

Rural Finance Schemes Miss the Target: An Empirical Analysis of Gender and Social Inequality Effects

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Using survey data from over 1,700 households in rural Bangladesh, this study explores whether access to credit has gender-specific impacts and whether this credit is associated with income distribution effects. To estimate these effects, a panel data model is used to explore the empirical association between access to credit, borrower gender and village income. Contrary to the common claim that microfinance benefits women the most, the results in this study suggest that women benefit from microfinance, but only marginally. The observed positive correlation between access to credit and income inequality may be explained by the fact that wealthier male borrowers benefit more from receiving micro loans. This study has important implications for credit program design. If microloans are targeted towards poor rural women in an effort to empower them and bring them out of poverty, we must design credit programs in ways that achieve these objectives.

INTRODUCTION

Does participation in rural finance schemes benefit the targeted population and does it generate income effects that contribute to economic growth? These questions are important in the debate on the impact of microfinance on poverty reduction and women empowerment. The importance of poverty reduction and gender equality have been emphasized in the United Nations 2030 agenda for Sustainable Development. The first goal of this agenda aims to “end poverty in all its forms everywhere”, and goal five aims to “achieve gender equality and empower all women and girls” (United Nations, 2015). With respect to gender equality, access to microcredit has been used as a tool to give poor rural women opportunities in entrepreneurial activities. This access to entrepreneurship and hence earning power in turn has been linked to increased empowerment in household decisions that include matters related to self-employment and the health and education of children (Khandker 1998; Pitt and Khandker, 1998). Access to credit has also been linked to asset building and income generation for the household (Kevane and Wydick, 2001; Pitt et al., 2003; McIntosh, 2008; Imai et al., 2010; Islam, 2011). All of these impacts, if accurate, can contribute towards establishing a more equal playing field for poor women and would bring about social and economic prosperity to poor countries around the world. In terms of income effects, closing the income gap between the rich and the poor is an important channel to reduce poverty because research shows that income inequality can deepen poverty and delay economic growth (Soubbotina and Sheram, 2000; Besley and Burgess, 2003; Bourguignon, 2004; Ravallion, 2005; Bhargava, 2006).

Despite ongoing criticism challenging microfinance’s impact on poverty reduction and empowerment, microfinance has continued to gain momentum and programs continue to expand throughout the world (Admed, 2004; Banerjee et al., 2009; Karlan and Zinman, 2011; Kaboski and

Townsend, 2011; Sayvaya and Kyophilavong, 2015). Given the inconsistency of the findings in the microfinance literature, we are not confident about the extent to which microfinance benefits communities and poor borrowers. Some studies find positive socio-economic impacts such as income stability and growth, increased employment, reduced income inequality, improvements in health, nutrition and schooling, women's empowerment and stronger social networks (Beck et al., 2004; Khandker, 2003; Khalily 2010; Khalily 2011). However, there are other studies that suggest negative impacts such as high interest rates, constant poverty levels, exploitation of women, increased inequality, increased dependencies and staggered local economic and social development (Rogaly, 1996; Copestake, 2002; Banerjee et al., 2009; Karlan and Zinman, 2011; Kaboski and Townsend, 2011).

Impact studies on microfinance have focused on borrower welfare. While the focus on borrower welfare is essential, it is also important to examine the potential spillover effects of microfinance. The reduction of credit constraints is expected to affect borrowers, but these effects may also induce other general equilibrium effects that will impact non-borrowers and the community as a whole. This study fills the gap in the literature of microfinance and income inequality because the main focus is on differential effects by the borrower's gender in the village and on intra-village effects rather than on individual borrower or household effects. Focusing on village-level effects allows us to reach broader conclusions about the impact of microfinance and it serves as a starting point to analyze some of the general equilibrium effects that may be induced by access to microfinance. The particular hypotheses tested are that village women benefit marginally from microfinance while men, particularly those at the upper income bracket, experience the greatest economic benefit from receiving microloans. Another hypothesis is that since those in the higher income percentile benefit more, microfinance loans contribute to village income inequality.

This study relies on household-level panel data from Bangladesh for the periods 1991-92 and 1998-99 (more details are provided in section 3). For the analysis, various econometric techniques are employed to explore the effect of microfinance on village income inequality and how the gender of borrowers influences these effects. First, a village fixed-effect method is used to empirically test the association between village characteristics, credit split by borrower gender and two dependent variables: average village income and village income inequality as measured by the Gini coefficient. Second, a quantile regression method is used to explore program effects by income distribution.

The main findings in this study suggest that microfinance contributes to income generation as well as income inequality at the village-level. A robust result is the negative correlation between education and income inequality. The results suggest that higher educational achievement reduces income inequality. The findings also suggest that borrowers in the upper percentile of income, particularly men, tend to benefit more from microfinance. In terms of the gender of borrowers in the village, the results suggest that loans given to women in the village have a minimal impact on village income, whereas the loans disbursed to men, have a substantial effect on income. The organization of the study is as follows; the first section presents background information about microfinance and income inequality, the second section describes the data, the third section presents the estimation strategy, the fourth section discusses the results, and the last section concludes the study.

LITERATURE REVIEW

Rural Finance and Gender

Access to credit in poor communities is considered an important tool to reduce poverty and empower the poor because it finances entrepreneurial activities (Parker and Nagarejan, 2001; Coung et al., 2007). In rural communities, where the availability of formal bank capital is scarce, microfinance has been an innovative way to reach the poor. Bangladesh has led the microfinance movement since professor M. Yunus designed the "Jobra" experiment in the 1970s. Many of these rural lending schemes in Bangladesh target the poor, particularly poor rural women. Loans are small (\$150 or less) although the loan amount can vary by program and by country.

