

The Microfinancing Village Household and Loan Return: Do Credit Source, Education, Land Assets, and Gender Matter?

Vange Mariet Ocasio

Whitworth University Department of Business and Economics

Disbursements of small-scale credit to poor entrepreneurial households in developing countries have become a popular tool for promoting self-sufficiency and alleviating poverty. The success of such programs, however, has been inconsistent across self-sufficiency and poverty measures. This study explores the effects of small-scale loans, household assets, and other household characteristics on household income. The study uses longitudinal survey data collected by the World Bank and the Bangladesh Institute of Development Studies from over 1,700 households in rural Bangladesh. The results suggest that microloans disbursed by microfinance institutions and other formal programs have a positive impact on income for borrowers. Loans received from relatives and other noninstitutional moneylenders, however, only benefit male borrowers. The findings document differential impacts by loan source, gender, education assets, and labor assets. Households that are resource poor in land assets and education, benefit the most from receiving small-scale credit. This study provides important policy insights. The results suggest that one-size-fits-all approaches to development finance may not be appropriate given that program outcomes can be sensitive to credit source, borrower's gender, and other household characteristics. To address endogeneity issues in the data, the study relies on a quasi-experiment survey design to reduce bias in the estimates. A quasi-experiment imposes a cutoff criterion for eligibility to allow us to trace treatment group impacts. A panel data model was also used to further control for unobserved effects.

Keywords: rural finance, development, microfinance, poverty, gender, loan return, bangladesh

Received September 6, 2022

Accepted March 2, 2023

Corresponding Author

Vange Mariet Ocasio

Whitworth University Department of
Business and Economics, Spokane, WA
99251, USA

E-mail: vocasio@whitworth.edu

JEL: R20, D13, G15, G21, G23

INTRODUCTION

Critics of microfinance argue that microloans are just “micro-Band-Aids” because they fail to generate benefits substantial enough to alleviate poverty in the countries where microcredit programs have been implemented. Bangladesh and Bolivia are examples of such countries (Cockburn, 2006). There are, however, studies that document lower levels of poverty headcount ratios for countries with the highest microfinance gross loan portfolios per capita (Bel hadj Miled et al., 2018). At the household and community levels, microfinance studies that use disaggregated data for measuring household and village-level effects, also suggest positive impacts over time (Khandker, 2005).

In Bangladesh, and other developing countries, microfinance programs target poor men and women who are small-scale entrepreneurs in the informal economy. Microfinance programs disburse small loans, create saving accounts, and other financial services that allow small businesses to obtain start-up money and insurance with little or no collateral requirements. Rural microfinance schemes provide additional services that include education, business training and financial management to poor men and women to enhance production potential and entrepreneurial success. A significant number of microfinance institutions (MFIs) and non-governmental organizations (NGOs) lend primarily to women. The Grameen Bank (GB), for instance, has a lending portfolio that is skewed towards female borrowers. Approximately 97 percent of GB loans are disbursed to women.¹ Other prominent microfinance programs in Bangladesh with a lending portfolio dedicated to women borrowers include FINCA and ACCION.² A primary reason MFIs and NGOs target microlending toward women is that women in developing countries are usually poorer than men on average (Burjorjee et al., 2002). Women in these countries do not own substantial assets to meet the collateral required by conventional banks and thus face greater barriers to obtaining credit (Khandker, 1998).

In the case of Bangladesh, microcredit is primarily given to poor rural women because they are integral participants in the informal economy. Women's participation in informal labor activities is often under oppressive environments that exclude women's voices, decision-making, and leadership (Schuler and Hashemi, 1995; Abdullah and Zeidenstein, 1982). In addition, given Bangladesh's history of 'purdah,' "a system for the seclusion of women", women in rural Bangladesh have traditionally faced exclusion in the formal labor market, lack education, land ownership, and access to credit (Papa et al., 1995; Auwal, 1996).

Using household-level longitudinal data from village programs in Bangladesh, this paper explores the return of small-scale credit to household income as well as other determinants of household income. The present study poses the following research questions: If increases in income contribute to poverty reduction, is the return from micro-loans important in income generation and thus poverty alleviation? Additionally, if credit plays a role in generating household income, do loan source, education, land ownership, and gender matter?

Many rural finance schemes in Bangladesh were developed following the "Jobra" experiment designed by Professor Muhammad Yunus in the late 1970s. Subsequently, the Dheki Rin Prokolpa was implemented by the Bangladesh Bank in collaboration with the Swanirvar Bangladesh and many other rural finance pilot programs. In the mid-1980s, many non-governmental organizations (NGOs) and nationalized commercial banks (NCBs) began to offer collateral-free small-scale loans to rural poor individuals and peer groups in Bangladesh. Most of the loans had a one-year term and employed on-site disbursement and weekly collection schemes in villages and centers. In Bangladesh, the largest providers of rural credit are the Grameen Bank (GB), NGOs like BRAC and Proshika, commercial and specialized banks such as the Bangladesh Krishi Bank (BKB), Rajshahi Krishi Unnayan Bank (RAKUB), and other government-sponsored microfinance projects like BRDB, RD-12 (Bank of Bangladesh).

The Grameen Bank's lending philosophy asserts that credit is a human right and considers poor individuals creditworthy. This view has been adopted by many development finance policymakers and has ignited group-based lending schemes in over 70 countries all over the world (Auwal, 1996). Countries such as Malaysia, Kenya, and the Philippines have implemented group-based lending schemes and have been successful in both reaching the poor and achieving poverty reduction results (Kamaluddin, 1993). Many studies at the household level, and cross-country studies, document the positive impacts of microfinance borrowing (Chomen, 2021; Miled et al., 2022; Eze, 2019; Ocasio, 2016a,b). Other studies, however, find mixed results. A study using data from Peru examined

¹<https://www.grameen-info.org/history/> , accessed May 17, 2022.

²http://www.villagebanking.org/site/c.erKPI2PCIoE/b.2604299/k.FFD9/What_is_Microfinance_What_is_Village_Banking.htm and <https://www.accion.org/about>, accessed May 17, 2022.

the effects of land inheritance on women's relative agency. They found that given intra-household dynamics, giving women more land increases their agency minimally, if at all. Giving land to men, however, is correlated with a decrease in a woman's agency. According to this study, when programs target women, they also empower men in unique ways (Guerra et al., 2019).

