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Does Microfinance Promote Women's Empowerment? An Empirical Investigation

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and
Sayema H. Bidisha

Abstract

The role of microcredit in promoting women empowerment remains a subject matter of academic as well as policy interest. The related empirical assessments are often flawed by the shortcomings associated with the methodologies employed that fail to tackle such issues as non-random participation and self-selection of program participants influenced by their unobserved characteristics. This paper employs suitable econometric techniques to overcome these problems while using a large household database providing information on individual characteristics of women, which makes it possible to construct several empowerment indicators. Given the nature of the available information, both the panel data modelling strategy and appropriate estimation procedures for cross-section data are used in empirical investigations. The results support strong positive effects of microcredit programs on women's empowerment.

By introducing a group-based lending system, where the members themselves act as collateral for future sanctions of loans, usually in small amounts, microcredit programs have received a lot of attention not only for making the poor credit-worthy who otherwise would not have had access to the formal banking system, but also for their role in poverty alleviation. There is now evidence to suggest that along with high repayment rates, microcredit programs have contributed to increased incomes, consumption, asset accumulation, and reduced poverty incidence for their borrowers (Khandker, 2005). One of the salient features of microcredit programs is the massive participation of women, who have created self-employment opportunities for themselves and other household members. Such employment opportunities are generally considered to have contributed not only to the financial betterment of rural women and improved living standard of their households, but are also thought to have helped raise borrowers' self-esteem, promote awareness about socio-economic and political issues and their rights, and enhance greater decision-making capacity within the household, all of which contributes to women's improved empowerment.

While various socio-economic impact assessments of NGO programs tend to report positive effects of microcredit interventions on women's empowerment, critics, however, argue that the existing patriarchal social structures – often compounded by religious norms and practices – imply women's very limited control over the credit money and little access to markets. Furthermore, given the pressure of repayment, the women borrowers have to undergo tremendous within-household conflict, which actually is disempowering. Therefore, the effect of

microcredit on women's relative status and empowerment remains controversial.

In analyzing the link between women empowerment and participation in credit programs, the key challenges are to measure empowerment and to tackle the methodological problems associated with the evaluation of program effects. Given the nature of the concept of empowerment, its quantitative measure is not straightforward. The standard practice has been to use various proxies through which women's position in the household can be captured. These include, amongst others, their ability to influence household decision-making over a range of activities, awareness about essential socio-economic and political issues, physical mobility, etc. The indicator variables are usually constructed from the responses of women to various questions asked during household surveys that are especially designed to incorporate different aspects of empowerment.

In terms of the empirical methodology, when empowerment indicators are compared between borrowers and non-borrowers to assess the impact of micro-credit programs, as done in most studies, analyses could be seriously flawed because of various sources of bias. In a cross sectional sample when the women in microcredit programs are found to show better empowerment outcomes, it might suggest at least two possible interpretations: either micro-credit effectively promotes women's status or the programs select already empowered borrowers. The latter reasoning could also imply participants' self-selecting into programs, which may be influenced by their inherent and unobserved characteristics. Therefore, an improved empowerment effect may be wrongly attributed to program participation unless suitable and

appropriate empirical frameworks are used. Much of the problem can be overcome when the required information is available both across and over time on both groups of people, yielding a panel database. However, even for pure cross-section data, there are ways of dealing with the biases.¹

In this backdrop, this paper aims to examine the relationship between women's empowerment and participation in microcredit programs, using a unique dataset that has been developed by the Palli Karma Sahayak Foundation (PKSF), which was set up in 1990 by the Government of Bangladesh to monitor the activities of and assess the effectiveness of microfinance institutions (MFIs) in the country. With a view to assessing program impacts, PKSF has developed a longitudinal database comprising about 3,000 households with so far four rounds of repeat surveys – one each undertaken in 1998, 2000, 2001 and 2005. The latest round of survey incorporated a wide range of questions on women's relative status within the household and thus a significant proportion of the empirical analysis of this paper is based on it. For a number of other aspects of women empowerment, the dataset allows comparing information across survey rounds and across microcredit participants and non-participants. This paper makes use of both the panel and cross-section dimensions of this dataset while employing appropriate methodologies to tackle various sources of bias in assessing the effect of microcredit on various quantifiable measures of empowerment.

This paper is organized as follows: after this introduction, Section 2 provides a brief review of the literature; Section 3 introduces the data, explains the ways of constructing the empowerment proxies, and outlines the methodologies for empirical analysis; Section 4 provides the results; and Section 5 concludes.

A Brief Review of the Literature

There have been numerous attempts in the literature to conceptualize women's empowerment although given its nature quantifying it is no straightforward task.² From an empirical view point the standard practice has been to proxy empowerment in terms of various indicators through which women's position in the household, their ability to exercise freedom as well as their level of awareness in terms of essential socio-economic features can be captured. The indicator variables are generally constructed from the responses of women to various questions asked during household surveys. Although such questions are mainly on day-to-day activities and on general

