37		
Tot. loans av.*(demeaned\a secondary rp)					-59.57	-0.51		
Tot. loans av.*(demeaned\a tertiary rp)					-58.30	-0.49		
Tot. loans av.*(demeaned\a years in village)					0.29	0.70		
Tot. loans av.*(demeaned\a house size)					-0.04	-0.91		
Number of loan cycles							140.92	1.20
No. loan cyls*(demeaned\a age)							50.70	1.45
No. loan cyls*(demeaned\a age square)							-0.58	-1.56
No. loan cyls*(demeaned\a female rp)							161.53	0.95
No. loan cyls*(demeaned\a elementary rp)							-674.11	-0.76
No. loan cyls*(demeaned\a secondary rp)							-747.03	-0.84
No. loan cyls*(demeaned\a tertiary rp)							-767.18	-0.86
No. loan cyls*(demeaned\a years in village)							2.00	0.47
No. loan cyls*(demeaned\a house size)							-1.17	-1.98
Constant	16543.55	4.55	16011.16	4.42	16588.78	4.60	16076.59	4.46
Model Statistics								
Sample	2018		2013		2013		2013	
F on Ho: u_i=0	3.597		3.572		3.532		3.576	
Overall R-square	0.061		0.06		0.063		0.059	

\a=variable-mean(variable)

Table A6: Impact on other (non-GBA) loans

Variables	Availed of Non-GBA Loans		Amt. of Non-GBA Loans		No. of Non-GBA Loans	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Member	-0.031	-0.42	-3.926	-1.57	0.022	0.18
Availed loan	-0.175	-1.91	-0.654	-0.21	0.166	0.96
Propensity score (PS)	1.160	2.68	46.546	3.03	0.348	0.48
Availed loan.*(demeaned\a PS)	-1.170	-1.25	-60.886	-1.98	-0.819	-0.68
Sigma			35.335	28.07		
Constant	-0.903	-8.40	-35.813	-8.80		
Sample	2001		2018		478	
Chi-square	13.823				2.329	
Estimation procedure	Probit		Tobit		Poisson	

\a=variable-mean(variable)

Table A7: Probit first stage - propensity score

Variables	Coefficient	Standard Error	z-value
Age, reference person (rp)	0.0770	0.0190	4.06
Age square., rp	-0.0007	0.0002	-3.33
Female, rp	-0.1447	0.0908	-1.59
Elementary, rp	0.0643	0.3974	0.16
Secondary, rp	0.0543	0.3962	0.14
Tertiary, rp	0.0434	0.3993	0.11
Years in village	0.0035	0.0023	1.53
House size	0.0020	0.0005	4.35
Constant	-2.9919	0.5924	-5.05
Sample	2018		
Pseudo R-square	0.034		

Table A8: Impact on personal savings

Variables	Have personal savings		Amount of personal saving by group	
	Coefficient	z-value	Coefficient	z-value
Member	0.341	4.95	-0.447	-4.7
Availed loan	0.687	7.20	0.347	3.09
Propensity score (PS)	0.465	1.13	0.990	1.83
Availed loan.*(demeaned\a PS)	-1.469	-1.55	-0.710	-0.67
Cut point 1			0.630	4.56
Cut point 2			1.143	8.05
Constant	-0.045	-0.44		
Sample	2010		1056	
Chi-square	154.81		25.37	
Estimation procedure	Probit		Ordered Probit	

\a=variable-mean(variable)

Table A9: Impact on household enterprise and employment
Estimation: Fixed-Effects Poisson Regression

Variables	Total Number of enterprises			Total number of employees		
	Coefficient	z-value	IRR	Coefficient	z-value	IRR
Member	0.210	4.13	1.23	0.237	5.51	1.27
Availed loan	0.185	2.63	1.20	0.161	2.73	1.17
Propensity score (PS)	0.850	2.95	2.34	0.814	3.36	2.26
Availed loan.*(demeaned\a PS)	-0.273	-0.54	0.76	0.294	0.74	1.34
Sample	2018			2018		
Chi-square	91.544			156.787		