In terms of women's empowerment due to access to credit, the results are mostly positive, but in some cases, program participation triggered unintended results. A study using a cross-section survey in rural areas in Côte d'Ivoire found that groups of women who obtained microfinance attained higher income and accumulated more assets than the women groups who did not borrow. Additionally, the study documents a higher decision-making capability from obtaining microfinance loans (Binaté et al., 2015). In contrast, another study explored the empirical correlation between women's participation in the rural credit program PARFAR and domestic violence (a form of disempowerment) in rural northern Cameroon find that while participation in credit programs enhances decision-making, it also increases the prevalence of domestic violence (Eze Eze, 2019). Similarly, a study using data from Ghana examined the role of financial literacy in the household accumulation of assets. The results suggest that financial literacy training is positively correlated with the accumulation of total productive assets for households in which women received the training. This positive correlation, however, is higher when men received the training (Koomson et al., 2022).

Earlier studies specific to Bangladesh, find evidence that microfinance programs help the poor in smoothing consumption and allow the self-employed to accumulate capital. The findings provide evidence for the claim that microfinance programs increase human capital (i.e. schooling) and encourage family planning (i.e. use of contraceptives) among poor families (Schuler and Hashemi, 1995; Khandker, 1998). In a similar study on the effect of microfinance in Bangladesh, the impact of program membership by gender in three group-based programs is analyzed. The three credit programs studied were the Grameen Bank, the Bangladesh Rural Advancement Committee (BRAC), and the Bangladesh Rural Development Board's RD-12 (BRDB-RD-12) program. The study measured the effects of access to credit on labor supply, schooling, expenditure, and assets. The results suggest women's participation in a credit program has a significant effect on labor supply, schooling, household expenditure, and asset building (Pitt and Khandker, 1998).

Positive spill-over impacts from small-scale credit borrowing are also documented at the community level. Khandker (2005), explored the impact of microfinance on poverty alleviation for participants at the village level. The results suggest that access to credit reduces poverty, particularly for female participants. The findings also show that access to microcredit raises household consumption for program participants and nonparticipants in the village. Many other studies also document the effectiveness of microfinance programs in alleviating poverty in Bangladesh (see Imai et al., 2010; Islam, 2011; McIntosh, 2008; Booperm et al., 2009; Hashemi et al., 1996; Schuler and Hashemi, 1994).

In terms of the institutional structure of MFIs, few studies explore whether loan source matter in the financial success of poor entrepreneurs. Among these studies, an analysis using the Italian Survey on Household Income and Wealth from 1995 to 2014 found that informal credit loans are less effective than formal loans (Benvenuti et al., 2021). Kaboski and Townsend (2005), find that the structure of MFI policies matters in increasing the probability participants will become business owners, experience asset growth, and attain occupational mobility. Other studies suggest that the institutional design of the credit source is correlated with the material well-being of participating households. A recent study explored whether the combined provision of credit and human development opportunities given to borrowers play a role in generating income for the household. The findings suggest that when sources of microcredit combined loans with the provision of human development opportunities (i.e. basic literacy, and marketing training) the income return from microfinance is greater (Ocasio, 2020).

The robustness of the results in the studies discussed here remains an issue because impact studies are sensitive to the method applied. Using similar panel data as in Khandker (2005), the present study uses per capita total

household income as a dependent variable and includes formal lending (credit from institutions) and credit from other informal sources (i.e., relatives, neighbors, etc.) to estimate the marginal return of micro-loans and other determinants of household income in rural villages in Bangladesh. There are compelling reasons to use per capita household income as the outcome variable instead of per capita household consumption expenditure (as in Khandker, 2005). Since many formal microcredit programs in the sample require households to have a saving account, using consumption expenditure as the dependent variable could understate impacts. Additionally, including microcredit lending from all sources allows us to measure differential impacts by credit providers. The results obtained in this study provide support for earlier evidence on the positive impacts of microfinance, credit source, and household assets (particularly, for female borrowers). However, this study extends the analysis by including informal lending sources and by documenting positive impacts for male borrowers as well.

This paper contributes to the current literature on microfinance in two ways. First, this study provides more robust results than previous findings that suggest microfinance in Bangladesh benefits mostly women. For example, using a different outcome variable and the same dataset, Khandker (2005) found that access to microcredit contributes to poverty reduction, for women, while in the case of men, microfinance had no statistical significance in augmenting household consumption. In the present study, when we use household income as the outcome variable, formal microfinance loans given to both female and male borrowers have a positive and statistically significant impact on household income.

Secondly, this study contributes to the literature in that it captures differential impacts by loan source, gender, education assets, land assets, and labor assets. Loans obtained from informal moneylenders, for instance, are included in the analysis to see how these loans affect borrowing households. The empirical results suggest that informal borrowing benefits male borrowers only. There are good reasons to examine differential impacts by loan source, education assets, and the gender of the borrower. The extensive literature on microfinance impacts suggests that the use of finance programs for rural development interventions yields different results due to intra-household and country-specific dynamics (see Shohel et al., 2022; ZahidMahmood, 2017; Binaté et al., 2015). This paper is organized as follows: section 1 presented a brief background on the evolution of microfinance in Bangladesh and relevant empirical literature, section 2 describes the data, section 3 presents the estimation strategy, and sections 4 and 5 summarize the results and provide the main conclusions.

THE DATA

The present study uses multi-period data collected by the World Bank and the Bangladesh Institute of Development Studies (BIDS). Data were collected in 1991-1992 and 1998-1999 for the purpose of analyzing household and village-level effects of microfinance borrowing. Over 1,700 household borrowers from major microfinance institutions (MFIs) and other sources of financing were surveyed. The three major MFIs included in the surveys were the Grameen Bank, the Bangladesh Rural Advancement Committee (BRAC), and the Rural Development-12 program of the Bangladesh Rural Development Board (RD-12). These programs and other sources of lending operated in 87 villages and 29 thanas in Bangladesh.³

The 29 thanas surveyed, were drawn from 391 rural thanas, and the villages selected were drawn from the village census of the Government of Bangladesh. Out of the 29 thanas selected, 24 were program thanas and the remaining 5 thanas did not participate in a program. Three villages in each program thana were randomly selected from program villages that were in operation for three years or more. Also included were three villages from nonprogram

³A thana is a community smaller than a district and consists of a number of villages.

thanas. Villages with less than 51 houses and villages with over 600 households were excluded from the sample. The households surveyed in 1991/1992 were resurveyed in 1998/1999. To form a data panel for a longitudinal study, only the households that participated in both periods were included in the analysis. Attrition in the data was low. Over 95% of the 1991/1992 participants remained with the microfinance programs in 1998/1999.