knowledge of the women, they are specially designed to capture different aspects of empowerment. Depending on the socio-economic structure of the country under consideration, position of women in the society could differ and the indicators should incorporate such differences as well. In this context, Maghadam and Senftova (2005) have analyzed empowerment with several broad (referred as 'domain') and as many as 44 specific indicators. The broad indicators comprised socio-economic factors; women's right to protect herself from violence and to maintain physical/sexual health (referred to as 'bodily integrity and health'); literacy and educational attainment; and economic, political and cultural participation and rights. Indeed the idea of using indicators to assess women's status or empowerment was popularized by Schuler and Hashemi (1994) and Hashemi *et al* (1996) as both studies aimed to provide some empirical evidence of program effects on women in Bangladesh. In both the studies the indicators were constructed using information on women's physical mobility, economic security, ability to make purchases, freedom from domination and violation, decision-making capacity, political/legal awareness and participation in political activities. Since then many authors have also used these indicators selectively. For example, Anderson and Eswaran (2009) evaluated women's position in the household by their mobility, ability to purchase different household items independently and various responses to questions related to female autonomy.³ In her analysis of Indian data, Garikipati (2008) considered several "vulnerability" and "empowerment"-related indicators.⁴ On the other hand, Amin and Pebley (1996) constructed three indices, viz. (i) interspouse consultation index, (ii) individual autonomy index and (iii) authority index, to assess empowerment. While in most cases the terms 'status' and women's 'empowerment' have been used synonymously some authors have distinguished between them. For instance, to assess empowerment Vlassoff (1994) made use of indicators related to educational attainment and mobility along with several 'attitudinal' indicators including personal autonomy, perceived economic power and 'prestige' in the household. However, responses to questions like approval of consulting girls in the choice of husband, approval of educating girls, approval of giving dowry, decision making power for purchasing cloth, amount of leisure time enjoyed, approval of eating with husband etc were used for assessing women's status.

The use of indicators and construction of scores as a proxy for empowerment has however been

questioned. Pitt *et al.* (2003) argue that such scoring exercises are arbitrary in nature due to the random choice of weights assigned to various outcomes associated with indicator variables. In their analysis of the effect of microcredit on women empowerment for Bangladesh, although they used empowerment proxies similar to those of Hashemi *et al.* (1996), Pitt *et al.* (2006) measured empowerment as a latent variable incorporating a variety of indicators that influence women's decision making power, autonomy, mobility, and participation in income-earning activities.

On the effects of microcredit participation on women's empowerment the literature provides mixed results. In a recent study, Duvendack *et al.* (2011) conclude that there is no strong evidence of empowering effect, a result which they claim is drawn from an extensive search of the literature. However, amongst others, in a much earlier study Naved (1994), with the help of focus group discussions and open-ended interviews, found microcredit to increase the mobility of women, improve their position, allow them to control a portion of the household income, and give them a sense of independence.⁵ The author however admitted that the interventions undertaken to change the attitudes of participants towards dowry and gender gap in educational attainment might have not been successful. Qualitative analysis of Amin and Pebley (1996) also showed that while women in microfinance organizations have had greater access to financial services and income-generating activities, in household decision making there was no significant difference between program participants and non-participants.⁶ In another study, based on a sample of 2000 households, Mahmud (2003) observed significant impact of credit programs on women's enhanced self-employment activities, ability to exercise decision making role in intra-household processes, and mobility into certain public places, but no such effects were found on women's wage employment and mobility into male-dominated places. The author argued that despite the robust effects of program participation, in terms of raising women's absolute and relative welfare, microfinance may not have strong potential. On the other hand, Banerjee *et al.* (2009) did not find any impact of credit participation on women's decision making at least in the short term. Nevertheless, they concluded that in the long run credit could have 'empowering' impact. Goetz and Gupta (1996) reports an interesting result in which the majority of women in their survey failed to exercise control over their loans. This would imply increased burden on women for repayment, and even the possibility of within household violence against

women. Garikipati (2008) finds that although providing credit to women helps the household tackle vulnerability, the women themselves does not experience significant and consistent improvement in their living standards.

On the other hand, Hashemi *et al.* (1996) provide empirical evidence that the credit programs empower women while strengthening their economic roles and by increasing their ability to support their families. According to their results, women who were engaged in productive employment and contribute to family incomes are likely to be 'empowered' regardless of their involvement in a credit program.⁷ In spite of methodological differences, the results of Pitt *et al.* (2006) are also consistent with those of Hashemi *et al.* (1996). Amongst others, Basher (2007) also provides the evidence of positive impact of microcredit. He argues that credit programs generate spillover effects and thereby contribute positively towards creating a congenial atmosphere towards the empowering position of women. Also, participation in group meeting and financial transactions as part of program activities helps women get acquainted with the existing information and communication system and consequently aids them to take part in non-economic activities as well.

Comparing program participants with non-participants is far from a straightforward task. One important issue associated with the quantitative or empirical studies is tackling the so called endogeneity bias. Such a bias could arise due to the fact that, the women who are relatively more innovative or empowered are more likely than others to join the credit programs and it could exaggerate the statistical effect of participation per se. Conversely, if microcredit attracts people with relatively weak abilities (or capacities) the participation effect might be underestimated as well. Given the fact that participation in a program is self-selective, unobserved attributes (e.g. certain features related to empowerment) could affect program participation and ignoring such unobservable could lead to biased estimate of program effect on empowerment. In addition to the problem of sample-selection, some authors such as Pitt *et al.* (1999) and Pitt and Khandker (1998) have also emphasized the possibility of biases due to choice-based sampling and nonrandom program placement. From a sampling point of view, if the proportion of program participants in the sample does not reflect the proportion of participants in the population, it could result in inconsistent estimates. In addition, non-random selection of villages targeted for microcredit program could produce

biases as well. To overcome this problem Pitt and Khandker (1998) designed a quasi experimental survey and their results showed that the positive program effect is diminished when estimation techniques do not consider the endogeneity problem. Banerjee *et al.* (2008) applied randomized experiment to treat some individuals with credit and others without credit to compare the results in terms of various outcomes. On the other hand, while Hashemi *et al* (1996) carefully designed their survey to deal with one source of bias, their use of simple logistic regressions for estimating program effect could not effectively address other sources of bias. Finally, to tackle the endogeneity problem, Anderson and Eswaran (2009) applied the instrumental variable approach in which they first modeled the work activities and earned income of women. In the next stage they used the predicted values obtained from these regressions to explain participation behaviour.

