

Are Microcredit Participants in Bangladesh Trapped in Poverty and Debt?

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Abstract

This paper addresses whether microcredit participants in Bangladesh are trapped in poverty and debt, as many critics have argued in recent years. Analysis of data from a long panel survey over a 20-year period confirms this is not the case, although numerous participants have been with microcredit programs for many years. The results of the analysis suggest that participants derive a variety of benefits from microcredit: It helps them to earn income and consume more, accumulate assets, invest in children's schooling, and be lifted out of poverty. This is not to say that non-participants have failed to progress over the same period. Both participants and non-participants have gained as the economy has grown; however, the rates

of poverty reduction have been higher for participants. Testing the net effect of microcredit programs requires applying an econometric method that controls for why some households participated and others did not, conditional on their initial characteristics. In addition, the method must control for time-varying, unobserved heterogeneity that affects everyone over time, albeit in possibly different ways. The paper's econometric estimates show significant welfare gains resulting from microcredit participation, especially for women. They also show that the accrued benefits of borrowing outweigh accumulated debt. As a result, households' net worth has increased, and both poverty and the debt-asset ratio have declined.

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1. Introduction

Microfinance has succeeded in reaching the poor and women who lack access to mainstream financial institutions.¹ But its success in reducing poverty, a stated goal of microcredit programs, is less certain. The microlending system has created such innovations as group liability enforcements and dynamic incentives, claiming that many of the poor, including women and other vulnerable groups, could be lent to profitably, and beneficiaries could accrue both short- and medium-term welfare gains. But critics argue that, while microfinance may satisfy the unmet financial demand of the poor, the accrued gains in income and consumption may not suffice to affect poverty reduction or asset accumulation in a sustainable way.

There are two strands of empirical literature on the poverty reduction role of microcredit. The first strand of studies, which uses non-experimental research methods, observes that microcredit helps to promote social, human, and economic development in various ways (e.g., Dunford 2006; Hossain 1988; Shaw 2004; Panjaitan-Drioadisuryo and Cloud 1999; Chemin 2008; Khandker 1998, 2005; McIntosh 2008; Pitt and Khandker 1996, 1998; Pitt, Khandker, McKernan, and Latif 1999; Kevane and Wydick 2001; Imai, Arun, and Annim 2010; Boonperm, Houghton, and Khandker 2009).² A recent study, using panel data from 1997 to 2005, finds that larger benefits are realized from medium-term, rather short-term, participation (Islam 2011). Another study, using a long panel survey (1991/92–2010/11), also confirms that participants who remained with

¹ According to the Consultative Group to Assist the Poor (CGAP), there are more than 200 million beneficiaries of microfinance worldwide. In Bangladesh alone, about one-fifth of the country's 150 million people—including three-fifths of rural households—are members of microfinance institutions.

² On the other hand, several studies argue that women have no control over the obtained credit and thus do not benefit from program participation (Amin and Pebley 1990; Goetz and Sen Gupta 1996; Mahmud 2003).

microcredit programs over a long period fared better than intermittent participants in terms of income and consumption gains and poverty reduction (Khandker and Samad 2013). A macro study, using cross-country data, reinforces the positive impacts of microcredit (Imai et al. 2012).

The second strand of studies, using randomized control trials (RCTs), finds that microcredit has mixed effects on poverty reduction.³ Various studies show the positive effects of microfinance (Coleman 1999, 2006; Karlan and Zinman 2009; McKenzie and Woodruff 2008; de Mel, McKenzie, and Woodruff 2008), while others find no evidence for income or consumption gains (Augsburg et al. 2011; Attanasio et al. 2012; Banerjee et al. 2010; Karlan and Zinman 2011; Crépon et al. 2011). Summarizing the findings of several RCT studies, a critic states that microfinance does not end poverty despite all the hype (Roodman 2012).⁴

Microfinance is also under attack for charging “exorbitant” interest rates (e.g., the nominal on-lending rate of Grameen Bank in Bangladesh is 20 percent, 7 percent higher than the commercial bank rate), which goes against its stated mission of poverty alleviation. Using anecdotal evidence, many critics cite microcredit’s high interest rates and inadequate benefits relative to the cost of borrowing as reasons for rising indebtedness among borrowers. Their argument is simple: If microcredit programs were so helpful, indebtedness should not have increased over time relative to asset accumulation; thus, microcredit is not a “miracle,” as its proponents would have us believe. However, one study observes that, while the interest rates of microfinance institutions (MFIs) are

³ RCT studies have their own methodological weaknesses and thus are not always necessarily better than non-RCT studies (Deaton 2010; Rodrik 2008; Ravallion 2012). Because microcredit operations are small in scale, the timeframe for realizing their impacts may exceed 1 or 2 years, which is the typical timeframe for most RCT studies in order to minimize spillover effects and contamination (Hermes and Lensink 2007). In fact, the seminal study of Pitt and Khandker (1998), which uses an innovative quasi-experimental design, relies on data collected on borrowing over a 5-year period from areas where microcredit had been in operation for at least 3 years.

⁴ Roodman and Morduch have been critical of the underlying methodology of Pitt and Khandker (1998), the most cited study in the literature on microcredit impacts. Roodman and Morduch (2011) is the most recent in a series of papers and postings that seek to refute the findings of Pitt and Khandker. In 2012, Pitt and Khandker revisited the claims of Roodman and Morduch, observing a lack of due diligence in their replication of the Pitt and Khandker study and confirming that none of their statistical claims invalidate Pitt and Khandker’s findings on the substantial positive effects of microcredit, especially among women borrowers (Pitt and Khandker 2012).

higher than those of formal lenders, they are much lower than informal lending rates (Faruqee and Khalily 2011). Moreover, the rates of return for activities supported by MFIs are not necessarily lower than the average interest rates of microcredit loans (e.g., Khandker, Samad, and Ali 2013). In any case, concern over whether microcredit participants are trapped in poverty and debt merits more careful and objective scrutiny.

This study revisits the controversy surrounding the role of microfinance in poverty reduction and indebtedness using the most recent data from Bangladesh. Using a follow-up survey of respondents over 20 years, it examines whether the earlier findings of Pitt and Khandker (1998) and Khandker (2005) can be substantiated using a long panel survey and whether microcredit participants are indeed trapped in debt and poverty as many have argued. The study also examines whether the gender of program participants matters, as observed by Pitt and Khandker (1998) and Khandker (2005). The complete data set used in this study constitutes an unusually long panel of more than 20 years, providing a unique opportunity to examine whether households that participated in microcredit programs over a long period remained poor or graduated from poverty.

Using a fixed-effects (FE) method that controls for both time-invariant and time-varying heterogeneity, we estimate the net effect of program participation for an average participant and separately by gender of program participants. Contrary to the prevailing view about microfinance dependence over time, we find that participants in microcredit programs are generally neither trapped in poverty nor overly indebted. Our findings also confirm that the welfare effects are higher for women than for men when both genders participate, as observed in earlier studies using the first (Pitt and Khandker 1998) and second (Khandker 2005) rounds of this panel data.