Credit programs were designed as gender-based group programs. Women could only borrow from a women's only group and men could access credit from men-only groups. In a peer-group credit program such as the Grameen Bank, only one member of the group could borrow at a given time and others could not borrow until the member of the group repaid the loan. This peer monitoring and borrowing system has been praised in the last decade for preventing loan default and ascertaining program success. Many programs in the sample required that members borrow from one program at a time and only one household member could obtain a loan at a given time.

Data from earlier years of microfinance lending in Bangladesh are useful because the number of operating MFIs in Bangladesh were less than today. A smaller number of microfinance lenders in a village minimizes the likelihood of endogeneity bias (i.e. the likelihood of excluding other credit sources that can potentially bias the results). Since finance money is fungible, a smaller number of MFIs and other sources of credit in a village provides us with less unobserved injections of microcredit and more reliable program effect estimates.

To address endogeneity or statistical bias in the estimates, the survey method relies on a quasi-experiment survey design. The use of a quasi-experiment survey allows us to estimate the impact of an intervention on the targeted population in the absence of random assignment to treatment or control (Dinardo, 2008). To do this, a program eligibility cutoff criterion was introduced. To be eligible to participate in a microfinance program operated by a formal MFI, a household could not own more than half an acre of land. Collateral was not required and therefore having more money or assets was not likely a function of more borrowing. The programs targeted the poorest borrowers.

Although this technique allows us to identify impacts on the targeted populations, it still leaves us with the potential for biased estimates due to unobserved factors. To control for unobserved effects, and further reduce potential endogeneity, the study uses a panel data model.

Data on the full sample distribution of credit by loan source indicate that formal MFIs and NGOs capture a significant share of the microcredit market. However, informal moneylenders are also significant contributors to rural credit. The Grameen Bank is the largest microfinance provider in the sample representing over 42 percent and 53 percent of the rural finance market in 1991-92 and 1998-99 respectively. Informal moneylenders are a significant source of credit with over 16 percent of the market share in the sample (Table 1).

Table 1. Credit distribution by source

Source of Microfinance	1991-1992 %	1998-1999 %
Government	0.56%	N/A
BRDB	19.91%	4.84%
BRAC	16.28%	11.68%
Grameen Bank	42.61%	53.16%
Other Banks/Cooperatives	4.06	3.37
Local Non-governmental Organizations	1.05%	10.62%
Informal Moneylenders	15.53%	16.34%
No. of Observations	3,053	7,396

**Other Non-governmental organizations

Source: Author's calculation from the 1991/92 and 1998/99 surveys.
Similar data are presented in Ocasio (2016a).

Given the eligibility criteria for participating in a formal microfinance program was ownership of half an acre of land or less, most program participants met the requirement. In both rounds of surveys, over 55 percent of microloan borrowers were landless or owned less than half an acre of land.

Table 2 presents summary statistics for relevant variables such as per capita income and microcredit variables. As can be observed in this table, the mean for the 1991-1992 variables for t-1 is zero. By assumption, there was no borrowing before 1991-1992 because data is only available starting in 1991-1992. In this case $L_{ijt}(t-1)$ in the 1992 survey = 0. In Table 2, we observe a significant increase in loan portfolios and/or microfinance borrowing from 1991-1992 to 1998-1999. Household per capita yearly income also increased substantially between the two survey periods. The increase in income is consistent with the effort of Bangladesh's government to reduce poverty in the 1990s. Bangladesh is often referred to as a success story among developing countries due to the progress the country has made in reducing poverty. At the start of the 1990s, the incidence of poverty was 57% but by the year 2000, it had declined to 49%. In 2005, the poverty headcount rate declined to 40% (World Bank).

THEORETICAL MODEL AND ESTIMATION STRATEGY

One of the challenges that arise with the use of household data to assess program impacts is the bias that can be introduced to the estimates by unobserved effects. This endogeneity bias can come from program placement, borrower selection methods, and the existence of other microlending programs in the same geographic location (Pitt et al., 1993; Ravallion, 1999). If these biases are correlated with the credit estimates in our model, the estimated impacts will not be reliable. To mitigate potential biases, the surveys were gathered using a quasi-experiment design and the present study uses a panel data model to estimate program impacts.

The estimation model begins with an equation for income y_{it} in year t which depends on the individual household's asset stock and characteristics X, the amount of loan received L, and a random error ε :

$$y_{ijt} = \beta_1 X_{ijt} + \beta_2 L_{ijt}^F + \beta_3 L_{ijt(t-1)}^F + \beta_4 L_{ijt}^M + \beta_5 L_{ijt(t-1)}^M + \varepsilon_{ijt} \quad (1)$$

In equation (1), y_{ijt} is individual household per capita income in village j, assumed to depend on household characteristics and current and past borrowing. X is a vector of individual household assets and characteristics. L^F and L^M respectively represent current (t) and past (t-1) borrowing over time for female and male borrowers from different programs. Estimates β_2 , β_3 , β_4 , and β_5 measure the effects of current and past credit (stock) for loans given to female and male borrowers by each of the microfinance programs. The model specification is such that if current loans are zero, namely, the household did not borrow in period T=2, we can still capture the effect of previous loans on income. The model specification also assumes there was no borrowing in 1992, (t-1). As such, zeroes were used for this time. The results in this study are generally consistent with the results obtained in similar studies that have used this dataset and other model specifications that do not use lags for the credit variables (i.e. t=1991/92 and 1998/99). The stability of the estimates across these methods suggests the use of zeros for 1992, (t-1) does not create an issue here (see Ocasio, 2016a).

Loans are separated by borrower gender and credit source to capture differential impacts between men and women household entrepreneurs. This separation of the credit variables allows us to empirically observe loan return dynamics by borrower demographics and inform program policy to better serve specific groups. To test the null hypothesis that men's and women's loans are equal (and hence no need to split credit variables by gender), an F-test was used to test the coefficients for equality. According to the F-test results (not shown here), the equality of the credit coefficients can be rejected at the 0.05 percent significance level or better. The result of this test provides further support for the hypothesis that gender and credit source matter.