Data and Methodology

Rather than going into the theoretical debate on the conceptualization of empowerment, we emphasize methodological aspects of evaluating the program effect on empowerment. In order to do so, we follow Hashemi *et al.* (1996) to construct empowerment indicators using a large database, developed by PKSf, as mentioned in the introductory section above, through four rounds of repeat surveys of the same households. At the outset it would be useful to mention that women's mobility and awareness-related information was gathered during the first (1998) and the latest (2005) surveys only. The 2005 data-generating exercise expanded the gender section of the questionnaire greatly, providing rich information on a number of additional women empowerment related indicators. Therefore, while overtime comparative assessment (along with the spatial dimension of the data) is possible for women's mobility and awareness, the information on other indicators is available on a pure cross-section basis. This requires us to use two different methodologies to tackle the problem of endogeneity and self-selection bias. The features of the data and methodologies used in the empirical assessment are described below.

Data

The PKSf database was developed under its Monitoring and Evaluation Study (MES) program. When initiated in 1998, PKSf employed a three-stage sampling procedure to select the sample households. First, a number of 13 PKSf member Non Government Organisations (NGOs) – known

as partner organizations (POs) – were selected so that they contained organizations of different sizes and types. Second, several areas of operation (mainly thanas) were identified.⁸ Then, within the selected PO operation areas, a total of 91 villages were chosen for survey. In order to select the household units in the panel, a census was carried out in these villages that classified all households into four groups on the basis of their 'eligibility' for microfinance targeting and actual program participation. 'Eligibility' determines whether a household should be targeted as a potential program participant in the first place. Following the practice of most NGOs in Bangladesh, households possessing only up to 50 decimals of land were considered as eligible for microcredit participants. The households in the surveyed villages were classified as: (i) households that were eligible and participating either in PKSf POs or NGOs (eligible participants), (ii) households that were eligible but were not included in any of the microcredit program (eligible non-participants), (iii) households that were not eligible according to the land-holding criterion but were participating in PO/NGO programs (non-eligible participants) and (iv) households that were not eligible and were not participating in any microcredit programs (non-eligible non-participants). Sample households within each group were drawn randomly from the census to finally generate about 3,000 households – both program villages and control villages.⁹

Sample households did not remain stable during the four survey rounds. A number of households moved out of the survey areas, resulting in 'missing' units, while some households split. For convenience, split-up households were combined together, whenever possible, and treated as a single unit in the analysis. After dropping the missing units and combining split units together, there were 2,729 households for which data existed for every round of surveys conducted.

Since the initiation of the survey, a large number of sample households had demonstrated significant variation in their program participation behavior. There were households that maintained their non-participation status (never participants) vis-à-vis those that had been in the program all along (regular participants) covering all four survey periods. Between these two extreme cases, there were occasional participants including the households that had left the POs for good, rejoined the program after their initial drop-outs, and became members for the first time at some later stage during the sample period. Table 1 shows that while 23% of households had never participated in microcredit schemes, regular participants

Table 1: Composition of the PKSF Panel in terms of the Participation Status of Households

Category	Program villages	Control villages	All
Never participants	560 (22.5)	77 (31.6)	638 (23.4)
Regular participants	797 (32.1)	5.0 (2.0)	803 (29.4)
Occasional participants	1,128 (45.4)	162 (66.3)	1,291 (47.2)
All	2,485 (100.0)	244 (100.0)	2,729 (100.0)

Note: Figures in parentheses are percentages of the column total.

comprised 29.4% of the sample. Thus, the group of occasional participants accounted for as high as 47.2% of the sample.

Construction of Empowerment Indicators

The 1st (1998) as well as the 4th rounds of the survey (2005) contained separate questions to interview all women aged between 15 and 50 years to generate information on empowerment. The 1998 survey contained only two sets empowerment related questions: about degree of mobility and level of awareness, which were again repeated in 2005. Additional questions related to spending decision, ability to make small/big purchases, involvement in major decision, relative freedom from domination and political awareness were added to the 2005 survey questionnaire for generating further information. Following Hashemi *et al.* (1996), empowerment to be proxied by 'mobility' and 'awareness' can be measured for 1998 and 2005, whereas for the latter year alone another seven empowerment-related scores can be constructed. The procedure of constructing empowerment score is discussed below:

Mobility Score

Both in 1998 and 2005 surveys, women were asked whether they visited a number of eight specified places, namely, banks, thana/upazilla headquarters, local markets, health centres, father's house, NGO offices, daughter and other in-laws' places, and schools/colleges. If a respondent went to at least one place during the last one year, she is given a score of 1/8. If all places were visited, a full 1 mark is awarded.

Awareness Score

The awareness score is constructed on an individual's correct answering of eight nutrition

and health-related questions. Three of these questions asked the respondent to identify food items, from a given set of three, that prevented night-blindness; another three questions enquired about the foods that were helpful to the growth of haemoglobin in the blood; in another question the respondent was asked to identify one item (amongst a set of three) which prevented goitre; finally, there was a question asking the person whether she could prepare oral saline. Someone, who could answer all the questions correctly, and could also correctly describe the process of preparing oral saline, was awarded a full mark of 1. Correct answer to one question resulted in a score of 1/8. This awareness score is constructed for both 1998 and 2005.

Other Empowerment-related Indicators

Apart from the mobility and awareness, a number of other empowerment-related indicators were constructed based on the additional questions of 2005 survey. These are:

Spending Decision Indicator

This indicator utilises information obtained through three questions: (1) whether the respondent could decide about how to use her own income, (2) whether she kept some money with her for her own spending or as a precaution for any unforeseen need, and (3) if some money was kept, whether the husband or the household head knew about it. If answers to all the questions are yes, a full score of 1 is given.