\a=variable-mean(variable)
IRR = Incidence Rate Ratio

Table A10: First Stage Propensity Score Regression
Dependent Variable: Avail loan
Estimation Procedure: Probit

Independent Variables	Coefficient	Standard Error	z-value
Age, reference person (rp)	0.077	0.0190	4.06
Age square, rp	-0.001	0.0002	-3.33
Female, rp	-0.145	0.0908	-1.59
Elementary, rp	0.064	0.3974	0.16
Secondary, rp	0.054	0.3962	0.14
Tertiary, rp	0.043	0.3993	0.11
Years in village	0.004	0.0023	1.53
House size	0.002	0.0005	4.35
Constant	-2.992	0.5924	-5.05
Sample Size	2,018		
LR Chi-square (8)	74.73		

Table A11: Impact on Total Assets
Estimation: Fixed-effects Tobit

Variables	Coef.	Std. Err.	z-value
Member	1015.2	100937.5	0.01
Availed loan	-37891.2	122070.3	-0.31
Propensity score (PS)	1396583.0	612817.9	2.28
Availed loan.*(demeaned\a PS)	-975040.5	1208059.0	-0.81
Constant	-138725.2	150595.1	-0.92
sigma_u	0.0	45864.64	0.00
sigma_e	1866553.0		
rho	0.0		
Sample	2018		
Chi-square (4)	5.38		

\a=variable-mean(variable)

Table A12: First Stage Propensity Score Regression
Dependent Variable: Avail loan
Estimation Procedure: Probit

	Coef.	Standard Error	z-value
Age, reference person (rp)	0.0770	0.0190	4.06
Age square, rp	-0.0007	0.0002	-3.33
Female, rp	-0.1447	0.0908	-1.59
Elementary, rp	0.0643	0.3974	0.16
Secondary, rp	0.0543	0.3962	0.14
Tertiary, rp	0.0434	0.3993	0.11
Years in village	0.0035	0.0023	1.53
House size	0.0020	0.0005	4.35
Constant	-2.9919	0.5924	-5.05
Sample Size	2018		
LR Chi-square (8)	74.73		

Table A13: Impact on Education

Variables	Age groups						Exp. per	
	6-12		13-16		17-24		att. child	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	t-value
Member	-0.044	-0.16	-0.049	-0.21	0.017	0.1	-39.305	-0.05
Availed loan	0.572	1.42	0.144	0.52	0.24	1.22	-681.985	-0.62
Propensity score (PS)	2.135	1.1	3.035	1.52	5.807	6.01		
Availed loan.*(demeaned\a PS)	0.209	0.06	1.163	0.4	-4.817	-2.26		
Age, reference person (rp)							104.755	0.53
Age square, rp							1.499	0.67
Female, rp							-575.653	-0.51
Elementary, rp							1795.53	0.96
Secondary, rp							5082.852	2.63
Tertiary, rp							6394.019	3.03
Years in village							27.014	0.92
House size							16.096	1.98
Elem school available							853.967	0.61
Secondary school available							-2476.33	-1.61
Tertiary school available							1429.158	0.78
Availed loan*(demeaned\a age)							725.98	1.8
Availed loan*(demeaned\a age square)							-8.19	-1.94
Availed loan*(demeaned\a female rp)							-505.695	-0.26
Availed loan*(demeaned\a elementary rp)							-1859.15	-0.46
Availed loan*(demeaned\a secondary rp)							-1175.27	-0.28
Availed loan*(demeaned\a tertiary rp)							-3918.33	-0.91
Availed loan*(demeaned\a years in village)							-107.584	-2.2
Availed loan*(demeaned\a house size)							-9.484	-0.97
Availed loan*(demeaned\a elementary school)							-223.88	-0.09
Availed loan*(demeaned\a secondary school)							2162.682	1.22
Availed loan*(demeaned\a tertiary school)							132.582	0.04
Constant	2.392	4.88	1.139	2.3	-2.245	-8.9	-6009.35	-1.21
Sample	1036		758		868		1404	
Chi-square	5.261		7.125		39.436			
R-square							0.088	
Estimation procedure	GLM\b		GLM\b		GLM\b		Fixed-Eff.	