The paper is organized as follows. Section 2 discusses the data, including household participation in microcredit and the microcredit loan portfolio. Section 3 presents a descriptive

analysis of household income, expenditure, poverty, and children's schooling outcomes. It also describes households' occupational mobility over time. Section 4 presents the trends in assets, net worth, and indebtedness to examine whether microcredit borrowers are trapped in debt. Section 5 presents the impacts of microcredit on household and individual outcomes based on household FE estimates. Section 6 presents the same impacts using alternate estimation techniques. Finally, Section 7 concludes.

2. The Long Panel Survey and Its Data Characteristics

The survey data used in this study were derived from a long panel survey over 20 years. The first survey round, conducted in 1991/92, studied the role of microfinance in the economic and social upliftment of the poor. Carried out jointly by the World Bank and the Bangladesh Institute of Development Studies (BIDS), the survey covered 1,769 households randomly selected from 87 villages in 29 *upazilas* (rural subdistricts) of Bangladesh.⁵ A second survey round, conducted in 1998/99, could not retrace 131 of the 1,769 households from the 1991/92 survey, leaving 1,638 available households, with an attrition rate of 7.4 percent. The 1998/99 survey also included new households from old villages and newly included villages; in total, 2,599 households were surveyed, of which 2,226 were from old villages and 373 from new ones. Among the 2,226 households in old villages, 279 were newly sampled ones and 1,947 were from the old panel surveyed in 1991/92. There were more panel households surveyed in 1998/99 (1,947) than in 1991/92 (1,638) because some from the old panel left after the first survey to form new households.

The households were surveyed a third time in 2010/11 with the help of the Institute of Microfinance (InM). This third survey round tried to revisit all of the households (2,599) surveyed

⁵ An *upazila* is an administrative unit smaller than a district, consisting of a number of villages.

in 1998/99. But due to attrition (a rate of about 10 percent), 2,342 households were identified. In all, 3,082 households were interviewed in 2010/11, with 740 households splitting-off during this period to form new households. The survey began in March 2010/11 and was completed in September 2010/11.

A total of 1,509 households were common to all three survey rounds, and this study's analysis is based on only those households. Over the three survey years, household membership grew steadily in various microcredit programs, with the exception of the Bangladesh Rural Development Board (BRDB) government program, which lost a good share of its members due to reorganization between the second and third survey years (Table 1). Membership in Grameen Bank, the largest among all the programs, increased from 8.7 percent in 1991/92 to 15.1 percent in 1998/99, and again to 27.4 percent in 2010/11. In addition to the four major programs (i.e., Grameen Bank, BRAC, BRDB, and Association for Social Advancement [ASA]), many other programs were developed over the past 20 years that are now serving rural communities to a great extent. In 2010/11, the aggregate coverage of these programs was nearly 33 percent of households, which was higher than that of Grameen Bank.

An important aspect of microcredit membership today is overlapping participation in multiple programs, which hardly existed in the early 1990s; its significant growth since that time is evident in the third survey round (2010/11), which showed that nearly 61 percent of Grameen Bank members were also members of other programs (Khandker and Samad 2013). Overall, about 32 percent of households in rural Bangladesh were members of multiple microcredit programs in 2010/11, reflecting an increase in program participation from 26.3 percent in 1991/92 to 48.6 percent in 1998/99 to 68.5 percent in 2010/11.

In addition, not all microcredit participants are borrowers. For many programs, new members must wait for some time before they can borrow, and some programs feature a non-borrowing membership plan that allows individuals to save money with microcredit programs without having to borrow. That said, a great majority of microcredit members are borrowers. In 2010/11, about 69 percent of rural households were microcredit members; microcredit borrowers constituted about 56 percent of households, implying that 13 percent of rural households were non-borrowing members (Table 1).

The distinction between participant and borrower is important, particularly in the context of impacts. While microcredit programs have offered various noncredit services in the past, they have become mostly credit-only institutions over time, and it is through access to credit, not just participation, that households can reap the benefits.⁶ As such, this study considers borrowing, not just participation, in estimating the impacts of microcredit. Cumulative borrowing from the four major microcredit programs, as well as from other microcredit sources, has increased by nearly 100 percent over time. The total amount borrowed per household in 1991/92 was Tk. 9,252, compared to Tk. 17,006 in 2010/11, implying a simple growth of more than 4 percent annually over the 20-year period (Table 2).

The highest growth in borrowing occurred for smaller programs (labeled “other programs” in Table 2), which are relatively new, compared to such major programs as Grameen Bank. For example, the average borrowing for BRAC grew by 7.8 percent per year, compared to 11.0 percent a year for smaller programs. At any time, more than two-thirds of microcredit loans are received by women, who are particularly targeted by the MFIs (Table 2). In 2010/11, women’s share of

⁶ It should be noted that MFIs in Bangladesh charge interest rates as high as 35 percent, compared to about 13 percent charged by the commercial banks; however, commercial banks do not lend to the poor, whose only option is to borrow from the MFIs or, alternatively, from informal lenders, who may charge interest rates as high as 240 percent per year (Faruqee and Khalily 2011).

microcredit lending was the highest for Grameen Bank (89 percent) and the lowest for BRAC (38 percent). In earlier years, women's share of BRAC microloans was much higher (e.g., 95 percent in 1998/99); but nowadays, most of the BRAC loans extended for small- and medium-sized enterprises (SMEs) target men more than women.

Another feature of microfinance operations in Bangladesh is mandatory savings of members/borrowers, in the form of weekly savings and deposits of a certain percentage of the loan amounts when disbursed. The more savings MFI members accumulate over the years, the better both they and the MFIs perform. MFIs consider member savings as part of their portfolio for financial transaction; aggregate program-level data shows that, in recent years, member savings have accounted for as much as 60 percent of MFI loans outstanding. However, for members, these savings should be compared to cumulative borrowing. Member savings represented about 8 percent of cumulative borrowing in 1991/92, increasing slightly to 10 percent for both 1998/99 and 2010/11 survey years (Table 2), perhaps suggesting that less than 10 percent of borrowing consists of MFI mandatory deposits, which nonetheless accounts for some 60 percent of MFI loans outstanding in Bangladesh.⁷

3. Correlation of Changing Participation Status with Poverty and Other Welfare Measures

In this study, the outcome of particular interest is poverty dynamics over a long period of time. It is conceivable that, as a result of a higher level of micro-borrowing and savings mobilized over this period, households enjoyed a higher level of income (assuming it was augmented through activities financed under microcredit programs), a higher level of consumption (since the participating households were poor to begin with), and thus a reduced level of poverty. For purposes of

⁷ Unlike other MFIs, Grameen Bank also mobilizes voluntary savings from its members and non-members; thus, Grameen's savings account for more than 80 percent of loans outstanding in recent years.

comparison, a set of four key indicators was selected: (i) income, (ii) expenditure, (iii) moderate poverty, and (iv) extreme poverty. Both income and expenditure were in real terms (in 1991/92 Tk.). The cost-of-basic-needs method was used to establish the poverty line, which requires one to establish the cost of a minimum food basket or food poverty line, and then add an allowance for non-food expenditure to estimate the moderate poverty line. By contrast, extreme poverty was determined by comparing the household's total consumption expenditure on food and non-food items against the food poverty line.⁸ The sample for this descriptive analysis was restricted to eligible households from the 1991/92 survey, regardless of their actual participation status.⁹ This was done to ensure that comparisons could be made between similar participants and non-participants.