Ability to make small purchases

The respondent was asked whether she could purchase herself such items as (i) ingredients of food preparation like spices and vegetable/mustard

oil, (ii) cooking stuffs like pots, spoons, etc. and (iii) other basic utensils. A score of 1 is given to an individual who could purchase all three types of items.

Ability to make large purchases

This indicator was constructed on the basis of individual's ability to make purchases of five things, viz., (i) clothing for children, (ii) own clothing, (iii) male members' clothing, (iv) educational materials and (v) medicine and medical services for own need.

Involvement in major decisions

This reflects whether the women household members participated in making important household decisions. If the respondent was able to take decision on her own, or jointly with her husband, or jointly with any other family members with regard to any of house repairing, buying of livestock, buying of land, renting-in(out) of land, purchasing of other assets like boats, rickshaw, etc, she was awarded a score of 1.

Relative Freedom from domination by the family

This score is constructed from the responses to a set of seven questions. These are: whether the husband or any other member of the household took away money from the respondent against her will; land, jewellery or other valuables had been taken away against her will; had been prevented from visiting her natal home; had been subject to verbal abuse by husband and any other household members, had been threatened by husband for second marriage, had been threatened to be divorced; had been beaten-up by husband or others within the household. If 'no' is the answer to all the questions, a full empowerment score of 1 is awarded.

Political Awareness

If the respondent could tell the names of the local union parishad (UP) chairman and the Member of the Parliament (MP), and voted in the last election a full score of 1 was awarded.

A Composite Indicator

Adding all the seven individual scores, one composite indicator of empowerment was constructed where a higher score is associated with greater level of empowerment. It is once again to be noted here that, the composite indicator can only be constructed for 2005. Only indicators of

mobility and awareness are available for both periods (1998 and 2005).

Panel Data Modelling Framework

As pointed out before, a positive association between program participation and empowerment could have two possible interpretations: either credit programs have empowering effect or the more empowered participants self-select into programs, which may be influenced by their inherent and unobserved characteristics. Since these are unobservable, the improvement in empowerment may wrongly be attributed to program participation. Similarly, a program might also be targeted to a village with characteristics favorable to better economic conditions thereby influencing the outcome. Pitt and Khandker (1998) have convincingly showed that the failure to address the problem of endogeneity of both microfinance and program participation could lead to misleading evidence. These problems can however be tackled most effectively with the help of panel data, as the fixed effects method of econometric estimation is can potentially deal with all individual-specific, household-level and village-level unobservable characteristics. Since for mobility and awareness indicators we have observations for more than one time period, it is possible to examine the program effect with the help of a panel fixed effects model.

To illustrate the effectiveness of the panel model in assessing the program effect, let us first consider a cross-section model pooled over time periods:

$$Y_{it} = \alpha + \beta X_{it} + u_{it} \quad (1)$$

where, Y is (are) the variable(s) of interest to be explained (e.g., household income, poverty status, wealth, etc), X contains a number of explanatory variables, and u is the classical white noise term. The subscript i denotes the cross section dimension ($i = 1, 2, 3, \dots, N$), while t captures time periods ($t = 1, 2, 3, \dots, T$). This is the standard pooled case where intercepts and slope coefficients are homogenous across all N cross-sections and through all T periods. With the availability of panel data, (1) can be modified to take into account heterogeneity across individuals and to reduce the omitted variable bias. Conditional on the set of X_{it} variables, the effects of all omitted or excluded variables are driven by three types: (i) individual varying but time period invariant (e.g., inherent enterprising skills, industriousness, ability), (ii) time period varying but individual invariant (overall economic growth influencing households' conditions), (iii) both individual varying and time

period varying. If Z_i is individual-varying but time-invariant and D_i is individual non-variant but time-varying factors, equation (1) can be written as:

$$Y_{it} = \alpha + \gamma Z_i + \beta X_{it} + \lambda D_i + u_{it} \quad (2)$$

It is impossible to estimate γ and λ directly, but defining the products $\gamma Z_i = \gamma_i$ and $\lambda D_i = \lambda_i$, equation (2) can be written as:

$$Y_{it} = \gamma_i + \lambda_i + \beta X_{it} + u_{it} \quad (3)$$

Therefore, the fixed effects of the omitted variables have been absorbed into the intercept term and in the specification actually replace it. The term γ_i can be interpreted as a set of intercept terms for each individual in the panel and the term λ_i can be interpreted as a set of time period intercept terms for each year of the panel.¹⁰ The use of panel data has clearly tackled the omitted variable bias. What is however even more striking about the advantage of the panel data framework is the fact that, it is not required to have *a priori* knowledge with regard to possible sources of heterogeneity bias. The fixed effects will sweep out all individual effects that remain invariant over time, while the time effects will control for all time-varying but individual-invariant factors.¹¹

Controlling for Heterogeneity bias with Cross Section Data

Apart from mobility and awareness, all other indicators were constructed based on information for 2005 only, thereby making it not feasible to use the panel data method. However, even for such cross-section data it is possible to control for selection bias using an econometric technique due to Heckman (1979). Under this procedure, the program effect can be modelled by two processes: (i) equation explaining the participation behavior, i.e. whether to participate in microfinance or not, and (ii) equation explaining the constructed empowerment scores. Because of the problem of heterogeneity bias, the two processes are related to each other.

Following the Heckman procedure, in the first step we estimate a probit model of program participation (i.e. whether women participate in the program or not – known as the selection equation), and in the second step an OLS equation, modelling the empowerment score (empowerment equation) is estimated. From the first stage, the effect of unmeasured characteristics influencing the participation decision is captured and a selection

bias control factor, popularly known as Lambda, is constructed.¹² In order to control for heterogeneity bias, in the second stage, the regression model includes Lambda or the inverse mills ratio and the coefficient on this factor captures the part of the effect of the unmeasured characteristics related to empowerment. Inclusion of such control factor in the analysis frees other explanatory variables in the equation from the effects of unmeasured characteristics and the selectivity bias could be tackled effectively.