Table 2. Summary statistics of household income and credit variables, taka

Variable	1991/92		1998/99	
	Mean	Std. Dev.	Mean	Std. Dev.
Household per capita yearly income	3,046.8	8,837.3	11,380.9	28,409.0
Women's loans from Grameen, (t)	402.6	1,091.7	720.5	1,660.3
Men's loans from Grameen, (t)	174.3	780.3	171.3	929.3
Women's loans from Grameen, (t-1)	0.0	0.0	402.6	1,091.7
Men's loans from Grameen, (t-1)	0.0	0.0	174.3	780.3
Women's loans from BRAC, (t)	265.1	833.6	401.5	1,162.9
Men's loans from BRAC, (t)	97.4	543.1	16.4	259.9
Women's loans from BRAC, (t-1)	0.0	0.0	265.1	833.6
Men's loans from BRAC, (t-1)	0.0	0.0	97.4	543.1
Women's loans from BRDB RD-12, (t)	168.8	640.3	133.2	703.2
Men's loans from BRDB RD-12, (t)	281.7	897.7	106.0	640.6
Women's loans from BRDB RD-12, (t-1)	0.0	0.0	168.8	640.3
Men's loans from BRDB RD-12, (t-1)	0.0	0.0	281.7	897.7
Women's loans from ASA, (t)	0.0	0.0	114.4	546.7
Men's loans from ASA, (t)	0.0	0.0	3.6	107.1
Women's loans from ASA, (t-1)	0.0	0.0	0.0	0.0
Men's loans from ASA, (t-1)	0.0	0.0	0.0	0.0
Women's loans from Prosh, (t)	0.0	0.0	41.1	602.2
Men's loans from Prosh, (t)	0.0	0.0	16.1	264.7
Women's loans from Prosh, (t-1)	0.0	0.0	0.0	0.0
Men's loans from Prosh, (t-1)	0.0	0.0	0.0	0.0
Women's loans from GSS, (t)	0.0	0.0	0.9	26.7
Men's loans from GSS, (t)	0.0	0.0	0.8	23.6
Women's loans from GSS, (t-1)	0.0	0.0	0.0	0.0
Men's loans from GSS, (t-1)	0.0	0.0	0.0	0.0
Women's loans from YD, (t)	0.0	0.0	0.0	0.0
Men's loans from YD, (t)	0.0	0.0	0.0	0.0
Women's loans from YD, (t-1)	0.0	0.0	0.0	0.0
Men's loans from YD, (t-1)	0.0	0.0	0.0	0.0
Women's loans from other NGOs, (t)	10.8	131.1	250.9	851.0
Men's loans from other NGOs, (t)	16.8	259.2	39.7	320.5
Women's loans from other NGOs, (t-1)	0.0	0.0	10.8	131.1
Men's loans from other NGOs, (t-1)	0.0	0.0	16.8	259.2
Women's loans from informal lender, (t)	51.8	561.6	88.6	565.0
Men's loans from informal lender, (t)	965.2	7,048.8	519.9	1,880.6
Women's loans from informal lender, (t-1)	0.0	0.0	51.8	561.6
Men's loans from informal lender, (t-1)	0.0	0.0	965.2	7,048.8
Number Of Observations	1,656.0		1,656.0	

Note: In the full dataset, microfinance programs included the Association for Social Advancement (ASA), PROSHIKA (Prosh), Youth Development (YD), Gano Shahajyo Sangstha (GSS), other local NGOs and other sources of informal lending in addition to Grameen Bank, BRAC, and BRDB RD-12 members.

Source: Author's calculations from the 1991/92 and 1998/99 household surveys in Bangladesh

To reduce potential endogeneity bias, the model specification is expanded to capture household and village-level unobserved effects.

The individual household income equation is rewritten:

$$y_{ijt} = \beta_1 X_{ijt} + \beta_2 L_{ijt}^F + \beta_3 L_{ijt(t-1)}^F + \beta_4 L_{ijt}^M + \beta_5 L_{ijt(t-1)}^M + \tau_{ij} + \alpha_j + \varepsilon_{ijt} \quad (2)$$

Where τ_{ij} is the household heterogeneity unobserved effect, which includes household characteristics such as managerial effectiveness, and land quality. Term α_j is the village unobserved effect and captures exogenous factors affecting the household such as microeconomic and macroeconomic conditions, and the existence of other financing programs in the village. The error term is represented by ε_{ijt} . By using a household fixed effect method, we also control for potential village-level endogeneity. Accordingly, the model equation can be simplified by combining the unobserved effects $\tau_{ij} + \alpha_j$ into ν_{ij} .

The reduced equation (2) can be stated as follows:

$$y_{ijt} = \beta_1 X_{ijt} + \beta_2 L_{ijt}^F + \beta_3 L_{ijt(t-1)}^F + \beta_4 L_{ijt}^M + \beta_5 L_{ijt(t-1)}^M + \nu_{ij} + \varepsilon_{ijt} \quad (3)$$

To reduce endogeneity bias, equation (3) is estimated using longitudinal data for 1991-1992 and 1998-1999. To compile a household panel, only the households surveyed in both periods were included in the sample. To determine whether a household fixed-effects model or a random-effects model is appropriate, a Hausman Test is employed. The Hausman Test, also called the Durbin-Wu-Hausman (DWH) test is a statistical technique that detects endogenous predictor variables in a regression model. If the p-value is small, namely less than 0.05, the null hypothesis that there is no correlation between a predictor variable and the error term can be rejected (Hausman, 1978; Hsiao, 1986). The test result for the baseline model that includes household characteristics and credit variables indicate that the null hypothesis of constant τ_{ij} and α_j , or in sum ν_{ij} for all i, must be rejected (X^2 -statistic 14.38 and p-value 0.0256). A Cross-section model like OLS is not appropriate for this data since the error term is potentially serially correlated with X and L. Accordingly, this analysis uses a fixed-effects (FE) estimator to analyze the marginal return of microfinance loans to household income.

RESULTS

The results from the household FE estimation of equation (3), are presented in Table 3. As anticipated, the coefficients for labor assets (i.e. number adults in household), land assets (i.e. avg. household landholding), and infrastructure development (i.e. bank and electricity present in the village) are positive and statistically significant.