\a=variable-mean(variable)
\b=Fractional Logit (Papke and Wooldridge,1996)

Table A14: First stage probit - Education

Variable	Coefficient	Standard Error	z-value
Age, reference person (rp)	0.0781	0.0191	4.09
Age square, rp	-0.0007	0.0002	-3.33
Female, rp	-0.1493	0.0912	-1.64
Elementary, rp	0.0671	0.3974	0.17
Secondary, rp	0.0537	0.3963	0.14
Tertiary, rp	0.0382	0.3994	0.10
Years in village	0.0033	0.0023	1.41
House size	0.0019	0.0005	4.11
Elem school available	0.0590	0.1207	0.49
Secondary school available	-0.0432	0.0716	-0.60
Tertiary school available	0.1923	0.1057	1.82
Constant	-3.0729	0.6073	-5.06
Sample	2001		
Pseudo R-square	0.0345		

Table A15: Impact on health

Variables	Proportion ill or injured		Prop who seek treatment if ill or injured		Prop fully immunized 0-5 years		Per capita medical expenditures	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	t-value
Member	0.193	1.39	0.171	0.73	0.259	1.34	-253.469	-1.56
Availed loan	0.062	0.38	-0.035	-0.13	-0.031	-0.12	19.656	0.07
Propensity score (PS)	1.967	2.17	2.17	1.62	0.967	0.92		
Availed loan.*(demeaned\a PS)	-1.828	-1.15	0.256	0.12	-1.921	-0.9		
Age, reference person (rp)							-174.387	-1.98
Age square, rp							2.3	2.11
Female, rp							5.883	0.02
Elementary, rp							485.616	1.05
Secondary, rp							202.958	0.55
Tertiary, rp							493.215	1.33
Years in village							4.781	0.69
House size							2.226	1.01
Govt hospital available							-252.641	-0.37
Private hospital available							479.518	0.81
Private clinic available							-398.245	-1.11
Health clinic available							333.16	1.67
Barangay Health Station available							83.307	0.68
Availed loan*(demeaned\a age, rp)							63.685	0.53
Availed loan*(demeaned\a age square, rp)							-0.943	-0.65
Availed loan*(demeaned\a female rp)							230.852	0.48
Availed loan*(demeaned\a elementary rp)							-736.62	-0.98
Availed loan*(demeaned\a secondary rp)							-178.779	-0.28
Availed loan*(demeaned\a tertiary rp)							-997.452	-1.36
Availed loan*(demeaned\a years in village)							-10.416	-0.75
Availed loan*(demeaned\a house size)							-1.76	-0.7
Availed loan*(demeaned\a govt hospital)							-718.734	-0.68
Availed loan*(demeaned\a private hospital)							-155.636	-0.2
Availed loan*(demeaned\a private clinic)							335.812	0.69
Availed loan*(demeaned\a health clinic)							(dropped)	
Availed loan*(demeaned\a BHS)							-320.088	-0.95
Constant	-2.927	-13.16	0.196	0.56	0.464	1.96	2941.841	1.74
Sample	1994		456		794		1994	
Chi-square	9.199		5.448		3.733			
R-square							0.031	
Estimation procedure	GLM\b		GLM\b		GLM\b		Fixed-Eff.	

\a=variable-mean(variable)
\b=Fractional Logit (Papke and Wooldridge,1996)

Table A16: First stage probit - Health

Variable	Coeficient	Standard Error	z-value
Age, reference person (rp)	0.0801	0.0193	4.15
Age square, rp	-0.0007	0.0002	-3.43
Female, rp	-0.1466	0.0920	-1.59
Elementary, rp	0.0954	0.3956	0.24
Secondary, rp	0.0950	0.3946	0.24
Tertiary, rp	0.0765	0.3976	0.19
Years in village	0.0036	0.0023	1.55
House size	0.0019	0.0005	4.10
Govt hospital available	0.4778	0.1144	4.18
Private hospital available	-0.1462	0.1507	-0.97
Private clinic available	-0.1156	0.0900	-1.28
Barangay Health Station available	-1.4195	0.0860	-16.51
Constant	-3.1444	0.6023	-5.22
Sample	1994		
Pseudo R-square	0.042		