One of the reasons microfinance is targeted towards women is that women, particularly in developing countries, are perceived to be poorer and more credit constrained than men. Women tend to own little assets as compared to men and this prevents them from providing the collateral necessary to borrow from formal banking institutions (Khandker, 1998; Burjorjee et al., 2002). In Bangladesh, credit is targeted towards poor rural women because they tend to be marginalized in the formal economy (see Schuler and Hashemi, 1995; Abdullah and Zeidestein, 1982). Also, given Bangladesh's system of "purdah", "a system for the seclusion of women", rural women usually are not allowed to own land or borrow from formal banks without their husbands (Papa, et al., 1995, Auwal, 1996).

The impact of microfinance on borrower welfare is mixed, but there seems to be consensus about the potential of microfinance as a tool to alleviate poverty. A heavily cited study on the impact of microfinance in Bangladesh examined the effects of microfinance on poverty reduction at both the participant and village levels and showed that access to microfinance helps reduce poverty at the household-level, especially for female participants. In terms of the effects on the local economy, the study concluded that microfinance has a positive impact at the village-level because it raises per capita household consumption for both participants and nonparticipants (Khandker, 2005). Other studies also report positive impacts of microfinance in Bangladesh. These studies suggest that microfinance increases consumption, results in higher productivity and leads to consumption smoothing (Hashemi, Schuler, and Riley 1996; Schuler and Hashemi 1994; Khandker, 1998; Zaman, 2001).

In terms of other gender-specific effects, Pitt et al. 1993, found that microcredit programs are effective in empowering women and allows them to acquire assets that can lead to entrepreneurial endeavors. In this study, the authors analyzed whether access to credit is an empowering experience for poor women who are typically restricted from engaging in market activities by poverty and societal norms. The results suggest that access to finance is positively correlated with the likelihood that a husband will agree to allow his wife to acquire assets on her own and without his permission.

The literature on women empowerment through entrepreneurship is mixed. A recent study on the correlation between non-farm enterprise revenue and access to microfinance suggests that credit given to male and female borrowers is positively associated with increases in non-farm revenue income for the household firm (Ocasio, 2016). Another study on the effect of microcredit on female entrepreneurship in Pakistan explored whether loan size is important in promoting entrepreneurial success. The findings indicate that access to finance allows female entrepreneurs to reach their goals (Mahmood et al., 2014). Other studies, however, find that microfinance does not develop entrepreneur capabilities for borrowers. A study on the empirical association between entrepreneurship and microcredit in Bangladesh uses a multivariate analysis to explore the factors associated with entrepreneurship development. The results suggest that microcredit does not promote entrepreneurship development and that the group characteristics of the female borrowers play a more significant role than access to credit (Afrin et al., 2010).

Microfinance and Inequality

Economic inequality represents disparities in the distribution of income and other economic assets. Generally, the term economic inequality refers to inequality of outcome and is usually linked to the idea of unequal opportunity. According to Tchouassi (2011), the concept of inequality can be explored within the realm of three types of processes and three different dimensions: (1) Economic, which refers to income, employment and access to physical assets; (2) social, which refers to access to health, education and social security; and (3) political, which refers to the right to vote, access to political power and legal institutions. The three different dimensions include geography (across regions), location (rural/urban) and population groups (gender, ethnicity and race). In terms of measuring differences in income equality, typically, the Gini coefficient is used.

Income inequality is a variable that is measured and closely monitored throughout the world because it has important implications for economic growth and development. Studies have found that inequality and economic growth are negatively correlated and that individuals with income and wealth below a certain threshold are unable to acquire human capital and in turn this limits economic growth (see Clarke,

1995; Peterson and Tabellini, 1994; Galor and Zeira, 1993; Beck, et al., 2007). Although most of these studies have traced the linkages between inequality and economic growth at the macro level, similar results can be expected at the micro level.

Microfinance has been considered an important development policy that aims to reduce poverty, vulnerability and inequality. The assumption is that if the poor receives more credit, inequality and vulnerability would be reduced. In this context, financial depth alleviates credit constraints on the poor and vulnerable populations and generates productive assets and thereby productivity. In turn, asset building and increased productivity contributes to poverty reduction (Hulme and Mosley, 1996; World Bank, 2001; Jalilian and Kirkpatrick, 2002; Kai and Hamori, 2009b). Other studies contradict the aforementioned studies by showing that financial depth only benefits the rich and as a result, income inequality and vulnerability is increased (Beck et al., 2004).

Ahlin and Jiang (2008) develop a model using microfinance as a proxy for financial development. The aim of their study was to explore whether microfinance could bring long-term development and reduce income inequality for a country. The authors made the distinction between entrepreneurship and self-employment and argued that these two concepts are not the same. They defined entrepreneurship as an activity that requires saving and the acquisition of new labor and capital, whereas self-employment requires little or no saving, minimal capital and mainly one's own labor. Microcredit, the authors argued, is based on self-employment schemes and as such, without saving and significant capital accumulation long-term economic development is difficult to come about. In terms of income inequality, the authors argue that if poor borrowers "graduate" from self-employment into entrepreneurship, this in turn will decrease income inequality because it would raise savings, create employment and increase the incomes of the newly hired individuals. This argument is relevant for this study in that it can explain the contradicting results found here and in the literature. It would be possible for microcredit to increase inequality if the self-employed does not generate income to close the income gap or it can reduce inequality if entrepreneurship flourishes. Green et al. (2006) also make a similar argument by asserting that improvements in access to credit among the poor can reduce poverty and thus close the income gap among the population.

Cross-country studies on the empirical relationship between microfinance and inequality show that microfinance has either an increasing effect or a decreasing effect on income inequality. A study explored the question of whether access to microfinance has an effect on reducing income inequality at the country level. The author used cross-sectional data from 70 developing countries to measure the size and/or depth of the financial section and to explore whether greater microfinance funding widens the income gap between the rich and the poor. The study finds that microfinance marginally decreases income inequality (Hermes, 2014).