Most of the credit coefficients for the Grameen Bank, NGOs, and informal moneylenders are statistically significant. The findings suggest that the benefits of microcredit extend to both male and female borrowers. Based on the fixed-effect estimation, a 10 percent increase in the current stock of female borrowing from the Grameen Bank, increases per capita income by .7 percent. A 10 percent increase in male borrowing from the Grameen Bank, increases per capita income by .9 percent (Table 3).

The credit coefficients for NGOs are positive and statistically significant. A 10 percent increase in past credit given to women by NGOs increases household income by 1.34 percent. Similarly, a 10 percent increase in past credit given to men by NGOs, increase household income by 1.75 percent. The magnitude of the estimates suggests that program effectiveness is different by credit source (Table 3).

The coefficients for the credit variables for informal lending sources are not what we would expect and warrant some analysis here. As an exercise, micro-loans obtained from informal credit sources such as moneylenders (i.e. employers, neighbors, shopkeepers, etc.) were included in this study. Interestingly, the credit coefficients for male

Table 3. Household fixed-effects estimates of the return of microfinance loans on total household income

Variables	Inincome
Number of adults in Household (15-59yrs.)	0.191*** (0.0388)
Avg. years of education of household adults	0.0169 (0.0240)
Bank in village (dummy)	0.294** (0.121)
Electricity in village (dummy)	0.301*** (0.101)
Log of household land (decimals)	0.0997** (0.0435)
Log of women's loans from Grameen, (t)	0.0690*** (0.0218)
Log of men's loans from Grameen, (t)	0.0914** (0.0382)
Log of women's loans from Grameen, (t-1)	-0.00774 (0.0181)
Log of men's loans from Grameen, (t-1)	0.0526 (0.0339)
Log of women's loans from NGOs, (t)	0.0265 (0.0234)
Log of men's loans from NGOs, (t)	0.118*** (0.0431)
Log of women's loans from NGOs, (t-1)	0.134*** (0.0369)
Log of men's loans from NGOs, (t-1)	0.175*** (0.0669)
Log of women's loans from informal lender, (t)	-0.0735** (0.0368)
Log of men's loans from informal lender, (t)	0.0610*** (0.0174)
Log of women's loans from informal lender, (t-1)	-0.115** (0.0525)
Log of men's loans from informal lender, (t-1)	0.0581** (0.0237)
Observations	3294
Number of Households	1656
F-statistics (29,1609)	29.43
Prob > F	0.0000

*t-statistic is significant at the 10 percent level or better

**t-statistic is significant at the 5 percent level or better

***t-statistic is significant at the 1 percent or better

Note: Robust standard errors are in parentheses. Regressions also include the following:

sex, age, education, year dummy, village level infrastructure and price variables to account

for the impact of time-varying changes in local economic conditions.

Source: Author's computations based on 1991-1992 and 1998-1999 household surveys in Bangladesh.

and female borrowing from informal lenders are statistically significant in a puzzling way. The findings show that a 10 percent increase in the current stock of credit given to men by informal credit sources increases household income by .6 percent. Credit given to women by informal credit sources in both periods, however, has a significant negative impact on income of .7 percent and 1.15 percent respectively (Table 3).

The estimates for the informal lending variables would be puzzling under sound credit market conditions. In such a market, we would expect an increase in borrowing for productive purposes to augment the income of borrowers. In Bangladesh, however, the rural credit market is imperfect due to asymmetric information, low population density, remote areas, and structures that deny many poor individuals access to credit (Ferrari, 2007). Women, particularly, tend to be excluded from borrowing in formal credit markets. In this context, when women borrow from the informal rural credit market (i.e. relatives, informal moneylenders), they often do so under exploitative conditions (Yunus, 2007). In this study, the findings suggest that borrowing from rural informal credit sources impacts household income positively when the borrower is a male and adversely when the borrower is a female. Other studies also document negative impacts when loans are disbursed to women participants. Shohel et al., 2022, for instance, explored the impact of microfinance in patriarchal communities in Bangladesh. They found that although MFIs claim that access to microfinance increases women's empowerment, financial participation, and social mobility, in reality, given the pervasive patriarchal gender norms in Bangladesh, men control and use most of the microfinance loans and women do not benefit as much as it is claimed. Other negative impacts have been documented. A study on the effect of microfinance on household incomes in Pakistan found that although microfinance borrowing substantially raised monthly income, food expenditures, education, and health, it also raised debt which negatively affected household income (ZahidMahmood et al., 2017).

The fixed-effects estimates presented are used to calculate the marginal monetary return to credit for male and female borrowers (Table 4).⁴ At the mean, an additional Tk 100 of borrowing from Grameen by women during 1998-1999 increased household yearly income by almost Tk 6.⁵ The most significant impact observed is the effect of women borrowing from NGOs. An additional Tk 100 in women's stock of credit from NGOs during 1991-1992 increases the household's total income by Tk 200.

In terms of the marginal return to income from microfinance for women borrowing from informal lenders, as previously discussed, credit from these sources has a reductive effect on household yearly income for women of Tk 36 for 1991-1992 and Tk 50 for 1998-1999. The marginal return to borrowing for male borrowers who obtain credit from NGOs is substantially higher. An additional Tk 100 in men's stock of credit from NGOs during 1991-1992 increases the household's total income by Tk 168 and by Tk 179 during 1998-1999. In terms of borrowing from informal moneylenders, this borrowing source benefits men and not women (Table 4).

When the sample is restricted by household demographics such as the ownership of land assets and by education assets (Table 5), we observe that microfinance benefits mostly households who are resource poor (i.e. own $\leq .50$ acres of land) and households that are less educated (i.e. < 4 yrs of schooling). The results in Table 5, suggest that the policies employed by the Grameen Bank and other microfinance programs are effective in terms of their impact on more vulnerable populations. Most of the coefficients for the resource wealthy households are not statistically significant which suggests that these households do not benefit from microcredit as much as those households who lack assets, collateral, and financial capital. In this context, the results suggest that microcredit benefits resource-poor households more.

The coefficient for loans disbursed by BRAC to less educated women in the period $t-1$ is negative and statistically

⁴Note: Because the estimation equations are in log-log (elasticity) form, marginal returns are calculated using the formula:

$$\frac{dY}{dX} = \beta \left(\frac{Y}{X} \right)$$

⁵The taka is the Bangladesh currency.