3.1 Growth in Income, Expenditure, and Non-food Consumption

Between survey years 1991/92 and 2010/11, real per capita income increased by 5.2 percent a year for program participants, compared to 6.2 percent for non-participants. However, the differences in per capita income for participants and non-participants were not significant for any year, as the t-statistics suggest. As Table 3 shows, participants experienced significantly higher growth in non-farm income than did non-participants over the 20-year period. As a share of total income, participants' non-farm income was 62.7 percent in 1991/92, compared to 61.3 percent for non-participants, which increased to 76.5 percent in 2010/11, as opposed to 72.6 percent for non-

⁸ The calculation of moderate poverty is based on the official poverty line, which includes the food poverty line and an allowance for non-food expenditures. The food poverty line is calculated by estimating the cost of a food basket needed to maintain the per-capita daily caloric requirement (2,120 calories) recommended by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) (FAO and WHO 1973). For Bangladesh, the food basket contains mainly rice, along with such other food items as pulses, milk, meat, fish, fruits, and vegetables in specific quantities. The cost of the food basket is calculated from the local prices for the food items. By contrast, extreme poverty is defined by the household's total consumption expenditure on food and non-food falling short of the food poverty line.

⁹ Eligible households are those that participated in microcredit programs and those that could have participated but did not, constituting 83 percent, 87 percent, and 99 percent of the households surveyed in 1991/92, 1998/99, and 2010/11, respectively.

participants. Like income, the average annual growth in per capita expenditure over the 20-year period was higher for non-participants (4.5 percent) than for participants (3.7 percent). For both participants and non-participants, food as a share of total expenditure declined by about 15–16 percentage points and varied little between groups, meaning that both experienced growth in the share of non-food consumption, indicating a higher level of welfare in rural Bangladesh. Indeed, in 1991/92, non-food consumption accounted for less than one-fifth of total consumption, compared to about one-third by 2010/11.

3.2 Reduction in Moderate and Extreme Poverty

In 2010/11, the incidence of both moderate and extreme poverty was significantly less for participants than for non-participants (Table 3). For moderate poverty, the gap between participants and non-participants was 1.7 percent (32.9 versus 34.3 percent) and was about four times wider for extreme poverty, at 6.9 percent (16.2 versus 23.1 percent). Thus, it appears that the extent of poverty reduction was higher for program participants than for non-participants even though the difference in poverty status between these groups differed little during earlier years (e.g., 1991/92). For example, for program participants, extreme poverty was reduced by 2.9 percentage points per year, compared to a 2.7 percentage points for non-participants. This trend runs counter to the notion that microcredit program participants could be trapped in poverty as critics have claimed.¹⁰ However, this simple comparison between participants and non-participants is not compelling enough to suggest that this is indeed the case since many factors beyond borrowing affect inter-group differences in outcomes. The key question is whether program participation plays a causal role in determining the level of income, consumption, and poverty reduction among participants.

¹⁰ This finding appears counterintuitive since non-participants had slightly higher incomes and expenditures than did their participant counterparts. However, this is possible because the expenditure of participants who were extremely poor grew more than did that of extremely poor non-participants, while moderately poor or non-poor non-participants did better than their participant counterparts.

3.3 Children's Education and Reduction in Gender Disparity

Human capital investment is another cornerstone of the success of microcredit programs. Earlier studies show that microcredit borrowing, especially by women, has a positive effect on children's schooling (Pitt and Khandker 1998). Earlier findings also suggest that microcredit improves health and nutrition (Pitt, Khandker, Chowdhury, and Millimet 2003) and empowers women (Pitt, Khandker, and Cartwright 2006), thereby playing a pivotal role in improving social and human development. The question is whether these benefits are sustained over time.

In terms of trends in the rate of children's school enrollment over time, we find that, for both participants and non-participants in microcredit programs, there is incremental growth in schooling investment for both boys and girls. However, as earlier research has shown, the schooling gains are higher for girls than for boys among microcredit program participants. Among participants, the school participation rate for girls (ages 5–18) was 71 percent in 2010/11, about 20 percent higher than in 1991/92; while the corresponding rate for boys was 69.6 percent in 2010/11, 14.7 percent higher than in 1991/92. Among non-participants, by contrast, the school participation rate for girls was similar to that of boys in 1991/92; however, boys gained 5.8 percent more than girls over time (70.1 percent versus 64.3 percent) (Table 4). Therefore, we can say that microcredit expansion has helped to reduce gender disparity in rural Bangladesh, at least in terms of children's education. This finding is consistent with earlier ones (e.g., Pitt et al. 2006), which showed that microcredit, by helping to improve women's empowerment, has in turn contributed to the social upliftment of girls in society.

3.4 Intergenerational Mobility

At an aggregate level, our long panel data also shows intergenerational mobility in terms of human capital investment. Overall, by 2010/11, 69.7 percent of boys and 69.9 percent of girls were

enrolled in school, compared to only 47.7 percent of boys and 45.8 percent of girls in 1991/92, which is an overall gain of 52 percentage points over the 20-year period (Table 4). This intergenerational mobility in terms of human capital directly results, in part, from microcredit program expansion since children's educational investment is higher among program participants than non-participants.

Intergenerational mobility can also be viewed through the lens of occupational mobility among adults in society. This study analyzed major farm and non-farm sectors of employment for participants and non-participants for the three survey years (Table 5). Employment categories were identified by income generation, and households engaged in multiple income-generation activities were assigned to the sector that yielded the highest income. The farm sector consisted of crop production and livestock and poultry, while the non-farm sector consisted of various areas of employment, including manufacturing and processing, transport, cottage industries, and the service sector. Employment has increased in terms of wage employment and self-employment in both the farm and non-farm sectors; however, wage employment is a lower-return activity in the farm sector than in the non-farm sector.

As Table 5 suggests, self-employment dominates wage employment overall for all three survey years. For example, 40.6 percent of households were involved in self-employment in 1991/92, of which the farm sector accounted for 25 percent (10.2 percent among all activities). But in 2010/11, although self-employment still dominated, at 57 percent of employment, the farm-sector share of self-employment grew to nearly 33 percent (18.6 percent among all activities). Self-employment in the non-farm sector has always been the most dominant activity and was more so in 2010/11 (38.4 percent) than in 1991/92 (30.4 percent). As for wage employment, the non-farm sector is more dominant, except for 1998/99, when the shares of the farm and non-farm sectors

were about the same. Wage employment in the farm sector accounted for 15.1 percent in 2011/11, down from 25.7 percent in 1991/92.