Tchouassi (2011), for instance, examines the relationship between microfinance, inequality and vulnerability in 11 developing countries in Central Africa. The findings in this study show that the number or intensity of microfinance institutions has an "equalizing" or negative impact on the Gini index in Central Africa countries. Similar findings are found in Kai and Hamori (2009). They employ a cross-country regression method to explore the effect of microfinance on inequality in 61 developing countries. Using the number of microfinance institutions as a proxy for the intensity of microfinance in a country, they show that microfinance has a decreasing effect on inequality. They conclude that since microfinance decreases inequality, it can be used as an effective redistribution tool. Another study supporting the aforementioned findings is that of Cuong, et al., (2007). They examine the effect of micro loans disbursed to the poor by the Vietnam Bank for Social Policies (VBSP), on household welfare and find that microfinance is associated with a small decrease in income inequality.

Consensus about the relationship between microfinance and income inequality is lacking and the findings are as mixed as those about the impact of microfinance on borrower welfare. There are studies such as the ones discussed above that find that the prevalence of microfinance reduces income inequality but others find that inequality is actually enhanced by access to microcredit. Copstake (2002), for instance, draws on research on the Zambian Copperbelt to show how impact on income distribution depends upon who obtains loans, who graduates to larger loans, who exits and group dynamic. The

findings suggest that although there are some initial increases in business income among borrowers, microfinance increases income inequality. This inequality in income, the study shows, is determined by factors such as who receives the loans, who is able to get larger loans, and the dynamics of the lending group. The study concludes by asserting that there are many reasons why microcredit may have a “polarizing” or increasing effect on inequality. One main reason is that there may be discrimination in favor of richer clients who benefit from better access to credit and the exclusion of poorer people. If this is the case, or if there are differential impacts from access to credit, then it is possible that in some cases inequality increases and in other cases it decreases or it may remain constant.

Exploring the relationship between microfinance and income inequality is important for the following reasons: (i) Particularly for poor countries, high income inequality is associated with crime, political instability and it hampers the processes of economic development and poverty reduction, Kai and Hamori (2009), and (ii) If income inequality creates a barrier for economic growth as some studies suggest, then reducing income inequality should be a policy initiative.

DATA

This analysis relies on household surveys compiled by the Bangladesh Institute of Development Studies (BIDS) and the World Bank over the periods 1991/92 and 1998/99. The data collection method follows a quasi-experimental design (i.e. regression discontinuity design (RD)) where a cut-off or qualification requirement is imposed for credit program participation). This quasi-experimental design is ideal to investigate causal hypotheses when a randomized experiment is not possible because inferences drawn from a well-executed RD design are comparable in internal validity to outcomes from randomized experiments (Tochim, 2006). The dataset is also ideal because it was collected during the early stages of microfinance development in Bangladesh. Since access to microfinance in Bangladesh has increased substantially, it renders the identification of control groups difficult and increases the risk of simultaneity bias which can obscure the results. The lack of credit saturation during this period minimizes endogeneity issues.

The data was aggregated into village-level data for the purpose of this study. The surveys covered 1,798 households drawn from 87 villages in 29 thanas (see Pitt and Khandker, 1998, and Khandker, 2005 for details on survey design).¹ This data was generated for the purpose of assessing the effectiveness of three major credit programs: the Grameen Bank, Bangladesh Rural Advancement Committee (BRAC), and the Rural Development-12 program of the Bangladesh Rural Development Board (BRDB). Program villages as well as non-program villages were interviewed. Target households were defined as those who owned half acre of land or less. Non-target households were those who owned more than half acre of land. Non-target households in program villages and non-program villages were surveyed and a minimum of three villages in each category were drawn from the village census of the Government of Bangladesh.

The households surveyed in 1991/92 were re-surveyed in 1998/99. Among the 1,769 households surveyed in 1991/92, 113 could not be reached in 1998/99 and only 1,656 households were available for the re-survey. For the purpose of this study, only the households that were surveyed in both periods are included.

The breakdown of household program membership in each of the three programs is presented in Table 1 in the Appendix. The Grameen Bank is the largest microfinance program with 42.61 percent members in 1991/92 and 53.16 percent members in 1998/99. We also observe a large decrease in membership in the BRDB program from 19.91 percent in 1991/92 to 4.84 percent in 1998/99. BRAC also experienced a decline in membership during the second period from 16.28 percent to 11.68 percent in 1998/99. The decrease in membership for BRDB and BRAC in the dataset can be attributed to the significant increase in the number of non-governmental organizations (NGOs) offering microcredit during this time.

In the data, microfinance participation is greatest among individuals who have little land or no land at all. In the 1991/92 survey, the participation rate among individual with no land is 1.8 percent and this rate

increased to 14.16 percent in the 1998/99 (see Table 2 in Appendix). The data shows that most microfinance participants have some land and meet the half acre eligibility criteria. In the 1991/92 survey, 84.38 percent of the households had at least half acre of land. This number, however, declined to 62.46 percent in the 1998/92 survey. We also observe that households who do not meet the qualifying criteria for obtaining microcredit (those households who own more than .50 acres of land) also participate in microcredit programs and participation increased from 13.8 percent in 1991/92 to 23.39 percent in 1998/99. We observe that the degree of program mistargeting is greater than 10 percent in the first period and over 20 percent in the second period. This observation becomes relevant in this particular study because if some borrowers are initially wealthier or less poor than others when they receive the loan, this can have important implications for income inequality. This study hypothesizes that poor women benefit marginally from microfinance while men, particularly those at upper income bracket, experience the greatest economic benefit from receiving micro loans. In this context, since those in a higher income percentile benefit more, microfinance loans have a polarizing effect on income and widens income inequality.

In terms of village income, this variable was derived by aggregating household incomes in each village to get average income for each village. The aggregated data resulted in a panel of 87 villages in the first period and 92 in the second period. Table 3 in the Appendix presents summary statistics for relevant variables such as average village income, and the various village microcredit variables.