More formally, let us consider E is the measured empowerment of individual women, which can be explained by a vector of their personal and household characteristics X , and by their participation status, (with $P_i = 1$ for participants and 0 for non-participants). According to Heckman procedure, we model P_i in the first place with a vector of Z variables as shown in equation (v). The selection bias control factor is constructed from this equation which is then inserted into equation (iv) to get the unbiased estimates.¹³

$$\begin{aligned} E_i &= \beta X_i + \gamma P_i + u_i \\ P_i &= \tau Z_i + v_i \end{aligned} \quad (4)$$

Empirical Analysis

Comparison of Mean Empowerment-related Scores

Before proceeding to estimation results, it would be interesting to analyze various mean empowerment-score differences between women groups with different participation status. For this, we run simple mean-difference regression model of the type: $E = \alpha + \beta P_i + u_i$ where E is the relevant empowerment-related score, $P_i = 1$, if the woman is currently participating in any program, and $P_i = 0$ otherwise. Under this framework, a test for the significance of β indicates whether there exists any significant difference between the mean empowerment scores of participants and non-participants.

Table 2 summarises the mean-difference results. According to column 1 and 2, the women who are currently in the program have higher mean scores (associated with all different types of empowerment scores computed) compared to their non-participant counterparts. Not only for the individual indicators (e.g., spending decision, mobility, small purchase, and political awareness), but also for the composite indicator,

Table 2: Differential Mean Empowerment-Related Score

Empowerment Scores	Constant	Current membership (=1 if currently a member, 0 otherwise)	Constant	Any program experience (=1 if a previous or current member, 0 otherwise)
	(1)	(2)	(3)	(4)
Spending Decision	0.27*** (29.97)	0.05*** (3.61)	0.25*** (25.86)	0.07*** (5.11)
Mobility	0.24*** (49.05)	0.06*** (8.36)	0.23*** (43.97)	0.06*** (7.56)
Small Purchase	0.66*** (52.57)	0.05** (2.41)	0.64*** (46.08)	0.09*** (4.50)
Large Purchase	0.38*** (38.13)	0.03* (1.70)	0.36*** (33.07)	0.06*** (3.74)
Major Decision	0.08*** (12.71)	0.01 (1.21)	0.07*** (10.33)	0.03** (2.73)
Freedom from Domination by family members	0.71*** (78.58)	0.02 (1.22)	0.70*** (70.48)	0.04** (2.67)
Political Awareness	0.65*** (76.80)	0.04*** (3.34)	0.62*** (67.60)	0.09*** (6.82)
Composite Empowerment Indicator	2.99*** (86.81)	0.26*** (4.85)	2.88*** (76.84)	0.42*** (8.05)

Notes: T-ratios are in parentheses. Statistical significance at the 1%, 5%, and 10% levels is denoted by respectively, *, **, ***. Total number of women in the age groups of 15-50 for whom the empowerment indicator can be constructed is 2171. The number of women who are currently participating in the microcredit program is 864. There are 265 women who are currently not participants but have some previous program participation experience.

the participation coefficients are statistically significant. In columns 3-4, the differential mean scores are computed for women with any experience of participation (i.e. both present as well as previous) vis-à-vis those without any participation *per se*. It is found that women with any microcredit participation experience, on average, have significantly higher empowerment scores relative to those without any such exposure.

Panel Estimation Results for Mobility and Awareness Indicators

In Appendix Tables A.1 and A.2 the fixed effects models of the constructed mobility and awareness scores (for 1998 and 2005) are estimated. Along with time effects, the models are also estimated with individual and household level fixed effects. Therefore, the village level endogeneity problem is also addressed. The set of explanatory variables comprises a number of usual individual and

household characteristics such as age, marital status, and educational attainment of the household head, and highest education obtained by the respondent. The database provides the information on whether the individual women are participants of large (such as BRAC, ASA or PROSHIKA) or medium or small NGOs. As such dummies of different types of credit programs have been used to evaluate the program effects by their sizes. Some of the NGOs focus only on credit programs (credit-only), while others offer various social and economic awareness programs (credit-plus) along with their microfinance schemes. To capture any differential impact on empowerment, the relevant dummy variables have also been used. Finally, different measures for participation in microfinance have been considered. These include, the length of programme participation (in years) by gender, current and previous membership (dummy variable), and total (cumulative) borrowing (by male and female members) used.

According to the estimates, after controlling for observable and all non-observable characteristics, any exposure to microcredit program significantly and positively influences the awareness and mobility scores. Considering the mobility scores first (Appendix Table A.1), it is found that the length of female programme participation has positive and statistically significant effect in the regression where they are included. The coefficients of the square of the length of participation are also correctively signed and significant. The male program participation has also statistically significant positive effect, implying that even male members' participation in microcredit can promote female members' mobility. Having a current as well as past membership both seem to raise the score with the resultant effects being significant. Indeed, separate regressions to assess the effect of any exposure to programs also reveal very strong, positive, and significant effects. The coefficient on total household borrowing is positive and statistically significant, and the cumulative female borrowing also exerts similar influence of women's mobility. In one set of the regressions, intercept dummies for large, medium, small NGO participants are introduced along with their interactions with the total household borrowing. It is found that compared to the base category, as the borrowings from all these NGOs increase, women's mobility scores also rise.¹⁴ However, no significant differential effects of credit-only or credit-plus NGO program could be found.¹⁵

Turning to awareness indicator, again there is positive and significant effect of the length of female program participation. Like the previous case of mobility, male program participation also helps raise women's awareness. Similarly, the effect of women's current and any previous program experience turns out to be significantly positive. Interestingly, women's own and household head's educational attainment seem not have any significant effects on women members' awareness, although in all cases the estimated coefficients are positive. Individual dummies associated with large, medium and small NGOs appear to be positive and highly significant while the comparable results for different types of programs (i.e. credit-plus and credit-only) remain unclear. It could be that despite being classified as different types of credit programs at the operation level there was not much difference with the main focus being on their credit schemes. On the whole, the panel data results suggest strong positive effect of programme participation on women's mobility and awareness.