Interestingly, the occupation shares changed considerably over the 20-year period, shifting gradually from farm to non-farm activities for both self-employment and wage employment. Over this period, microcredit program participants had better occupational mobility than did non-participants. For example, 36.4 percent of participant households were self-employed in the non-farm sector in 1991/92, and this figure grew to 40.6 percent by 2010/11. The corresponding figures for non-participants were 26.2 percent in 1991/92 and 29.3 percent in 2010/11 (Table 5).

4. Asset Ownership and Indebtedness of MFI Participants

Thus far, the survey results have shown that microcredit participants have benefited in a variety of ways. They have accumulated program savings, although often involuntarily. In addition, they have invested in children's education, moved up the occupational ladder, consumed more, and earned more over time. Microcredit participants are not necessarily better off than their non-participant counterparts in terms of some of these performance indicators; however, we find a higher rate of poverty reduction—for both moderate and extreme poverty—among program participants than non-participants, demonstrating that the benefits are perhaps accrued through the credit and noncredit support that participants received from microfinance institutions (MFIs) over time, which in turn helped them to alleviate poverty.

Critics recognize the benefits accrued by microfinance participants, yet they contend that participants have become indebted and perhaps over-indebted as a result of continued borrowing from the MFIs. This raises the question: Have microcredit participants become overly indebted over time such that their accumulated debt outweighs their accumulated benefits, including accrued

accumulated assets? It is possible that participating households may be over-indebted because of cumulative loans over time. Thus, even though microcredit participants are not trapped in poverty, as we have just seen, they may be trapped in never-ending debt. This is a major concern, given that competition among MFIs is becoming fiercer and membership in multiple programs is on the rise.

The term *indebtedness* can be variously defined. One definition is in terms of a household's debt-asset ratio. A household can be considered over-indebted if its debt accounts for a high percentage of its assets, which are both physical (i.e., land and non-land) and financial (i.e., savings). Debt is defined as the amount of loan outstanding from various sources, including microcredit programs or informal sources (e.g., friends and relatives).

In terms of wealth distribution across the three survey years, participants owned more assets than non-participants generally, with the exception of 1998/99 (Table 6). In 1991/92 and 1998/99, the extent of non-land assets as a share of total wealth was similar for both participants and non-participants, at about 40 percent in both survey years. In 2010/11, non-participants had a higher share of non-land assets than did participants, at 34.8 percent and 28.8 percent, respectively. Although participants owned more land than did non-participants for all three survey years, the value of land assets did not exhibit the same trend. Over the 20-year period, the land price skyrocketed, with phenomenal growth in the value of landholdings for participants and non-participants alike. In 1991/92, the price of land was well below Tk. 1,000 per decimal; however, by 2010/11, it had jumped to more than Tk. 31,000 per decimal, reflecting a growth rate of about 200 percent per year.

Thus, using land value or total assets, which includes land value, to calculate the debt-asset ratio may not be a reliable measure. For this reason, we considered non-land assets in defining the

debt-asset ratio since the value of non-land assets over the 20-year period has not witnessed such rapid growth.¹¹ For participants, the value of non-land assets increased from Tk. 18,273 to Tk. 62,596 from 1991/92 to 2010/11, implying 12 percent growth in real value per year; over the same period, non-participants' non-land assets grew from Tk. 12,831 to Tk. 68,293, with a growth of more than 21 percent per year.¹² By contrast, debt in absolute value has been higher for participants than non-participants. As a result, the debt-asset ratios are higher for program participants than for non-participants each year. This means that microcredit participants are more indebted than non-participants, a finding that is consistent with recent assertions of critics and public officials.

Similar to the debt-asset ratio, household net worth is another welfare indicator used to assess household solvency. Households participating in microcredit programs in recent years are not necessarily worse off than their non-participant counterparts in terms of net worth (i.e., total wealth less total debt). As Table 6 shows, in 1991/92, the net worth of participants was nearly twice that of non-participants, which then reversed in favor of non-participants in 1998/99, at which time participants' net worth was 22 percent less. But by 2010/11, participants' net worth was at least 7 percent higher than that of non-participants, although the difference is not statistically significant. In short, we cannot conclude from comparing the average debt-asset ratios or net-worth situations that microcredit participants are necessarily trapped in debt, as argued.

5. Program Participation: Fixed-Effects Estimates

The above analysis shows that microcredit participants and non-participants appear to have performed equally well over the years in attaining higher living standards. Although participants

¹¹ Moreover, unlike non-land assets, land asset is not quickly saleable to refinance a business or repay debt. Note that non-land assets also include financial assets such savings in a bank.

¹² Savings accounted for only 10–15 percent of total non-land assets for participants, compared to 4–18 percent for non-participants.

have done slightly better on average than non-participants for such outcomes as extreme-poverty reduction, the differences in most outcomes between the two household groups are not substantially high. If both participants and non-participants fared equally better over the 20-year period, then the welfare gains could not necessarily be attributed to microfinance, but to economic growth. That is, microcredit program participants still would have been better off without participating in any microcredit program, in which case, the obvious question is this: What was the net effect of microcredit participation in this process?

One may counter this argument by saying that microcredit participants would probably have been worse off without microcredit because they were less capable than their non-participant counterparts. Earlier studies show there is negative self-selection bias, implying that less capable households are more likely to participate in microcredit programs (Pitt and Khandker 1998). This situation requires an econometric analysis that helps to estimate the causal effect of microcredit, which will show its effect net of other changes in the economy that equally affected everyone in the society.

To estimate the net effect of microcredit, we assume a reduced-form demand for borrowing (B_{ijt}) of the i -th household living in j -th village in period, t as follows:¹³

$$B_{ijt} = \lambda X_{ijt} + \eta_{ij}^b + \mu_j^b + \varepsilon_{ijt}^b, \quad (1)$$

where B_{ijt} represents program participation status, X_{ijt} is a vector of household characteristics (e.g., age and education of household head), λ_{ijt} is a vector of unknown parameters to be estimated, η_{ij} is an unmeasured determinant of the credit demand that is time-invariant within a household, μ_j is an

¹³ It should be noted that the same equations can be estimated for outcomes of individuals k across households i . In this study, our interest is to measure the effects on both household and individual outcomes by male and female participants; however, for simplicity, we use the household notation in the model.

unmeasured determinant of credit demand that is also time-invariant within a village, and ε_{ijt} is a non-systematic error term.

Household- and individual-level outcomes (Y_{ijt}) in period t , conditional on program participation, are defined as follows:

$$Y_{ijt} = \alpha X_{ijt} + \rho B_{ijt} + \eta_{ij}^y + \mu_j^y + \varepsilon_{ijt}^y, \quad (2)$$

where ρ measures the effects of program participation on consumption and other outcomes of interest.