ESTIMATION STRATEGY

Economists use two fundamental measures of income distribution to explore issues of income inequality; the personal or size distribution of income and the functional or distributive factor share distribution of income. The personal distribution of income is the measure most commonly employed by economists. The personal income measure focuses on the incomes of individual persons or households and the total incomes they receive. A common way to examine personal income statistics is to construct a Lorenz curve. Figure 1 in the Appendix illustrates a Lorenz curve (top) and a Generalized Lorenz curve (bottom). In the Lorenz curve, the cumulative proportion of income recipients is plotted on the horizontal axis. We can see that at point .2, we have the lowest (poorest) 20% of the population; at point .6 we have the bottom 60%; and at the very right of the axis, all 100% of the population has been accounted for. The vertical axis illustrates the cumulative income share received by each proportion of the population. We can represent perfect equality by drawing a diagonal line from the left corner (the origin) of the square, all the way to the upper right corner of the square (Todaro and Smith, 2009, p. 210).

The Generalized Lorenz curve (bottom graph in Figure 1 in the Appendix) is similar to the Lorenz curve but it is scaled up at each point by the cumulative mean income of the population. As can be noted from Figure 1(Appendix), the data display the presence of income inequality among microcredit borrowing households. This fact is not uncommon since countries and therefore households, typically do not exhibit perfect equality or perfect inequality in their distribution of income (Todaro and Smith, 2009, p. 212).

In terms of inequality among microfinance borrowers, the Lorenz curve (top) suggests that between the periods 1992 and 1999 income inequality remained relatively constant for the households in the bottom (poorest) 20% of the population. In other words, the poorest borrowers were no better or worse off between the two periods. Figure 1 (Appendix) suggests that income inequality among the top earners slightly decreased (see dash line in both diagrams). The Generalized Lorenz curve also suggests that nominal incomes increased more for households in the 50th percentile of income and above.

When estimating program impacts, endogeneity is an empirical issue we typically control for due to the biases that are inadvertently introduced with program placement and household selection. When we systematically target a specific population, a program placement bias is created (Pitt, et al., 1998; Ravallion, 1999). This is the case in the poor villages targeted in this study where the incidence of poverty is greater. A household selection bias is also created if program participation is correlated with household

characteristics we cannot observe. The methodological concern is the potential for biased estimates due to unobserved heterogeneity.

Fixed-Effect Estimator: Effect of Microcredit on Village Income

To estimate the effect of microcredit on village income, an income equation is used relating village income y_{jt} in year t to the village's asset endowment and characteristics X , the amount of loan M received by the village, and a random error ε :

$$y_{jt} = \beta_1 X_{jt} + \beta_2 M_{jt}^F + \beta_3 M_{jt}^M + \varepsilon_{jt} \quad (1)$$

where y_{jt} is average village income in village j , which is assumed to depend on village characteristics and village current borrowing. X is a vector of village assets and characteristics such as average years of education, infrastructure and other variables. M^F and M^M respectively are vectors of average current microcredit received by village female and male borrowers from different programs. Parameters β_2 and β_3 measure the effects of current credit (stock) for loans given to all female and male borrowers in the village by each of the microcredit programs. Loans are separated by gender because credit markets and labor markets are different for men and women in Bangladesh and the impact of microfinance borrowing is expected to differ by gender.

Equation (1), if estimated in this standard, cross-sectional way, would suffer from the biases discussed earlier since it is likely that exogenous factors will affect village level income. To the extent these factors cause the error term in (1) to be correlated across all periods for a particular village, cross-section estimates that do not account for this correlation will not be efficient (see Mundlak, 1978 and Hsiao, 1986).

To control for potential village endogeneity, the data is arranged into a panel for the two periods and the income equation is expanded to capture village level unobserved effects and unobserved changes between periods. The income equation is rewritten:

$$y_{jt} = \beta_1 X_{jt} + \beta_2 M_{jt}^F + \beta_3 M_{jt}^M + \varphi_j + \eta_j + \varepsilon_{jt} \quad (2)$$

where φ_j is a village fixed effect, which include village characteristics such as the managerial ability of the population in a village, land quality and external factors such as local conditions or the presence of other government programs. η_j is a time fixed effect and ε_{jt} is the error term that is potentially serially correlated with X and M .

As noted earlier, the first issue that arises is the homogeneity of village effects. To discern which model would yield the most reliable estimates, a Hausman test was employed (see Hausman, 1978 and Hsiao, 1986). According to the results of this test, the null hypothesis of homogeneity, which says that φ_j and is constant for all j , must be rejected. Therefore, this analysis relies on the FE estimator to analyze the empirical correlation between microfinance and village income.

Fixed-Effect Estimator: Effect of Microcredit on Village Income Inequality

Once the effects of microcredit on village-level income are traced, this study explored the hypothesis concerning the relationship between microfinance and within village income inequality. Here, the estimated equation relates income inequality as measured by the Gini coefficient, $GINI_t$ in year t , to the village's asset endowment and characteristics X , the amount of loan received by the village, M , and a random error ε :

$$GINI_{jt} = \beta_1 X_{jt} + \beta_2 M_{jt}^F + \beta_3 M_{jt}^M + \varepsilon_{jt} \quad (3)$$

where $GINI_{jt}$ is the village j Gini coefficient, which is assumed to depend on village characteristics and current village borrowing. X is a vector of village assets and characteristics. M^F and M^M respectively are vectors of the average current micro loans received by female and male borrowers from different programs in each village. Parameters β_2 , and β_3 , measure the effects of current credit (stock) for loans given to female and male borrowers in each village by each of the microcredit programs.

As previously noted, the above equation is vulnerable to the biases discussed earlier since it is likely that exogenous factors will also affect village level income. To mitigate the potential biases discussed above, the income inequality equation is expanded to capture village level unobserved heterogeneity.