Table 4. Marginal Returns To Income from Microfinance Loans (taka per 100 taka in borrowing)

Gender and period	Marginal return to household total yearly income
Women's Borrowing	
Returns from Grameen Bank Loans in 1991-1992	-.31
Returns from Grameen Bank Loans in 1998-1999	5.78***
Returns from NGO Loans in 1991-1992	200.36***
Returns from NGO Loans in 1998-1999	6.37
Returns from Informal Lender Loans in 1991-1992	-35.9**
Returns from Informal Lender Loans in 1998-1999	-50.03**
Men's Borrowing	
Returns from Grameen Bank Loans in 1991-1992	4.9
Returns from Grameen Bank Loans in 1998-1999	32.18**
Returns from NGO Loans in 1991-1992	168.2***
Returns from NGO Loans in 1998-1999	179.3***
Returns from Informal Lender Loans in 1991-1992	.97**
Returns from Informal Lender Loans in 1998-1999	7.1***

*t-statistic is significant at the 10 percent level of better

**t-statistic is significant at the 5 percent level or better

***t-statistic is significant at the 1 percent or better

Source: Author's calculations based on 1991-1992 and 1998-1999 household surveys in Bangladesh.

significant. The same is observed for BRAC loans given to men with higher educational achievements. The impact of BRAC loans received by male borrowers with fewer labor assets (<4 adults) is positive and statistically significant. BRDB RD-12 loans given to men with less land and education assets have a negative significant coefficient. These results are puzzling since we would expect credit to be positively associated with income, but as discussed previously, in the presence of imperfect credit markets characterized by asymmetric information, lack of business skills, limited investment, and limited market opportunities, it is possible for credit to have a reductive effect on household income (Table 5).

When the sample is restricted by land assets, education assets and labor assets, the coefficients for credit from NGOs given to women borrowers are statistically significant for period $t-1$ for borrowers with less land, education, and labor assets. In the case of NGO loans disbursed to men, the credit coefficients are positive and statistically significant for borrowers in most education and asset groups (Table 5).

In terms of loans disbursed by informal money lenders (relatives, neighbors, etc.), we observe that men who borrow money from these sources benefit the most. In the case of women who borrow from these sources, however, most of the credit coefficients are not significant with the exception of women who borrowed from these sources in period $t-1$. In this case, women borrowers with less land (formal program target), do not benefit from credit received from informal lenders. Credit received by women from informal moneylender have a reductive effect on household income. As previously discussed, under imperfect markets and oppressive borrowing terms, it is possible for credit to impact the household in negative ways (Table 5).

CONCLUSION

The present study explored whether microfinance loans from all sources of rural finance in the sample yield a positive return to household income. Additionally, the study explored whether loan source, education, land

Table 5. Household Fixed-Effects Estimates of the Impact of Microfinance Loan on Household income for Selected Groups

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Inincome Land Assets ≤.50 decimals	Inincome Land Assets >.50 decimals	Inincome Education Assets <4.5 years	Inincome Education Assets >4.5 years	Inincome Labor Assets <4 adults	Inincome Labor Assets >4 adults
Log of women's loans from Grameen, (t)	0.0731*** (0.0256)	0.148 (0.135)	0.0683** (0.0271)	0.104 (0.105)	0.0609** (0.0283)	0.258*** (0.0984)
Log of men's loans from Grameen, (t)	0.0984* (0.0517)	0.180 (0.202)	0.0894* (0.0519)	-0.0960 (0.0871)	0.0824* (0.0448)	0.0678 (0.199)
Log of women's loans from Grameen, (t-1)	0.00581 (0.0223)	-0.0141 (0.140)	-0.00558 (0.0222)	0.0112 (0.0998)	0.00693 (0.0256)	0.0557 (0.0985)
Log of men's loans from Grameen, (t-1)	0.0677* (0.0402)	0.0622 (0.153)	0.0338 (0.0385)	0.00324 (0.0861)	0.0330 (0.0419)	0.0784 (0.133)
Log of women's loans from NGOs, (t)	0.0130 (0.0270)	0.151 (0.199)	0.0351 (0.0294)	-0.0283 (0.113)	0.00725 (0.0331)	0.000876 (0.115)
Log of men's loans from NGOs, (t)	0.0921* (0.0520)	0.231 (0.178)	0.116** (0.0570)	0.0655 (0.303)	0.0813 (0.0576)	0.332 (0.215)
Log of women's loans from NGOs, (t-1)	0.141*** (0.0408)	0 (0)	0.126*** (0.0392)	0.0248 (0.234)	0.131** (0.0541)	-0.101 (0.138)
Log of men's loans from NGOs, (t-1)	0.183** (0.0897)	0 (0)	0.223** (0.0923)	0.220 (0.322)	0.123 (0.0950)	0.448** (0.226)
Log of women's loans from informal lending sources, (t)	-0.0735 (0.0487)	-0.0144 (0.124)	-0.0542 (0.0514)	-0.00343 (0.103)	-0.0467 (0.0493)	-0.240 (0.153)
Log of men's loans from informal lending sources, (t)	0.0561** (0.0223)	0.0326 (0.0760)	0.0436* (0.0232)	0.0956 (0.0628)	0.0810*** (0.0249)	0.0195 (0.0676)
Log of women's loans from informal lending sources, (t-1)	-0.130** (0.0634)	-0.139 (0.137)	-0.0809 (0.0692)	0.0500 (0.149)	-0.0622 (0.0667)	-0.268 (0.176)
Log of men's loans from informal lending sources, (t-1)	0.0376 (0.0290)	0.0764 (0.0930)	0.0353 (0.0335)	0.0717 (0.0851)	0.0438 (0.0366)	0.0313 (0.0790)
Log of women's loans from BRAC, (t)	-0.00452 (0.0275)	-0.0429 (0.135)	-0.0245 (0.0297)	-0.0940 (0.112)	0.0141 (0.0310)	-0.117 (0.116)
Log of men's loans from BRAC, (t)	0.162 (0.104)	0.209 (0.270)	0.160 (0.107)	-0.0196 (0.163)	0.323* (0.167)	0.140 (0.130)
Log of women's loans from BRAC, (t-1)	-0.0334 (0.0338)	0.0520 (0.176)	-0.0830** (0.0398)	-0.0267 (0.0781)	-0.0369 (0.0425)	0.0379 (0.0825)
Log of men's loans from BRAC, (t-1)	0.174 (0.109)	0.0230 (1.180)	0.140 (0.104)	-0.123* (0.0705)	0.306* (0.177)	0 (0)
Log of women's loans from BRDB RD-12, (t)	0.0368 (0.0358)	-0.100 (0.230)	0.00807 (0.0347)	0.154 (0.157)	0.0182 (0.0389)	0.284 (0.256)
Log of men's loans from BRDB RD-12, (t)	-0.0551 (0.0395)	0.207 (0.255)	-0.0853* (0.0471)	0.0187 (0.138)	-0.0311 (0.0412)	-0.140 (0.290)
Log of women's loans from BRDB RD-12, (t-1)	0.0283 (0.0410)	-0.118 (0.202)	0.00800 (0.0380)	0.0931 (0.147)	0.0257 (0.0426)	0.331 (0.265)
Log of men's loans from BRDB RD-12, (t-1)	-0.0779* (0.0402)	0.119 (0.207)	-0.121*** (0.0454)	-0.0435 (0.113)	-0.0458 (0.0389)	-0.134 (0.283)
Number of observations	1462	508	1380	590	1419	633
F-statistics	16.18	8.73	25.07	4.44	19.22	6.98
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