Applying a deviation from the mean version to equation (2),

$$(Y_{ijt} - \bar{Y}_{ij}) = \alpha(X_{ijt} - \bar{X}_{ij}) + \rho(B_{ijt} - \bar{B}_{ij}) + (\varepsilon_{ijt}^y - \bar{\varepsilon}_{ij}^y) \quad (3a)$$

$$\Rightarrow \Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{ijt} + \Delta \varepsilon_{ijt}^y,$$

where $\Delta B_{ijt} = \lambda \Delta X_{ijt} + \Delta \varepsilon_{ijt}^b$ (3b)

Since we are assuming at this stage that the terms η , μ , and ε are uncorrelated across equations (3a) and (3b), consisting of unobserved village and household (or individual) heterogeneity, and are differenced out over time, it follows that the simple ordinary least squares (OLS) estimation of equation (3a) will be consistent; that is, a household-level, fixed-effects (FE) method can be applied to estimate the program effect.¹⁴

¹⁴ The FE method is a generalization of the double-difference (DD) estimation technique, which captures the intervention effect by the interaction of the intervention and time; in this way, participation remains distinct from non-participation when time-differenced, even when participation status does not change over time.

Given the above model specification (3), we can differentiate program participation by men and women. This is in line with the approach of earlier studies that show that the effects of microcredit are higher for women than for men borrowers (Pitt and Khandker 1998; Khandker 2005). Moreover, the distribution of loans is not same for men and women; as shown in Table 2, women's loans constitute 75 percent of household loans. Therefore, it is imperative to differentiate the effects of program participation by gender, as in earlier studies.¹⁵ Also, we measure the impacts of borrowing (whether a household borrows from microcredit), rather than just participation.¹⁶ We apply simple household-level, FE, assuming that both village- and household-level heterogeneity do not change over time.

Altogether, we have 15 sets of results, each of which is differentiated by male and female borrowing, giving us 30 estimated parameters. For most outcomes, we find that loans to women matter more than loans to men, although none matter much for such outcomes as total per capita and farm income. The overall results suggest that microcredit increases income, especially non-farm income; total per capita expenditure, especially non-farm expenditure; labor supply of both men and women; household non-land asset; net worth; and boys' and girls' school enrollment (Table 7). We also find that the household debt-asset ratio is reduced as a result of microcredit participation, suggesting that microcredit borrowing increases assets more than debt over time. Microcredit also reduces poverty, especially extreme poverty.¹⁷ As in earlier studies of Pitt and Khandker (1998) and Khandker (2005), we find that the program effects are more pronounced for women's participation

¹⁵ This differentiation can capture the participation impact only if the participation varies over the years. Indeed, we find that both male and female participation varies over time, both within the original households and within those that were generated as a result of household split-off.

¹⁶ This is consistent with earlier studies that used cumulative borrowing (in Taka amount) as the intervening variable and treated participating non-borrowers and non-participants as a similar group with zero borrowing from MFIs (Pitt and Khandker 1998; Khandker 2005).

¹⁷ Khandker (2005), using two panel years (1991/92–1998/99), found that the effects of microcredit are higher for extreme poverty than for moderate poverty; our finding is consistent with this earlier one.

than for men. For example, women's participation reduces extreme poverty by nearly 4 percentage points. Similarly, women's loans matter more than men's in influencing boys' and girls' schooling. For example, girls' school attendance increases by 5.9 percentage points due to men's program participation and by 6.6 percentage points due to women's participation.

However, men's participation appears to matter more than women's participation in influencing a household's non-land asset holdings and net worth, while the opposite is true for a household's debt-asset ratio. Men's participation increased household net worth by 18.8 percent, compared with 5.3 percent due to women's participation. However, women's participation reduced the debt-asset ratio by 47.5 percent (14.5 percentage points), compared to 27 percent (8.3 percentage points) due to men's participation. In short, male borrowers added more to household stocks of non-land assets and net worth over time, while female borrowers were responsible for households accumulating more assets than debt at the margin.

6. Do the Techniques Matter for the Findings?

The above model estimation is based on the assumption that household and village heterogeneity do not change over time. This assumption may not be tenable if microfinance participation can affect income and consumption in a way that affects demand for credit, thus making the demand and outcome equations endogenously determined over time; that is, errors in the borrowing equation (1) and outcome equation (2) are correlated.

We assume the reduced-form demand for borrowing (B_{ijt}) of the i -th household living in the j -th village in period t , expressed as the following equation:¹⁸

¹⁸ It should be noted that the borrowing equation is also disaggregated by gender of program participants.

$$B_{ijt} = \lambda X_{ijt} + \eta_{ijt}^b + \mu_{jt}^b + \varepsilon_{ijt}^b \quad (4)$$

In this equation, unlike equation (1), the assumption of fixed village and household heterogeneity is relaxed. Instead, we assume that η_{ijt} and μ_{ijt} are unobserved variables that may vary over time.

In this case, household- and individual-level outcomes (Y_{ijt}) in period t , conditional on participation, are redefined as follows:

$$Y_{ijt} = \alpha X_{ijt} + \rho B_{ijt} + \eta_{ijt}^y + \mu_{jt}^y + \varepsilon_{ijt}^y, \quad (5)$$

where, as before, ρ measures the effects of program participation on consumption and other outcomes of interest.

With time-varying, unobserved village- and household-level heterogeneity, applying a deviation from the mean version of the FE to equation (5), gives the following:

$$(Y_{ijt} - \bar{Y}_{ij}) = \alpha(X_{ijt} - \bar{X}_{ij}) + \rho(B_{ijt} - \bar{B}_{ij}) + (\eta_{ijt}^y - \bar{\eta}_{ij}^y) + (\mu_{jt}^y - \bar{\mu}_j^y) + (\varepsilon_{ijt}^y - \bar{\varepsilon}_{ij}^y) \quad (6a)$$

$$\Rightarrow \Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{ijt} + \Delta \eta_{ijt}^y + \Delta \mu_{jt}^y + \Delta \varepsilon_{ijt}^y,$$

$$\text{where } \Delta B_{ijt} = \lambda \Delta X_{ijt} + \Delta \eta_{ijt}^b + \Delta \mu_{jt}^b + \Delta \varepsilon_{ijt}^b \quad (6b)$$

Since the terms η , μ , and ε , consisting of unobserved village and household (or individual) heterogeneity, are correlated across equations (6a) and (6b) and cannot be differenced out over time, the simple OLS estimation of equation (6a) will be inconsistent.

Thus, because of time-varying, unobserved village- and household-level heterogeneity, panel estimation models such as FE techniques may not yield consistent estimates since we cannot

difference out the time-varying, unobserved heterogeneity. We could control for the bias due to time-varying heterogeneity in two possible ways. One is to apply an FE method, such as model (3), which controls for initial household- and village-level characteristics using predetermined variables; that is, this version of the FE model controls for initial characteristics, assuming that these initial factors control for the time-varying heterogeneity that correlates the errors of the borrowing and outcome equations. More specifically, following Jalan and Ravallion (1998), we rewrite model (3) as follows:

$$\Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{ijt} + \gamma X_{ij0} + \Delta \varepsilon_{ijt}^y, \quad (7)$$

where X_{ij0} is a vector of household- and village-level characteristics for the initial survey year (i.e., 1991/92).