The income inequality equation is rewritten:

$$GINI_{jt} = \beta_1 X_{jt} + \beta_2 M_{jt}^F + \beta_3 M_{jt}^M + \phi_j + \eta_j + \varepsilon_{jt} \quad (4)$$

where ϕ_j is the village fixed effect, which include village characteristics such as the managerial ability of the population in a village, land quality and external factors such as local conditions or the presence of other government programs. Like in equation (2), η_j is a time fixed effect and ε_{jt} is the error term and is potentially serially correlated with X and M .

RESULTS

The first set of results includes the effect of microcredit on village income. The second set of results, are obtained from the regressions using the Gini coefficient as a dependent variable to examine the empirical association between microcredit and village income inequality. Lastly, the results from the quantile regression are discussed.

The results from equation (2) presented in Table 4 in the Appendix, show that nonagricultural assets are important in generating income in the village. A 10 percent increase in the value of nonagricultural assets in the village is associated with a 2.3 percent increase in average village income. This result suggests that village ownership of assets is important in income generation.

In terms of microcredit, the coefficients for almost all of the credit variables are positive and statistically significant (with the exception of the BRDB loans disbursed to women in the village). The results suggest that one additional female borrower in the village with a 10 percent increase in credit from BRAC contributed to a .9 percent increase in average village income. Similarly, one additional female borrower in the village with a 10 percent increase in credit from the Grameen Bank contributed to a .9 percent increase in average village income. The findings suggest that all of the loans disbursed to male borrowers in the village contribute to income generation in the village. One additional male borrower in the village with a 10 percent increase in credit from BRAC, BRDB and the Grameen Bank contributed to village income increases of 1.5, 1.6 and 1.0 percent respectively. These results suggest that both the accumulation of assets, particularly nonagricultural assets and microcredit are associated with increases village incomes.

The results for the effect of microfinance loans on village income inequality have development policy implications. An interesting result that stands out from Table 5 in the Appendix is the coefficient for average years of education of village adults. The findings suggest that a one-unit increase in average years of education in the village decreases village income inequality or the Gini coefficient by .0359.

In terms of asset holdings, a one-unit increase in nonagricultural assets increases village income inequality by .0002. Microcredit has a similar effect in terms of widening income inequality at the village level. The findings suggest that when one additional female borrower in the village obtains a one-unit increase in credit from the Grameen Bank, village income inequality increases by .003. Similarly, when one additional male borrower in the village obtains a one-unit increase in credit from the BRDB, village income inequality increases by .008.

The results from this regression suggest that increases in average years of schooling in the village decreases income inequality while access to microcredit for both men and women in the village increases

income inequality. From a policy perspective, if income inequality is viewed as a barrier for creating economic growth within a village, it would be beneficial to design programs that increase education and allocate credit in a way that minimizes income inequality.

To decompose income inequality and trace its potential sources, a quantile regression method is employed. Using the 25th, 50th and 75th income quantiles in the regressions, we are able to explore the empirical association between access to microcredit at different percentiles of household income. If the hypothesis that wealthier male clients benefit more from microfinance is supported by the results, then the widening income inequality that we observed in the earlier results would be partially explained. To explore effects by income percentiles, equation (1) is estimated at the household level using the quantile regression method.

The results from the quantile regression indicate that borrowers in all income percentiles benefit from obtaining credit.² The findings show that micro loans disbursed by most of the programs have a positive and statistically significant effect on household income. An interesting result is the fact that households in the 50th and 75th percentile of income tend to benefit from microcredit more than the households in the bottom 25th percentile of income (this is reflected by the larger coefficient for these variables). This is particularly observed in loans received by men in all three programs. In this context, loans given to male borrowers in both poorer and wealthier households tend to have a greater return to household income as compared to loans disbursed to female borrowers from all income levels. This is an insightful result since many microfinance programs make it a policy goal to target the very poor, particularly women.

CONCLUSION

This study began with an empirical inquiry about the effect of microcredit on village income and on village income inequality. Loans were separated by gender to trace gender-specific effects. The study conjectured that women benefit marginally from micro credit while men, particularly those at the upper income quantile, benefit more. The results indicate that microcredit loans benefits both male and female borrowers but men enjoy a higher income return from receiving microcredit than women.

One conclusion that can be derived from the results is the fact that education will tend to increase the entrepreneurial abilities of borrowers and overall productivity. As such, it is expected that as the village population as a whole becomes more educated, incomes will grow and thus potentially reduce the income gap among the villagers. Another implication from the results is that if microcredit has an income polarizing effect, greater effort should be made to reduce inequality. To this end, program mistargeting should be minimized so that the targeted population benefits the most.

The results and analysis presented in this study, raise important questions: First, if poor individuals, particularly women, are targeted by microfinance programs, why do we observe an increase in income inequality? Intuitively, if microfinance benefits poor borrowers, one would expect income inequality to decrease. We would also expect poor women to benefit more.

One possible explanation for the results observed here is the fact that in the sample, there were a significant number of non-target households who received microcredit loans from the three programs analyzed in this study. As mentioned earlier, a non-target borrower or a borrower who does not qualify to receive a micro loan, is a person who owns more than half an acre of land. A poor borrower in this study is defined as a borrower who owns half an acre of land or less.

If we look at Table 2 in the Appendix, we would observe that in the 1991/92 survey, the participation rate in the group that owns over half acre of land is 13.8 percent and 23.39 percent in 1998/99. We observe an increase in the participation rate among the asset-wealthier borrowers in the second period. If these households were resource wealthy (as defined by the World Bank/BIDS study) before they obtained the micro loan, it is possible for microcredit's return to household income to be greater for wealthier borrowers than that of poorer borrowers. In this context, it is possible for the income gap between microcredit borrowers to become wider. If this is the case, the results observed in this study, namely that microfinance has a positive and statistically significant effect on intra-village inequality, are not counterintuitive.