Cross-Section Results

The estimation results involving the cross-section only dimension of the empowerment indicators using the Heckman procedure are shown in Table 3. For the selection equation, (column 1), the participation behaviour (i.e. whether the women participates in the program or not) is being explained by the respondent's age, age-squared, marital status, educational attainment of the respondent and household head, and the amount of landholding by the household. It is found that both the coefficients on age and age-squared are plausibly signed and statistically significant. Married women have a greater likelihood of participation compared to their unmarried counterparts. Educational attainment, as measured by the number of years spent in educational institutions, of women along with that household heads are found to be negatively associated with participation, reflecting the relatively low level of education of the program participants as well as the household head.¹⁶ Finally, as the NGOs mostly target households with relatively small amount of land the sign on the coefficient of land ownership is consistent with our *a priori* expectation. On the whole, the participation equations is robustly modelled as all the individual explanatory variables are statistically significant.

Columns 2, 3 and 4 of Table 3 present the estimation results of the composite empowerment score, where along with several explanatory variables, the lambda correction term, constructed from the selection equation is included.¹⁷ Identification of these three equations is attained by excluding the size of households' landholding in the empowerment model.¹⁸ It is quite plausible that that households' landholding is a determinant of program participation, but is not related to empowerment women's empowerment. It was pointed out earlier that in Bangladesh NGOs target the potential members based on their landholding in which households with higher amount of cultivable land are not considered for membership. In case the landholding status reflects the economic wellbeing affecting empowerment, we have added per capita household income to the list of explanatory variables for the empowerment equations.

In Table 3, three different empowerment equation is modeled based on the nature of program participation variable used. First in column 2, participation is being indicated by women's current and previous (separately) membership in NGO programs.¹⁹ In column 3, participation is measured

**Table 3: Estimation of the Empowerment Equation
(Dependent Variable: Composite Empowerment Score)**

Explanatory variables	Participation Equation	Empowerment Model (present/past membership being key variable)	Empowerment Model (cumulative borrowing as main variable)	Empowerment Model (for different schemes of credit programs)
	(1)	(2)	(3)	(4)
Age in years	0.202*** (0.028)	0.192*** (0.033)	0.227*** (0.02)	0.22*** (0.027)
Age squared	-0.0026*** (0.00042)	-0.03*** (.0005)	-0.003*** (0.0005)	-0.003*** (0.006)
Marital status (if married = 1, otherwise =0)	0.003*** (0.0012)	-0.223* (0.122)	-0.222* (0.12)	-0.22* (0.12)
No. of years of education	-0.0184*** (0.00651)	0.034*** (0.007)	0.030*** (0.006)	0.031*** (0.006)
No. of years of education of household head	-0.1383*** (0.0065)	0.012** (0.006)	0.009 (0.006)	0.009 (0.006)
Amount of cultivable land owned by household	-0.0008*** (0.0002)			
Female income Share in total household income		0.014*** (0.003)	0.014*** (0.003)	0.014*** (0.003)
Per capita income of household		0.00000065 (0.0000056)	0.00000064 (0.0000056)	0.00000071 (0.0000071)
Number of male child in the household		0.039* (0.023)	0.038** (0.023)	0.036* (0.023)
Number of female child in the household		0.028 (0.024)	0.028 (0.024)	0.027 (0.024)
Whether presently a program member? (yes =1, no=0)		0.459** (0.20)		
If not a present member, whether previously was a member (yes =1, no=0)		0.464** (0.21)		
Cumulative female borrowing			0.00000214** (0.00000097)	-0.0000001 (0.00000009)
Small NGOs*female borrowing				0.000006*** (0.000002)
Medium NGOs*female borrowing				0.000004** (0.0000015)
Large NGOs*female borrowing				0.000006*** (0.00025)
Lambda		0.167* (0.09)	0.093*** (0.034) (0.03)	0.061** (0.03)
Constant	-0.2033*** (0.112)	-0.453 (0.501)	-0.869* (0.458)	-0.74* (0.456)
Number of observations	2159	2159	2159	
Adjusted R ²	0.16	0.12	0.12	0.13

Note: Figures in parentheses are standard errors. Statistical significance at 1%, 5% and 10% levels are denoted by respectively *, **, and ***. For column 4 intercept dummies for large, medium, and small NGOs were included, which failed to become significant and were subsequently dropped.

by total cumulative female borrowing.²⁰ Finally in column 4, women's participation by large, medium

and small NGOs are considered.²¹ When participation is defined by women's present and

past membership (column 2), coefficients associated with both the participation dummies, respondents' age, age-squared, marital status, education, share of income in household total income and number of male child turn out to be statistically significant determinants of empowerment. That is, our results clearly reveal that both the current and previous memberships have positive and significant influence on the empowerment score. The lambda correction term turns out to be positive and statistically significant, suggesting that participants compared to non-participants have unmeasured characteristics which are positively related to empowerment. Therefore, although more empowered women are more likely to join, program participation has significant effect on women's empowerment.