Table A17: Impact on hunger and reduced food consumption

Variable	Hunger incidence		Reduced food incidence	
	Coefficient	z-value	Coefficient	z-value
Member	-0.049	-0.32	-0.023	-0.26
Availed loan	-0.004	-0.02	-0.051	-0.47
Propensity score (PS)	1.292	1.55	-0.343	-0.63
Availed loan.*(demeaned\a PS)	-0.041	-0.03	1.607	1.66
Constant	-2.287	-10.96	-1.114	-8.49
Sample	2014		2009	
Chi-square	3.645		3.042	
Estimation procedure	Probit		Probit	

\a=variable-mean(variable)

Table A18: First stage probit - Hunger

Variable	Coefficient	Standard Error	z-value
Age, reference person (rp)	0.0770	0.0190	4.06
Age square, rp	-0.0007	0.0002	-3.33
Female, rp	-0.1447	0.0908	-1.59
Elementary, rp	0.0643	0.3974	0.16
Secondary, rp	0.0543	0.3962	0.14
Tertiary, rp	0.0434	0.3993	0.11
Years in village	0.0035	0.0023	1.53
House size	0.0020	0.0005	4.35
Constant	-2.9919	0.5924	-5.05
Sample	2,018		
Pseudo R-square	0.0340		

Table A.19: Impact on per capita income, expenditure, savings, food expenditure with income quintile
Estimation: Fixed-effects regression

Variables	Per capita income		Per capita expenditure		Per capita sav 1		Per capita sav 2		Per capita food exp.	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Member	-116.63	-0.06	-2,293.17	-1.44	2,176.54	1.65	1,600.41	1.18	-630.41	-1.24
Quartile 1*Availed Loan	-23,213.95	-5.08	-9,459.75	-2.71	-13,754.20	-4.79	-14,567.24	-4.91	-3,476.87	-3.13
Quartile 2*Availed Loan	-13,903.13	-3.34	-6,752.58	-2.13	-7,150.55	-2.74	-7,680.61	-2.84	-1,408.46	-1.39
Quartile 3*Availed Loan	-1,212.17	-0.30	1,849.64	0.60	-3,061.81	-1.21	-3,010.56	-1.15	1,382.08	1.41
Quartile 4*Availed Loan	45,113.72	11.35	23,915.60	7.88	21,198.11	8.48	23,928.61	9.27	6,659.93	6.89
Age, ref. person (rp)	-882.79	-2.00	-592.84	-1.76	-289.95	-1.04	-211.35	-0.74	-341.30	-3.18
Age square, rp	13.71	2.84	8.65	2.35	5.05	1.66	5.01	1.60	4.38	3.73
Female, rp	14,827.07	5.78	8,531.91	4.36	6,295.16	3.90	6,265.26	3.76	2,523.97	4.05
Elem, rp	6,826.59	0.61	4,464.90	0.52	2,361.69	0.33	2,489.98	0.34	-180.25	-0.07
Secondary, rp	13,450.09	1.20	8,664.14	1.01	4,785.95	0.68	5,478.81	0.75	1,514.57	0.56
Tertiary, rp	25,738.28	2.28	19,060.37	2.21	6,677.91	0.94	8,648.25	1.18	4,229.01	1.54
Years in village	57.94	0.82	49.95	0.92	7.99	0.18	17.34	0.38	-16.06	-0.93
House size	80.01	4.74	79.93	6.20	0.08	0.01	7.89	0.72	9.05	2.20
Availed loan*(demeaned\a age)	1,434.61	1.23	782.92	0.88	651.69	0.89	863.49	1.14	545.47	1.92
Availed loan*(demeaned\a age square)	-19.40	-1.57	-9.85	-1.04	-9.55	-1.23	-12.30	-1.53	-6.47	-2.15
Availed loan*(demeaned\a female rp)	-3,305.85	-0.60	1,620.92	0.38	-4,926.78	-1.42	-3,952.96	-1.10	646.84	0.48
Availed loan*(demeaned\a elementary rp)	-14,132.79	-0.61	-8,641.05	-0.49	-5,491.74	-0.37	-5,197.95	-0.34	-1,560.10	-0.28
Availed loan*(demeaned\a secondary rp)	-15,374.72	-0.66	-9,062.08	-0.51	-6,312.65	-0.43	-5,467.91	-0.36	-3,118.41	-0.55
Availed loan*(demeaned\a tertiary rp)	-30,681.25	-1.31	-24,004.88	-1.34	-6,676.38	-0.45	-7,609.41	-0.50	-5,532.37	-0.97
Availed loan*(demeaned\a years in vill.)	37.58	0.27	-6.21	-0.06	43.78	0.50	37.61	0.42	23.85	0.71
Availed loan*(demeaned\a house size)	-71.70	-2.83	-73.28	-3.78	1.58	0.10	1.60	0.10	-17.51	-2.84
Constant	32,381.63	2.21	24,922.72	2.23	7,458.91	0.81	5,824.55	0.61	16,801.31	4.72
Model Statistics										
Sample	2018		2,018		2,018		2,018		2,018	
F on Ho: u_i=0	3.068		3.437		1.652		1.723		3.232	
Overall R2	0.223		0.157		0.122		0.147		0.114	