In terms of the generalizability of the results, although appropriate methods were employed to circumvent the limitations of the data, caution should be exercised in reaching blanket conclusions about the effects of microcredit on poor villages. Program impacts can be location-specific and as such, it is essential that we continue to replicate studies like the one presented here in order to ascertain consensus about program impacts.

The findings in this study contribute to the understanding of the relationship between microfinance and income inequality but they do not end the discussion. As mentioned in the earlier sections of this paper, the literature on this topic presents mixed results as to the effect microfinance has on income inequality. Future research should focus on long-term effects both concerning issues within-household inequality and distribution as well as village-level effects. Additionally, from a policy standpoint, if poor women are the program target, we should explore ways to make micro loans work for them specifically.

ENDNOTES

1. A thana is an administrative unit that is smaller than a district and consists of a number of villages. In Bangladesh, there are “Divisions” and under those divisions there are “Zilas”. Thanas are under the umbrella of zilas.
2. To conform to the page limit, the result tables from the quantile regressions are not included.

REFERENCES

- Abdullah, T., and Zeidenstein, S. A. (1982), *Village women of Bangladesh: Prospects for change*. Oxford: Pergamon Press.
- Admed, S. (2004), Microcredit in Bangladesh: Achievements and Challenges, Microfinance Gateway. Available at <http://www.microfinancegateway.org/sites/default/files/mfg-en-case-study-microcredit-in-bangladesh-achievements-and-challenges-2004.pdf>. Accessed January 10, 2015.
- Afrin, S., Islam, N. and Uddin, S.(2010), Microcredit and Rural Women Entrepreneurship in Bangladesh: A Multivariate Model. *Journal of Business and Management*, Vol. 16, No. 1.
- Ahlin, Christian and Neville Jiang (2008). Can Micro-Credit Bring Development? *Journal of Development Economics*. 86.1: 1-21.
- 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.
- Barnerjee, A., Duflo, E., Glennerster, R. et al. (2009) The Miracle of Microfinance? Evidence from a Randomized Evaluation, Paper prepared under a research partnership between the Abdul Latif Jameel Poverty Action Lab at MIT and the Center for Microfinance at IFMR.
- Bhargava, V. (2006) Global Issues for Global Citizens: An Introductory to Key Development Challenges. World Bank, Washington, D.C. Available at <http://documents.worldbank.org/curated/en/390361468319746301/Global-issues-for-global-citizens-an-introduction-to-key-development-challenges;jsessionid=BSelMjzUe7o6Z0RhZJU82qt1>. Accessed August 8, 2016.
- Beck, Thorsten, Asli Demirguc-Kunt, and Ross Levine (2007). Finance, Inequality, and the Poor. *Journal of Economic Growth*. 12(1): 27-49.
- Beck, T., Deminguc-Kunt, A., & Levine, R (2004). Finance, Inequality and Poverty: Cross-Country Evidence. NBER Working Paper 10979. Available at http://siteresources.worldbank.org/DEC/Resources/Finance_Inequality_and_the_Poor.pdf, Accessed August 8, 2016.
- Besley, T. and Burgess, R. (2003) Halving Global Poverty. *Journal of Economic Perspectives*, 17, 3-12.
- Bourguignon, F. (2004) The Poverty-growth-inequality triangle. New Delhi Working Papers No 125. Available at <http://www.icrier.org/pdf/wp125.pdf>, Accessed August 8, 2016.
- Clarke, George (1995). More Evidence on Income Distribution and Growth, *Journal of Development Economics*. 47: 403-427.

- Copestake, James (2002). Inequality and the Polarizing Impact of Microcredit: Evidence from Zambia's Copperbelt. *Journal of International Development*. 14.6: 743-755.
- Cuong, Nguyn Viet, David Bigman, Marrit Van den Berg, and Vu Thieu (2007). Impact of Micro-Credit on Poverty and Inequality: The Case of the Vietnam Bank for Social Policies, Paper submitted to *Microfinance: What Do We Know?* Goringen, Netherlands.
- Galor, Oded and Joseph Zeira (1993). Income Distribution and Macroeconomics. *Review of Economic Studies*. 60: 35-52.
- Green CJ, Kirkpatrick CH, Murinde V (2006). Finance for Small Enterprise Growth and Poverty Reduction in Developing Countries. *Journal of International Development*. 18(7): 1017-1030.
- Hashemi, Syed M., Sidney R. Schuler and Ann P. Riley (1996). Rural Credit Programs and Women's Empowerment in Bangladesh. *World Development* 24 (April): 635-53.
- Hausman, J.A., Specification test in econometrics, (1978). *Econometrica* 46(6), 1251-1271.
- Hermes, N. (2014). Does microfinance affect income inequality? *Applied Economics*, Vol. 46, No. 9, 1021-1034.
- Hsiao, C., Analysis of Panel Data (1986). Cambridge Univ. Press.
- Hulme, D. and Moseley, P. (1996). *Finance Against Poverty*. Volumes 1 and 2, Routledge: London.
- Imai, K.S., T. Arun, and S.K. Annim (2010), Microfinance and household poverty reduction: new evidence from India. *World Development*, 38(12), December, 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*, Vol. 93(3): 847-866.
- Kaboski, J. P. and Townsend, R.M. (2011) A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative. *Econometrica*, Vol.79, No.5,1357-1406.
- Karlan, D., and Zinman, J. (2010/11), Microcredit in Theory and Practice: Using Randomised Credit Scoring for Impact Evaluation. *Science* 332(6035): 1278-1284.
- Khalily, M.A., Baqui, M., Khaleque, A., Bidsha, S.H. and Ahmed, M. (2011), Access to Financial Services in Bangladesh. Dhaka: Institute of Microfinance (InM).
- Kevane, M. and Wydick, B. (2001), Microenterprise Lending to Female Entrepreneurs: Sacrificing Economic Growth for Poverty Alleviation? *World Development* 29, 1225-1236.
- Mahmood, S., Hussain, J., Matlay, H.Z. (2014) Optimal microfinance loan size and poverty reduction amongst female entrepreneurs in Pakistan, *Journal of Small Business and Enterprise Development*, Vol. 21 Iss: 2, pp.231 - 249
- McIntosh, C. (2008), Estimating Treatment Effects from Spatial Policy Experiments: An Application to Ugandan Microfinance. *Review of Economics and Statistics*, 90(1), 15-28.
- Jalilian H, Kirkpatrick C (2002). Financial Development and Poverty Reduction in Developing Countries. *International Journal of Finance and Economics*. 7(2): 97-108.
- Kai H. Hamuri S (2009b). Globalization, Financial Depth and Inequality in Sub-Saharan Africa. *Economic Bulletin*. 29(3): 2025-2037.
- Khandker, Shahidur R (1998). *Fighting Poverty with Micro credit: Experience in Bangladesh*, New York: Oxford University Press.
- Khandker, Shahidur R (2005). Microfinance and Poverty: Evidence Using Panel Data from Bangladesh. *The World Bank Economic Review*, 17(2), 263-286.
- Khandker, Shahidur R (2003). Microfinance and Poverty: Evidence Using Panel Data from Bangladesh. *The World Bank, Policy Research Working Paper #2945*.
- Mundlak, Yair, (1978). On the Pooling of Time Series and Cross Section Data. *Econometrica*, Vol. 46, No. 1, pp. 69-85.
- Ocasio, V.M., (2016). Financing Village Enterprises in Rural Bangladesh: What Determines Non-Farm Revenue Growth? *International Journal of Development Issues*, Vol. 15 No. 1 pp. 76-94.
- 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.