A second way to control for the bias due to time-varying heterogeneity is to apply a propensity score-weighted FE method. Following Hirano, Imbens and Ridder (2003), we first calculate the weight variable on the basis of the propensity score obtained through the participation equation, using the 1991/92 survey data. More specifically, the weight variable is given a value of 1 for participants and $p/(1-p)$ for non-participants, where p is the propensity score (probability of receiving microcredit). In the second stage, the impact of microcredit is estimated using household-level FE as before, but this time as a weighted regression incorporating the weight variable.¹⁹

¹⁹ Another estimation technique commonly used to control for time-variant heterogeneity for many outcomes is the Dynamic Panel Generalized Method of Moments (GMM) estimator. Unfortunately, with just 3 time periods in our data set, some data transformations necessary to implement the GMM cannot be achieved. For example, the endogenous program participation must be instrumented with its own second or deeper lagged variable because, unlike the first lagged variable, it is not correlated with the error term. With respect to our data, the second lagged variable is invalid for both the 1991/92 and 1998/99 observations.

As Table 8 shows, simple household FE results are not far off from alternative estimation methods that control for time-varying heterogeneity.²⁰ In some cases, the FE results are strengthened somewhat while in others they are marginally weakened. In any case, the direction of the change in outcomes remains the same, although the coefficients are slightly changed. For example, according to the simple FE method, men's participation increases household net worth by 18.8 percent, compared with 13.8 percent according to propensity-score weighted FE, where the coefficient is adjusted downward. But this is not the case for many outcomes. For example, according to the simple FE method, women's participation increases net worth by 5.3 percent, compared to 8.9 percent according to the weighted FE model. This is a case of a slightly improved coefficient of participation. We therefore conclude that, even after controlling for possible bias due to time-varying heterogeneity, microcredit borrowing matters and matters more for women than for men, thereby reducing poverty and increasing household net worth without making borrower households over-indebted relative to assets in the process.

7. Conclusions

This paper has examined a long panel survey in Bangladesh over a 20-year period beginning in 1991/92. The panel data used in this analysis contains rich household- and individual-level information from a panel survey of more than 1,500 households first surveyed in 1991/92, again in 1998/99, and lastly in 2010/11. The data set is unique in terms of its content and coverage for investigating the long-term consequences of microcredit expansion in rural Bangladesh. Earlier analysis of the first two survey rounds demonstrated a positive attribution for microfinance in poverty reduction. The addition of a third survey round provided a unique data set to validate the

²⁰ The basic regression results of alternative models are presented in the Annex (Tables A1 and A2).

earlier results and examine the trend in welfare gains over the 20-year period to determine whether microcredit participants are trapped in poverty and debt, as speculated in the public domain.

Our analysis was restricted to panel households of microcredit program participants and non-participants. The descriptive analysis found that microcredit participants did better than non-participants for some outcomes, while non-participants did better than participants for others. Although simple comparisons do not prove a causal role of microfinance, the simple differences across participants and non-participants show the direction of changes in welfare gains over time. We found that poverty rates in both groups fell substantially over time. While 77.8 percent of participants were extremely poor in 1991/92, only 14 percent were extremely poor in 2010/11; the corresponding figures for non-participants were 77.7 percent in 1991/92 and 22.0 percent in 2010/11.²¹ Thus, the key issue concerns the net role of microfinance in reducing poverty. At the same time, program participants experienced a greater increase of debt-asset ratios at the margin than did non-participants. Does this mean that microcredit participants became more over-indebted than their non-participant counterparts?

No doubt, 20 years is a long time. Over that period, many economic changes occurred in Bangladesh beyond the expansion of microcredit, including physical infrastructure and economic policies that may have contributed to the welfare status of both participants and non-participants. In such a setting, even with panel survey data, it may be difficult to isolate the net effects of microcredit expansion on the welfare gains of borrowers over time. It is possible that those who did not participate in microcredit programs may have gained from the spillover effects of microcredit expansion. Thus, the changes in gains over the 20-year period by both groups, which do not differ

²¹ Note that the difference in the reduction in poverty rates is above the attrition rate of 7.4%. This shows that the finding is robust.

substantially, may be the result of changes in the overall economic structure and may not have much to do with microcredit expansion.

This study has addressed the critical issue—what would have happened to participants since 1991/92 without microcredit programs—using an econometric estimation technique that takes into account the time-varying endogeneity of program borrowers; namely, why certain households borrowed from microcredit and remained borrowers while others did not, even when both groups were eligible to participate and borrow from the outset. Using a household-level FE method to control for time-varying, unobserved household- and village-level heterogeneity, we find that program participation has indeed mattered, and more for women borrowers. Results show that microcredit has helped increase income, consumption, and assets for borrowers and in the process, has helped to reduce poverty, especially extreme poverty. We also find that, even if participants borrowed and afterwards accumulated debt, they accumulated more assets than debt over time, so that debt-asset ratios have in fact declined as a result of program participation.²² Thus, in contrast to the common perception about poverty and indebtedness, we find that microcredit participants are not necessarily trapped either in poverty or debt.

²² Another measure of indebtedness is the debt servicing to income ratio, which is discussed in a follow-up paper that evaluates alternative measures of indebtedness. However, as this definition of indebtedness (either debt-asset ratio or debt servicing to income ratio) is a continuous variable, it does not tell us whether a household is over-indebted or severe indebted. This requires introducing some thresholds of debt-asset ratio or debt servicing to income ratio at which a household is treated as over-indebted or severely indebted. If we define severe indebted are those for whom the debt-to-non-land asset ratio is higher than 0.6, we find that for each year in general there are higher shares of severe indebted households among microcredit borrowers than among non-microcredit borrowers. But the difference is not statistically significant in any of the survey periods (see, Khandker, Faruquee and Samad 2013). In 2010/11, for example, 17 percent were severe indebted among microcredit borrowers compared with 15 percent among non-microcredit borrowers.

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**Table 1. Percentage Household Participation in Microcredit Program
for Three Survey Years**

Survey year	Grameen Bank	BRAC	BRDB	ASA	Other programs (one or multiple)	Any program	Non-participant
1991/92 (N = 1,509)	8.7 (8.6)	11.2 (9.0)	6.4 (5.8)	0 (0)	0 (0)	26.3 (23.3)	73.7
1998/98 (N = 1,758)	15.1 (13.6)	16.2 (10.1)	8.3 (4.4)	4.1 (3.6)	14.9 (11.4)	48.6 (38.0)	51.4
2010/11 (N = 2,322)	27.4 (21.7)	20.9 (12.3)	4.7 (1.3)	23.8 (19.3)	32.9 (28.2)	68.5 (56.2)	31.5

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/2011.