\a=var-mean(var)

Table A.20: Impact on per capita income, expenditure, savings, food expenditure by education of reference person
Estimation: Fixed-effects regression

Variable	Per capita income		Per capita expenditure		Per capita sav 1		Per capita sav 2		Per capita food exp.	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Member	41.82	0.02	-2,222.14	-1.34	2,263.96	1.66	1,700.56	1.20	-589.73	-1.13
At most some elementary	-5,864.09	-1.43	-1,511.02	-0.50	-4,353.08	-1.74	-4,903.94	-1.88	-45.32	-0.05
Secondary	9,726.60	2.60	7,301.51	2.64	2,425.09	1.06	3,520.61	1.48	1,566.66	1.79
At least some tertiary	9,805.45	2.12	4,205.85	1.23	5,599.61	1.99	6,353.41	2.17	2,254.07	2.09
Age, reference person (rp)	-861.01	-1.82	-577.27	-1.65	-283.74	-0.98	-203.46	-0.68	-333.74	-3.02
Age square, rp	12.37	2.40	7.64	2.00	4.73	1.50	4.57	1.39	4.02	3.33
Female, rp	15,908.65	5.81	9,348.97	4.62	6,559.68	3.93	6,634.47	3.82	2,751.31	4.30
Years in village	18.61	0.25	19.88	0.35	-1.26	-0.03	4.27	0.09	-25.45	-1.43
House size	91.32	5.10	89.62	6.76	1.71	0.16	10.78	0.95	11.92	2.85
Availed loan*(demeaned\a age)	738.29	0.59	441.37	0.48	296.92	0.39	470.60	0.59	442.62	1.52
Availed loan*(demeaned\a age sq	-6.39	-0.48	-3.13	-0.32	-3.26	-0.40	-5.26	-0.63	-4.48	-1.45
Availed loan*(demeaned\a female	3,184.27	0.54	4,536.02	1.05	-1,351.75	-0.38	-98.17	-0.03	1,693.89	1.24
Availed loan*(demeaned\a years i	-58.74	-0.40	-50.10	-0.46	-8.64	-0.10	-19.17	-0.20	13.81	0.40
Availed loan*(demeaned\a house	-51.59	-1.91	-67.07	-3.36	15.48	0.94	16.03	0.94	-16.10	-2.55
Constant	48,203.67	4.61	35,872.44	4.64	12,331.24	1.93	11,669.44	1.76	18,775.29	7.68
Model Statistics										
Sample	2,018		2,018		2,018		2,018		2,018	
F on Ho: u_i=0	3.966		4.113		2.086		2.223		3.875	
Overall R2	0.069		0.062		0.028		0.039		0.03	

\a=variable-mean(variable)