When program participation is proxied by the cumulative female borrowing, most coefficient estimates reflect results similar to those of column 2, particularly in terms of the sign and significance of the variables. The coefficient on the female cumulative borrowing is positive and significant at the 5% level. The lambda correction term is positive and highly significant. Finally, in column 4, the same empowerment equation is estimated, but with the objective of testing the hypothesis that, whether controlling for the heterogeneity bias, different sizes of program have significantly differential impact on empowerment. The results suggest that compared to the base category (non-participants), the effect of borrowing (and hence participation) from all different sizes of NGOs increases members' empowerment score significantly. The selection bias variable again turns out to be positive and statistically significant, justifying the adoption of the Heckman procedure. The results of Table 3, therefore, strongly suggest that even after controlling for heterogeneity bias, participation in microcredit has a positive effect on women's empowerment, as measured by the constructed composite indicator.

Concluding Observations

The effect of women's participation in NGO programs on their empowerment has been a subject matter of great interest amongst policymakers and researchers. Inconclusive evidence seems to have been offered by the existing studies with many of them suffering from serious methodological issues while investigating the matter. Notwithstanding the problem of conceptualization of empowerment, studying the issue empirically is fraught with a critical analytical challenge in which comparison of quantifiable indicators between program participants and non-participants is unlikely to

produce convincing results because of the so-called endogeneity problem arising from self-selection bias. That is, the women who are relatively empowered may be more likely than others to join the NGO programs, which, in turn, could exaggerate the true statistical effect of microcredit participation.

This paper contributes to the literature by undertaking statistical analysis with the objective of tackling the selection bias problem. It has made use of a large and rather unique database that provides household information along with data on individual-specific characteristics of women. Following the generally accepted practices in the literature, this paper has constructed several indicators to measure empowerment. Then, suitable econometric techniques have been used to provide program participation effects that are not subject to the influence exerted by participants' inherent characteristics. Given the nature of the available information, both the panel data modelling strategy and Heckman estimation procedure for cross-section data were used to deal with the problem.

On the whole, our results support a strong positive contribution of microcredit programs on women's empowerment. The panel data modelling results show that controlling for all unobservable individual, household, and village level characteristics, program participation is associated with women's greater mobility and awareness. This broad result is largely maintained even when participation is measured by the different indicators such as the length of program attendance by female as well as male, cumulative female, male and household borrowing, and by current and previous membership in NGO programs. The results do not generally alter much by women's participation in NGOs of different sizes.

When a composite indicator is considered based on the information generated from several gender empowerment-related questions for a single period (cross-section) data), our statistical analysis confirms selection-bias to be a genuine problem in studying the relationship between program participation and empowerment. The estimated selection-bias factor is found to be positive and statistically significant, which is to be interpreted as the evidence of program participants' (as against non-participants) having unobserved characteristics positively related to empowerment. However, even after controlling for this bias, there exists strong econometric evidence of a positive empowerment effect of participation. According to our results, current membership as well as previous program exposures, and women's cumulative borrowing

have significant positive impact on empowerment. Again, these results are not very sensitive to women's attending NGOs of different sizes.

There are important implications of the findings of this paper. First and foremost, it shows that failure to tackle the endogeneity problem could result in flawed assessment of the impact of microcredit programs. There is also the evidence of the empowerment effect being retained as the impact for the women with past program experience which is found to be positive as well. The favorable program effect is found to be widespread; i.e. along with large NGOs, participation in the programs of smaller NGOs are also beneficial.

Along with the interests associated with the presented results, the paper suggests one particularly important policy implication. The tendency of the more empowered women joining the program, as reflected in the positive selection bias factor, could indicate the inability of the microfinance institutions in reaching out to the less empowered and more vulnerable groups. There is already a lot of concern about microcredit programs' failure to not target the vulnerable groups, and the finding of this paper may be interpreted as supporting this view to some extent.²² It is very likely that most of the 'eligible non-program participants' are the hardcore poor or the poorest of the poor, whose welfare improvement is considered to be the most critical poverty challenge facing the country. These groups of people require more motivation and support for joining microfinance programs. However, as the findings of this paper suggests, when their participation is ensured, microcredit can be very effective. Therefore, the potential of NGO programs in promoting women's empowerment remains very high and should deserve serious policy attention both by the government and the NGOs themselves.

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Endnotes

1. For example, while Heckman (1979) provides a widely used methodology of dealing with such problems, Pitt *et al.* (1998) employs a 'quasi-experimental' survey to tackle the biases. For example, while Heckman (1979)

provides a widely used methodology of dealing with such problems, Pitt *et al.* (1998) employs a 'quasi-experimental' survey to tackle the biases.

2. See Kabeer (2005) for further discussion on the definition and concepts of empowerment in socio-anthropological literature.
3. The authors used responses related to the questions on whether women covered their head inside house, whether covers inside/outside house in the presence of men, whether wears veils ('burkha') to cover when went outside house/for festival or visit, etc., to reflect the degree of women's autonomy.
4. Under vulnerability she used information related to (i) affected by droughts, (ii) investment in and access to social capital, (iii) livelihood diversification, (iv) entrepreneurial behavior, and (v) a composite non-vulnerability indicator. Empowerment was based on the information on: (i) owner of household assets and income, (ii) division of domestic chores, (iii) ability to influence within-household decisions, (iv) work-time allocation, (v) control over minor finances, (vi) control over major finances, (vii) allocation of time, and (viii) a composite indicator.
5. In terms of women's role in decision-making, Naved (1994) concluded that although husband's opinion got priority, women were at least consulted.
6. Like Naved (1994), Amin and Pebley (1996) failed to find any statistically significant difference between the attitude of program participants and non-participants with regard to such awareness factors as ideal age of marriage for girls and educational aspirations for boy-child and girl-child. However, program participants were more likely to have a greater mobility compared to non-participants, although the former were traveling mainly to areas close to their neighbourhood rather than distant places.
7. According to Hashemi *et al.* (1996), the chance of becoming empowered increases by 8-12 times for women who contribute to family income in comparison with those who neither participate in NGO-programs nor contribute to household financially.
8. Thanas are local administrative units. Bangladesh is divided into more than 460 such local administrative authorities.