Note: Sample is restricted to 1,509 panel households from 1991/92 survey that are common to all three surveys. Sample size is higher in 1998/99 and 2010/11 because of household split-offs. Figures in parentheses are percentages of borrowers. Sums of figures across columns for 1998/99 and 2010/11 exceed 100 percent because of household participation in multiple programs.

Table 2. Household Cumulative Loans and Savings (Tk.) from Microcredit Programs over Time For Three Survey Years

Survey year	Grameen Bank loans	BRAC loans	BRDB loans	ASA loans	Loans from other programs	Aggregate loans from all programs	Aggregate savings for all programs
1991/92 (N = 769)	16,289.4 (0.73)	5,276.7 (0.71)	6,453.9 (0.38)	0 (-)	0 (-)	9,252.3 (0.67)	700.3 (0.08)
1998/99 (N = 1,099)	25,938.4 (0.84)	6,377.1 (0.95)	6,552.4 (0.52)	6,346.8 (0.99)	4,680.2 (0.86)	13,262.1 (0.84)	1,341.5 (0.10)
2010/11 (N = 1,770)	11,597.6 (0.89)	13,452.3 (0.38)	2,501.3 (0.58)	7,760.1 (0.84)	10,849.5 (0.79)	17,005.6 (0.73)	1,689.9 (0.10)

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: Findings are restricted to microcredit participants. Loans and program savings are CPI-adjusted Tk. with 1991/92 = 100. Loans are cumulative for 5 years preceding the surveys. Figures in parentheses are sample size (column 1), share of loans to women (columns 2–7), and share of program savings in cumulative program loans (column 8).

Table 3. Distribution of Household Income, Expenditure, and Poverty for Microcredit Participation Status for Three Survey Years

Outcome variable	1991/92		1998/99		2010/11	
	Participants (N = 769)	Non- participants (N = 483)	Participants (N = 1,014)	Non- participants (N = 420)	Participants (N = 1,554)	Non- participants (N = 334)
Per capita income (Tk./month)	521.8	495.6	502.7	523.1	1,066.0	1,114.3
	t = 0.74		t = -0.86		t = -0.36	
Non-farm income as share of total income (%)	62.7	61.3	67.8	64.1	76.5	72.6
	t = 0.60		t = 2.05		t = 2.40	
Per capita expenditure (Tk./month)	327.3	318.6	440.0	436.9	571.6	604.0
	t = 1.04		t = 0.17		t = -1.71	
Food expenditure as share of total expenditure (%)	81.3	82.1	75.1	76.2	66.2	65.0
	t = -1.23		t = -1.15		t = 1.59	
Moderate poverty (%)	86.3	87.6	60.6	58.2	32.9	34.6
	t = -0.67		t = 0.88		t = -0.62	
Extreme poverty (%)	75.1	78.5	43.6	46.5	16.2	23.1
	t = -1.38		t = -1.05		t = -3.19	

Sources: World BankBIDS surveys, 1991/92 and 1998/99; World Bank-InM survey, 2010/11.

Note: Monetary figures are CPI-adjusted Tk. with 1991/92 = 100. The analysis is restricted to 1991/92 microcredit-eligible households (i.e., those who participated and those who were eligible but did not participate in microcredit programs in 1991/92), which constitute 64, 62, and 61 percent of the surveyed households in 1991/92, 1998/99, and 2010/11, respectively. Figures in parentheses are t-statistics of the differences between participants and non-participants.

Table 4. Children’s Educational Outcomes by Microcredit Participation Status for Three Survey Years

School enrollment (ages 5–18)	1991/92			1998/99			2010/11		
	Participants (N _B = 816, N _G = 744)	Non- participants (N _B = 425, N _G = 397)	All (N _B = 1,241, N _G = 1,141)	Participants (N _B = 883, N _G = 815)	Non- participants (N _B = 305, N _G = 283)	All (N _B = 1,188, N _G = 1,098)	Participants (N _B = 925, N _G = 1,021)	Non- participants (N _B = 180, N _G = 179)	All (N _B = 1,105, N _G = 1,200)
Boys (%)	54.9	41.7	47.7	56.2	61.4	58.0	69.6	70.1	69.7
	t = 4.69			t = -1.75			t = -0.12		
Girls (%)	51.0	41.5	45.8	65.5	58.1	62.9	71.2	64.3	69.9
	t = 3.19			t = 2.44			t = 2.02		

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: N_B and N_G refer to observations for boys and girls, respectively. The analysis is restricted to 1991/92 microcredit-eligible households (i.e., those who participated and those who were eligible but did not participate in microcredit programs in 1991/92), which constitute 64, 62, and 61 percent of the surveyed households in 1991/92, 1998/99, and 2010/2011, respectively.

**Table 5. Distribution of Program Participating Households by Major Employment (%)
for Three Survey Years**

Survey year	Self-employment, crop production	Self-employment, livestock and poultry	Self-employment, non-farm activities	Wage employment, farm sector	Wage/salaried employment, non-farm sector
Participants					
1991/92 (N = 766)	11.8	2.8	36.4	18.7	30.2
1998/99 (N = 1,012)	9.8	2.3	48.1	18.1	21.9
2010/11 (N = 1,545)	6.7	9.6	40.6	13.8	29.6
Non-participants					
1991/92 (N = 482)	4.6	2.5	26.2	30.6	36.3
1998/99 (N = 418)	11.3	2.7	35.6	26.3	24.1
2010/11 (N = 324)	16.4	11.8	29.3	20.3	22.1
All					
1991/92 (N = 1,248)	7.6	2.6	30.4	25.7	33.8
1998/99 (N = 1,430)	10.4	2.4	43.4	21.2	22.7
2010/11 (N = 1,869)	8.6	10.0	38.4	15.1	28.1

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: The analysis is restricted to 1991/92 microcredit-eligible households (i.e., those who participated and those who were eligible but did not participate in microcredit programs in 1991/92), which constitute 64, 62, and 61 percent of the surveyed households in 1991/92, 1998/99, and 2010/11, respectively. Households dependent solely on non-earned income (e.g., remittances or pensions) are excluded. A household can be engaged in multiple income-generation activities, and major employment is determined by the activity generating the highest income.