*t-statistic is significant at the 10 percent level or better.

**t-statistic is significant at the 5 percent level or better.

***t-statistic is significant at the 1 percent or better Note: Robust standard errors are in parentheses. Regressions also include the following: sex, age, education, year dummy, village level infrastructure and price variables to account for the impact of time-varying changes in local economic conditions.

Source: Author's computations based on 1991-1992 and 1998-1999 household surveys in Bangladesh.

ownership, and the gender of the borrower matter in achieving positive returns to income from receiving small-scale finance. We theorized that a positive microfinance loan return increases household income and contributes to poverty reduction. Additionally, we hypothesized that if credit plays a role in generating household income, then loan source, education, land ownership, and the gender of the borrower will also impact household income.

The findings suggest that the return from microloans contributes to increases in household income. This result, however, depends on the credit source. The results presented here also suggest that there are differential impacts based on gender, socioeconomic factors, land ownership and other assets. An inherent insight is that loan sources are not equally effective in helping poor borrowers achieve their small-scale production goals. Furthermore, the gender of the borrower matters and not all funding sources are effective in contributing to the financial success of female borrowers.

Incorporating what we know about differential impacts in program evaluation methods could improve the effectiveness of microfinance schemes and result in significant poverty reduction. The empirical results in this study have important policy implications for development finance programs. One implication is that if microcredit plays an important role in increasing household income, microcredit programs would be more effective if efforts were aimed at identifying relevant borrower demographics for the purpose of customizing credit programs to the specific needs of the borrower. Such customized approach to lending can help the borrower achieve financial success. Another important policy implication stemming from this study is that given the geographical, and cultural settings of Bangladesh, credit should be complemented with investment opportunities in working capital, technology, and equal opportunity for women in informal and formal markets. In this context, if female borrowers are limited to informal sources of credit, financial success may be curtailed. If women cannot participate in the formal economy, the extent of their production and market will be limited.

The marginal impacts of credit on household income suggest that provision of credit can be effective in augmenting household income, but not all credit sources succeed in facilitating positive economic outcomes for borrowers. This is particularly the case when providing credit to female borrowers. With these challenges in mind, microfinance programs should continue to increase effort to compliment credit with other services such as financial education, saving, insurance and other tools known to facilitate social and entrepreneurial success.

The conclusions derived from this study provide perspectives for further research on the relationship between credit program design, credit source, and the demographics of the targeted populations. Given the limitations presented by a quasi-experiment survey design, further research into the dynamics of borrower characteristics and program success should include randomized control trials to reduce any potential endogeneity bias that can undermine the empirical correlation between these factors.

REFERENCES

- Abdullah, T. and Zeidenstein, S. A. (1982). *Village women of Bangladesh: Prospects for change*. Oxford: Pergamon Press.
- Auwal, M. A. (1996). Promoting microcapitalism in the service of the poor: The Grameen model and its cross-cultural adaptation. *The Journal of Business Communication*, 33(1), 27-49.
- Bank of Bangladesh. (2002). *Microfinance in Bangladesh*. Paper for the SAARCFINANCE Seminar on Microfinance, Dhaka, Bangladesh. Retrieved from <https://www.bb.org.bd/saarcfinance/seminar/cpbdesd.php>, Accessed August 6, 2022.
- Bel hadj Miled, K. and Ben Rejeb, J. E. (2018). Can microfinance help to reduce poverty? A review of evidence for developing countries. *Journal of the Knowledge Economy*, 9, 613-635. <https://doi.org/10.1007/s13132-015-0348-2>
- Bel Hadj Miled, K., Younsi, M. and Landolsi, M. (2022). Does microfinance program innovation reduce income inequality? Cross-country and panel data analysis. *Journal of Innovation and Entrepreneurship*, 11, 7. <https://doi.org/10.1186/s13731-022-00195-7>
- Benvenuti, M., Casolaro, L. and Ciani, E. (2021). Informal loans, liquidity constraints and local credit supply: Evidence from Italy. *Review*