- Parker, J., & Nagarajan, G. (2001). Can Microfinance Meet the Poor's Needs in Times of Natural Disaster?. Microenterprise Best Practices, Development Alternatives, Inc.
- Peterson, Torsten and Guido Tabellini (1994). Is Inequality Harmful for Growth?. *American Economic Review*, 84.3: 600-621.
- Pitt, Mark M. and Khandker, Shaibur 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, MM., Khandker, S.R., Catwright, J. (2003). Does Micro-Credit Empower Women? Evidence from Bangladesh. *World Bank Policy Research*, Working Paper No. 2998.
- Pitt, M., Rosenzweig, M., & Gibbons, D. (1993). "The determinants and consequences of the placement of programs in Indonesia. *World Bank Economic Review*, 7(3), 319-348.
- Ravallion M. (2005). Inequality is Bad for the Poor. Policy Research Working Paper 3677, World Bank Washington DC.
- Ravallion, M. (1999). The mystery of the vanishing benefits: Ms speedy analyst's introduction to evaluation. Policy Research Working Paper No. 2153. Washington, DC: The World Bank.
- Rogaly, B (1996). Microfinance Evangelism, Destitute Women and the Hard Selling of a New Anti-Poverty Formula. *Development in Practice*, 6(2): 100-112.
- Sayvaya, I., and Kyophilavong, P., (2015) Does microfinance reduce poverty in Lao PDR?. *International Journal of Development Issues*, Vol. 14 Iss: 3, pp.215 - 23
- Schuler, S.R. and Hashemi S.M. (1995). Family planning outreach and credit programs in Bangladesh. *Human Organization*, 54(4), 455-461.
- Soubbotina, T. and Sherman, K. (2000). Beyond Economic Growth: Meeting the Challenges of Global Development. World Bank, Washington DC.
- Tchouassi, Gerard (2011). Microfinance, Inequality and Vulnerability: Empirical Analysis from Central African Countries. *Journal of Development and Agricultural Economics*, Vol. 3(4), pp. 150-156.
- Todaro, Michael P., Smith, Stephen C. (2008). *Economic Development*, Tenth Edition, Pearson Addison Wesley, pp. 210-215.
- Trochim, William M.K., Research Methods Knowledge Base. Available at <http://www.socialresearchmethods.net/kb/quasird.php>, Accessed July 12, 2016.
- United Nations (2015), Transforming our world: the 2030 Agenda for Sustainable Development. Available at http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E. Accessed May 20, 2016.
- Yunus, M (2007), *Banker to the Poor: Micro-Lending and the Battle Against World Poverty*, Public Affairs, United States.
- Zaman, H. (2001). Assessing the Poverty and Vulnerability Impact of Micro-Credit in Bangladesh: A Case Study of BRAC. Background paper for the WDR 2000/2001.

APPENDIX

TABLE 1
FULL SAMPLE DISTRIBUTION OF PROGRAM MEMBERSHIP

Microcredit Institutin/Bank	1991/92	1998/99
	%	%
BRDB	19.91	4.84
BRAC	16.28	11.68
Grameen Bank	42.61	53.16
No. of Observations	3,053	7,396

Source: Author's calculation from the 1991/92 and 1998/99 surveys.

TABLE 2
PROGRAM PARTICIPATION BY LAND HOLDINGS

Landholding (decimals)**	Landholding (acres)	1991/92		1998/99	
		Number of Observations	Participation rate in each land holding group (%)	Number of Observations	Participation rate in each land holding group (%)
0	0	19	1.81	158	14.16
.5-50.75	0.00499894-0.507392	886	84.38	697	62.46
51+	0.509892+	145	13.80	261	23.39
All households		1,050	100.0	1,116	100.0

Source: Author's calculation from the 1991/92 and 1998/99 surveys. Adapted from Ocasio (2016).