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Table A.1. Fixed Effects Regression Results (Dependent variable – Mobility Score)

Age of the household head	.088** (.039)	.088** (.039)	.095** (.038)	.092** (.038)	.076** (.038)	.075** (.038)	.099** (.039)	.087** (.038)	.10*** (.03)	.093** (.038)
Square of the age of the household head	-.00024 (.00057)	-.00020 (.00057)	-.00066 (.00057)	-.00066 (.00057)	-.00041 (.00056)	-.00039 (.00056)	-.00039 (.00058)	-.00055 (.00057)	-.00046 (.00058)	-.00064 (.00057)
Marital status of the household head (Married=1; otherwise)	-.38* (.23)	-.405* (.232)	-.35 (.23)	-.37 (.23)	-.36 (.22)	-.35(.22)	-.34 (.23)	-.312 (.230)	-.343 (.234)	-.277 (.232)
Highest education achieved by the respondent (in years of schooling)	.029** (.011)	.028** (.011)	.030*** (.011)	.029*** (.011)	.028** (.011)	.028** (.011)	.031*** (.011)	.031*** (.011)	.032*** (.011)	.032*** (.011)
Highest education achieved by the household head (in years of schooling)	-.0036 (.019)	-.0042 (.0198)	-.0054 (.019)	-.0048 (.019)	-.0023 (.019)	-.0022(.019)	-.0066 (.0200)	-.0050 (.019)	-.0057 (.020)	-.0051 (.019)
Income share of female in the household	.0060 (.0039)	.0059 (.0039)	.0052 (.0039)	.0050 (.0039)	.0058 (.0038)	.0059(.0038)	.0056 (.0039)	.0058 (.0039)	.0056 (.0039)	.0057 (.0039)
Per capita income	.000013 (.0000087)	.000013 (.0000087)	.000013 (.0000086)	.000014 (.0000086)	.000012 (.0000085)	.000012(.0000086)	.000013 (.0000088)	.000012 (.0000086)	.000013 (.0000088)	.000012 (.0000086)
Female program participation years			.042*** (.006)	.041*** (.0063)						
Square of female program participation years			-.00011*** (.00004)	-.00011*** (.000041)						
Male program participation in years				.092** (.039)						
Square of male program participation years				-.0011 (-.0009)						
Small NGOs? (Yes=1)							.12 (.10)			
Medium NGOs? (Yes=1)							.35* (.20)			
Large NGOs? (Yes=1)							.39*** (.13)			
Currently NGO member? (Yes=1)		.51*** (.08)								
Previously NGO member? (Yes = 1)		.31*** (.11)								
If the respondent have any exposure (previous or presently) to NGO? (Yes=1)	.463*** (.081)				.42*** (.08)	.44*** (.08)				

Table A.2. : Fixed Effects Regression Results (Dependent variable – Awareness Score)

Age of the household head (years)	.259*** (.063)	.259*** (.0636)	.251*** (.0633)	.2484*** (.0632)	.24*** (.06)	.24*** (.06)	.25*** (.06)	.23*** (.06)	.26*** (.06)	.24*** (.06)
Square of the age of the household head	-.0021*** (.0009)	-.0027*** (.0009)	-.002** (.127)	-.002*** (.000)	-.0022** (.0009)	-.0022** (.0009)	-.0021** (.0009)	-.0021 (.0009)	-.0022** (.0009)	-.0022** (.0009)
Marital status of the household head (Married =1; 0=otherwise)	.0829 (.3845)	0.0724 (.3846)	.127 (.383)	.085 (.382)	.15 (.38)	.09 (.38)	.11 (.38)	.19 (.38)	.10 (.38)	.21 (.38)
Highest education achieved by the respondent (years of schooling)	.0172 (.016)	.0167 (.0169)	.016 (.016)	.016 (.016)	.016 (.016)	.015 (.016)	.014 (.016)	.013 (.016)	.016 (.016)	.015 (.016)
Highest education achieved by the household head (years of schooling)	.012 (.0237)	.012 (.023)	.012 (.023)	.012 (.023)	.013 (.023)	.012 (.023)	.0083 (.023)	.0094 (.023)	.0087 (.0236)	.0091 (.023)
Income share of female in the household	-.0017 (.0062)	-.0018 .00629	-.001 (.006)	-.001 .006	-.0012 (.0061)	-.0015 (.0061)	-.0018 (.0061)	-.0015 (.0061)	-.0017 (.0061)	-.0011 (.0061)
Per capita income	.000003 (.00001)	.000003 (.00001)	.000004 (.000014)	.000004 (.0000)	.0000027 (.000014)	.0000032 (.000014)	.0000037 (.000014)	.0000034 (.000014)	.0000037 (.000014)	.0000035 (.000014)
Female program participation years			.042*** (.010)	.040*** (.010)						
Square of female program participation years			-.00023*** (.00007)	-.0002*** (.0000)						
Male program participation years				.143** (.066)						
Square of male program participation years				-.0008 (.0017)						
Small NGOs? (Yes=1)							.52*** (.17)	.64*** (.20)		
Medium NGOs? (Yes = 1)							.65*** (.31)	.70* (.37)		
Large NGOs? (Yes=1)							.80*** (.21)	.84*** (.28)		
Currently NGO member? (Yes=1)		.3296** .1364								
Previously NGO member? (Yes=1)		.146 (.183)								
If the respondent have any exposure (previously or presently) to NGO (yes=1)	.2869** (.1306)				.36*** (.13)	.31** (.14)				