- Economics Household*, 20, 1429-1461. <https://doi.org/10.1007/s11150-021-09567-6>
- Binaté Fofana, N., Antonides, G., Niehof, A. and van Ophem J. A. C. (2015). How microfinance empowers women in Côte d'Ivoire. *Review Economics of the Household*, 13, 1023-1041. <https://doi.org/10.1007/s11150-015-9280-2>
- Boonperm, J., Haughton, J. and Khanker, S. R. (2009). *Does the village fund matter in Thailand?*. Policy Research Working Paper No. 5011, Washington, DC: World Bank. Retrieved from <https://openknowledge.worldbank.org/handle/10986/4202?show=full>, Accessed August 5, 2022.
- Burjorjee, D. M., Deshpande, R. and Weidemann, C. J. (2002). *Supporting women's livelihoods microfinance that works for the majority. A guide to best practices*. United Nations Capital Development Fund, Special Unit for Microfinance. Retrieved from <https://www.findevgateway.org/sites/default/files/publications/files/mfg-en-paper-supporting-womens-livelihoods-microfinance-that-works-for-the-majority-a-guide-to-best-practices-2002.pdf>, Accessed August 5, 2022.
- Chomen, D. A. (2021). The role of microfinance institutions on poverty reduction in Ethiopia: The case of Oromia Credit and Saving Share Company at Welmera district. *Future Business Journal*, 7, 44. <https://doi.org/10.1186/s43093-021-00082-9>
- Cockburn, A. (2006, October 19). *The myth of micro loan*. The Nation. Retrieved from <https://www.thenation.com/article/archive/myth-microloans/>, Accessed August 6, 2022.
- DiNardo, J. (2008). Natural experiments and quasi-natural experiments. In Vernengo, M., Perez Caldentey, E., & Rosser, B. J. Jr. (Eds.), *The New Palgrave Dictionary of Economics* (pp. 856-859). London: Palgrave Macmillan. <https://doi.org/10.1057/9780230226203.1162>. ISBN: 978-0-333-78676-5.
- Eze Eze, D. (2019). Microfinance programs and domestic violence in northern Cameroon; the case of the Familial Rural Income Improvement Program. *Review of Economics of the Household*, 17, 947-967. <https://doi.org/10.1007/s11150-017-9393-x>
- Ferrari, A. (2007). Increasing access to rural finance in Bangladesh : The forgotten "Missing Middle". *Directions in Development, Finance*. Washington, DC: World Bank. Retrieved from <https://openknowledge.worldbank.org/handle/10986/6832>, Accessed August 5, 2022.
- Guerra, M. J. M., Mohapatra, S. and Swallow, B. (2019). What influence do empowered women have? Land and the reality of women's relative power in Peru. *Review of Economics Household*, 17, 1225-1255. <https://doi.org/10.1007/s11150-019-09461-2>
- Hashemi, S. M., Schuler, S. R. and Riley, A. P. (1996). Rural credit programs and women's empowerment in Bangladesh. *World Development*, 24(4), 635-653.
- Hausman, J. A. (1978). Specification test in econometrics. *Econometrica*, 46(6), 1251-1271.
- Hsiao, C. (1986). *Analysis of panel data*. Cambridge: Cambridge University Press.
- Imai, K. S., Arun, T. and Annim, S. K. (2010). Microfinance and household poverty reduction: New evidence from India. *World Development*, 38(12), 1760-1774.
- Islam, A. (2011). Medium-and long-term participation in microcredit: An evaluation using a new panel dataset from Bangladesh. *American Journal of Agricultural Economics*, 93(3), 847-866.
- Kaboski, J. P. and Townsend, R. M. (2011). A structural evaluation of a larger-scale quasi-experimental microfinance initiative. *Econometrica*, 79(5), 1357-1406.
- Kamaluddin, S. (1993, March 18). Lender with a mission: Bangladesh's Grameen Bank targets poorest of the poor. *Far Eastern Economic Review*, 156(11), 38-40.
- Khandker, S. R. (1998). *Fighting poverty with micro credit: Experience in Bangladesh*. New York: Oxford University Press.
- Khandker, S. R. (2005). Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, 17(2), 263-286.
- Koomson, I., Villano, R. A. and Hadley, D. (2022). The role of financial literacy in households' asset accumulation process: evidence from Ghana. *Review of Economics Household*. <https://doi.org/10.1007/s11150-022-09603-z>
- Levy, M. F. (1988). *Each in Her Own Way: Five Women Leaders of the Developing World* (pp. 31-59). Boulder, CO: Lynne Rienner Publishers.
- McIntosh, C. (2008). Estimating treatment effects from spatial policy experiments: an application to Ugandan microfinance. *Review of Economics and Statistics*, 90(1), 15-28.

- Ocasio, V. M. (2016a). Financing village enterprises in rural Bangladesh: What determines non-farm revenue growth? *International Journal of Development Issues*, 15(1), 76-94.
- Ocasio, V. M. (2016b). Rural finance schemes miss the target: An empirical analysis of gender and social inequality effects, *Journal of Applied Business and Economics*, 18(6), 78-93.
- Ocasio, V. M. (2020). A human development approach to sustainable financial inclusion: The case of microfinance in rural Bangladesh. *Journal of Applied Business and Economics*, 22(4), 103-118.
- Papa, M. J., Auwal, M. A. and Singhal, A. (1995). Dialectic of control and emancipation in organizing for social change: A multitheoretic study of the Grameen Bank in Bangladesh. *Communications Theory*, 5(3), 189-223.
- Pitt, M. M. and Khandker, S. R. (1998). The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy*, 106(5), 958-996.
- Pitt, M., Rosenzweig, M. and Gibbons, D. (1993). The determinants and consequences of the placement of programs in Indonesia. *World Bank Economic Review*, 7(3), 319-348.
- Ravallion, M. (1999). The mystery of the vanishing benefits: Ms. Speedy analyst's introduction to evaluation. Policy Research Working Paper No. 2153. Washington, DC: World Bank. Retrieved from <https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-2153>. Accessed August 5, 2022.
- Schuler, S. R. and Hashemi, S. M. (1994). Credit programs, women's empowerment, and contraceptive use in rural Bangladesh. *Studies in Family Planning*, 25(2), 65-76.
- Schuler, S. R. and Hashemi, S. M. (1995). Family planning outreach and credit programs in rural Bangladesh. *Human Organization*, 54(4), 455-461.
- Shohel, T. A., Niner, S. and Gunawardana, S. J. (2022). 'Even though I get a loan, my husband controls it': Rhetoric versus reality of empowering Bangladeshi women through microfinance programs. *European Journal Development Research*. <https://doi.org/10.1057/s41287-022-00539-9>
- World Bank. (2008). Bangladesh – Poverty assessment for Bangladesh: Creating opportunities and bridging the east-west divide. Retrieved from <https://openknowledge.worldbank.org/handle/10986/7886#:~:text=Bangladesh%20represents%20a%20success%20story,to%2040%20percent%20in%202005>, Accessed July 29, 2022.
- Yunus, M. (2007). Banker to the Poor: Micro-Lending and the Battle Against World Poverty, Public Affairs, United States.
- ZahidMahmood, H., Abbas, K. and Fatima, M. (2017). Islamic microfinance and household welfare nexus: empirical investigation from Pakistan. *Journal of Global Entrepreneurship Research*, 7, 18. <https://doi.org/10.1186/s40497-017-0075-1>