**An area unit is typically measured in decimals in rural India and Bangladesh. A decimal equals 1/100 acre.

TABLE 3
SUMMARY STATISTICS OF VILLAGE INCOME, ASSETS AND CREDIT VARIABLES

Variable	1991/92		1998/99	
	Mean	Std. Dev.	Mean	Std. Dev.
Village average yearly income (taka)	3039.896	2699.58	11265.81	8090.016
Village Gini coefficient	0.6014713	0.1170468	0.6406667	0.1241001
Avg. years of education of village adults (15-59yrs)	2.764324	1.029669	2.483238	1.129816
Avg. village holding of transport assets (taka value)	9020.91	7118.409	1118.073	1852.786
Avg. village holding of land (acres of land)	33.70085	62.18996	54.2179	39.03127
Avg. village holding of nonagricultural assets (taka value)	982.1134	1037.885	1292.334	9747.425
Current village avg. of women's loans from BRAC (taka)	258.274	466.1732	397.7179	544.4104
Current village avg. of men's loans from BRAC (taka)	95.88652	259.3547	16.76502	75.6949
Current village avg. of women's loans from BRDB (taka)	168.0837	377.8233	129.5267	312.0768
Current village avg. of men's loans from BRDB (taka)	287.5427	558.7238	108.3815	314.2197
Current village avg. of women's loans from Grameen (taka)	400.1323	730.1934	702.2535	978.364
Current village avg. of men's loans from Grameen (taka)	171.4244	464.2168	165.626	541.2363
Number of Observations	87		92	

Source: Author's calculations from the 1992 survey of households and villages in Bangladesh.

TABLE 4
FIXED-EFFECT ESTIMATOR: EFFECT OF MICROCREDIT ON VILLAGE INCOME

VARIABLES	lnincome
Avg. years of education of village adults (15-59yrs)	-0.137 (0.103)
Log of Avg. village holding of transport assets (taka value)	0.0454 (0.106)
Log of Avg. village holding of nonagricultural assets (taka value)	0.234*** (0.0734)
Log of Avg. village holding of land (decimals)	0.0289 (0.184)
Log of avg. current loans given to women in the village from BRAC	0.0947* (0.0478)
Log of avg. current loans given to women in the village from BRDB	0.0148 (0.0367)
Log of avg. current loans given to women in the village from Grameen	0.0944* (0.0538)
Log of avg. current loans given to men in the village from BRAC	0.151** (0.0662)
Log of avg. current loans given to men in the village from BRDB	0.160*** (0.0562)
Log of avg. current loans given to men in the village from Grameen	0.103* (0.0515)
Observations	151
Number of Villages	92
F-statistics (18,41)	23.49
Prob > F	0.0000

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

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

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

Note: Robust standard errors are in parentheses. Regressions also controlled for the following: Average number of adult female and male in the village, average adult age in the village, average years of education achieved by village, 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 1991/92 and 1998/99 household surveys in Bangladesh.

TABLE 5
FIXED-EFFECT ESTIMATES OF THE EFFECT OF MICROCREDIT ON
VILLAGE INCOME INEQUALITY

VARIABLES	gini
Avg. years of education of village adults (15-59yrs)	-0.0359* (0.0184)
Avg. village holding of transport assets (taka value)	0.000637 (0.000417)
Avg. village holding of nonagricultural assets (taka value)	0.000229*** (6.32e-05)
Avg. village holding of land (decimals)	-0.00108 (0.0393)
Avg. current loans given to women in the village from BRAC	0.00273 (0.00303)
Avg. current loans given to women in the village from BRDB	0.00812 (0.00646)
Avg. current loans given to women in the village from Grameen	0.00302* (0.00159)
Avg. current loans given to men in the village from BRAC	0.00565 (0.00431)
Avg. current loans given to men in the village from BRDB	0.00817* (0.00461)
Avg. current loans given to men in the village from Grameen	0.00219 (0.00345)
Observations	151
Number of newvillid	92
F-statistics (18, 41)	11.11
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

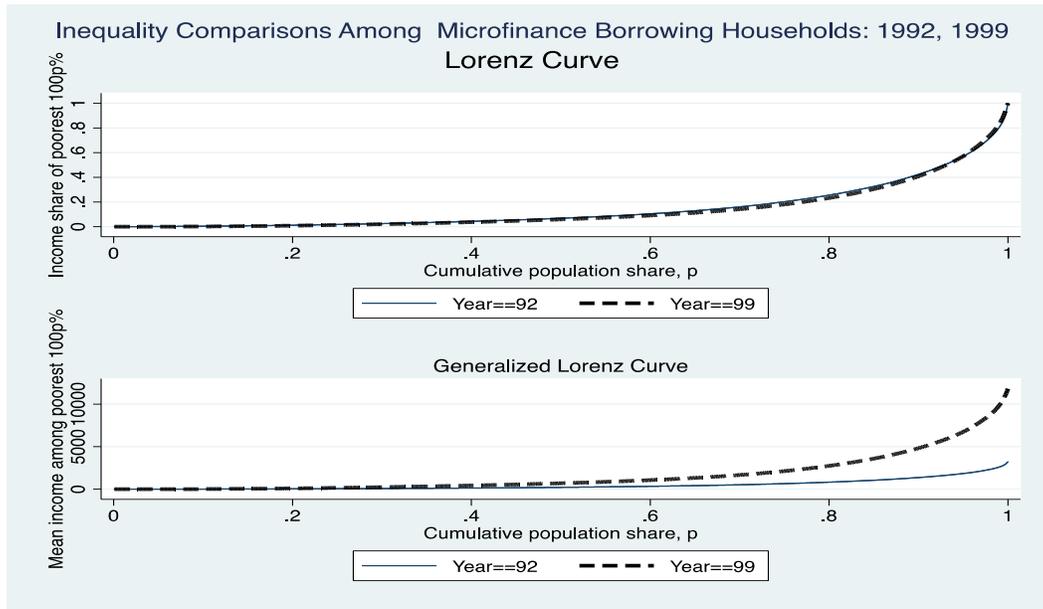
***t-statistic is significant at the 1 percent or better

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

Average number of adult female and male in the village, average adult age in the village, average years of education achieved by village, 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 1991/92 and 1998/99 household surveys in Bangladesh.

FIGURE 1
LORENZ CURVES—MICROFINANCE BORROWING HOUSEHOLDS IN BANGLADESH



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