Table 6. Distribution of Household Assets, Debt, and Net Worth by Microcredit Participation Status for Three Survey Years

Indicator	1991/92		1998/99		2010/11	
	Participants (N = 769)	Non- participants (N = 483)	Participants (N = 1,014)	Non- participants (N = 420)	Participants (N = 1,554)	Non- participants (N = 334)
Total asset (Tk.)	68,783.9 t = 6.21	36,480.0	109,721.3 t = -2.22	145,488.3	843,336.0 t = -0.58	769,494.4
Land asset quantity (decimals)	50.4 t = 10.37	13.5	44.1 t = 1.46	36.7	25.1 t = 0.80	22.3
Land asset value (Tk.)	50,510.9 t = 6.21	23,649.3	89,632.1 t = -2.28	120,073.1	780,531.3 t = 0.64	701,200.0
Non-land asset value (Tk.)	18,273.0 t = 3.73	12,830.7	20,089.2 t = -2.46	25,415.2	62,595.9 t = -0.76	68,294.3
Non-land asset as share of total asset (%)	42.5 t = -1.37	44.6	38.2 t = 0.61	37.3	28.8 t = -3.15	34.8
Savings (Tk.)	1,022.7 t = 3.59	395.8	1,919.4 t = -1.52	3,075.2	11,342.2 t = -2.64	13,936.1
Savings as share of nonland asset (%)	10.8 t = 10.23	03.8	11.5 t = 9.75	04.4	15.8 t = -0.73	17.6
Debt (Tk.)	1,967.9 t = 3.72	1,168.5	3,026.2 t = 3.25	1,782.1	11,431.8 t = 1.16	9,042.1
Ratio of debt to non- land asset (%)	24.2 t = 1.41	19.4	28.8 t = 9.04	06.7	33.7 t = 2.17	19.5
Net worth (Tk.)	68,400.2 t = 6.15	35,953.3	113,613.3 t = -1.82	144,981.7	287,625.0 t = 0.44	269,349.1

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: The analysis is restricted to 1991/92 microcredit-eligible households (i.e., those who participated and those who were eligible but did not participate in microcredit programs in 1991/92), which constitute 64, 62, and 61 percent of the surveyed households in 1991/92, 1998/99, and 2010/11, respectively. Monetary figures are CPI-adjusted Tk. with 1991/92 = 100.

Table 7. Impacts of Microcredit Borrowing: Household Fixed-Effects Estimates
($N_{HH} = 1,509$)

Microcredit borrowing variable	Log per capita, total income (Tk./month)	Log per capita, farm income (Tk./month)	Log per capita, non-farm income (Tk./month)	Log per capita, total expenditure (Tk./month)	Log per capita, food expenditure (Tk./month)	Log per capita, non-food expenditure (Tk./month)	Moderate poverty	Extreme poverty
Household males	0.012 (0.23)	-0.084 (-0.23)	0.160 (1.38)	0.039 (1.79)	0.013 (0.89)	0.073 (1.65)	-0.015 (-0.62)	-0.019 (-0.87)
Household females	0.039 (1.16)	0.020 (0.39)	0.170 (2.40)	-0.006 (-0.36)	-0.010 (-0.83)	0.019 (0.63)	-0.003 (-0.15)	-0.037 (-2.37)
R ²	0.104	0.086	0.176	0.372	0.265	0.438	0.299	0.327

Table 7. (Continued)

Microcredit borrowing variable	Log household, male labor supply (hours/month)	Log household, female labor supply (hours/month)	Log household, non-land asset (Tk.)	Log household net worth (Tk.)	Log household, debt-asset ratio	Boys' school enrollment (ages 5–18)	Girls' school enrollment (ages 5–18)
Household males	0.154 (1.79)	0.004 (0.04)	0.264 (4.84)	0.188 (3.16)	-0.270 (-4.23)	-0.046 (-1.49)	0.059 (1.63)
Household females	0.304 (4.56)	0.458 (5.28)	0.236 (5.51)	0.053 (1.64)	-0.475 (-10.00)	0.065 (3.15)	0.066 (2.71)
R ²	0.202	0.246	0.454	0.655	0.187	0.113	0.120

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: Figures in parentheses are t-statistics based on standard errors clustered at the village level. Regressions include more control variables at the household level (e.g., age, sex, and education of household head and log of land asset) and village level (e.g., price of consumer goods, male and female wages, infrastructure availability [e.g., electricity and schools], and proportion of village land irrigated).

Table 8. Alternate Estimates of Microcredit Borrowing Impacts on Selected Outcomes
($N_{HH} = 1,509$)

Microcredit borrowing variable	Moderate poverty	Extreme poverty	Log household, non-land asset (Tk.)	Log household, net worth (Tk.)	Log household debt-asset ratio
Household FE					
Household males	-0.015 (-0.62)	-0.019 (-0.87)	0.264 (4.84)	0.188 (3.16)	-0.270 (-4.23)
Household females	-0.003 (-0.15)	-0.037 (-2.37)	0.236 (5.51)	0.053 (1.64)	-0.475 (-10.00)
R ²	0.299	0.327	0.454	0.655	0.187
Household FE after controlling for initial conditions					
Household males	0.001 (0.04)	-0.011 (-0.50)	0.271 (4.98)	0.140 (2.47)	-0.272 (-4.34)
Household females	-0.005 (-0.26)	-0.037 (-2.50)	0.224 (5.56)	0.058 (1.86)	-0.475 (-10.11)
R ²	0.310	0.342	0.466	0.663	0.192
Propensity score-weighted household FE estimates after controlling for initial conditions					
Household males	-0.015 (-0.55)	-0.037 (-1.52)	0.326 (4.83)	0.138 (2.29)	-0.251 (-3.36)
Household females	-0.006 (-0.31)	-0.039 (-2.51)	0.285 (4.63)	0.089 (1.88)	-0.492 (-9.71)
R ²	0.314	0.355	0.457	0.633	0.202

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: Figures in parentheses are t-statistics based on standard errors clustered at the village level. Regressions include more control variables at the household level (e.g., age, sex, and education of household head and log of land asset) and village level (e.g., price of consumer goods, male and female wages, infrastructure availability [e.g., electricity and schools], and proportion of village land irrigated).

Annex

Table A1. Impacts of Microcredit Borrowing: Household FE Estimates after Controlling for Initial Conditions
(N_{HH}=1,509)

Microcredit borrowing variable	Log per capita, total income (Tk./month)	Log per capita, farm income (Tk./month)	Log per capita, non-farm income (Tk./month)	Log per capita, total expenditure (Tk./month)	Log per capita, food expenditure (Tk./month)	Log per capita, non-food expenditure (Tk./month)	Moderate poverty	Extreme poverty
Household males	0.013 (0.24)	-0.051 (-0.61)	0.143 (1.28)	0.028 (1.28)	0.007 (0.48)	0.062 (1.44)	0.001 (0.04)	-0.011 (-0.50)
Household females	0.029 (0.29)	0.016 (0.32)	0.161 (2.32)	-0.001 (-0.07)	-0.005 (-0.42)	0.021 (0.71)	-0.005 (-0.26)	-0.037 (-2.50)
R ²	0.119	0.102	0.212	0.385	0.281	0.447	0.310	0.342

Table A1. (Continued)

Microcredit borrowing variable	Log household, male labor supply (hours/month)	Log household, female labor supply (hours/month)	Log household, non-land asset (Tk.)	Log household, net-worth (Tk.)	Log household, debt-asset ratio	Boys' school enrollment (ages 5–18)	Girls' school enrollment (ages 5–18)
Household males	0.144 (1.66)	0.005 (-0.04)	0.271 (4.98)	0.140 (2.47)	-0.272 (-4.34)	-0.047 (-1.52)	0.056 (1.51)
Household females	0.282 (4.39)	0.434 (5.17)	0.224 (5.56)	0.058 (1.86)	-0.475 (-10.11)	0.053 (2.54)	0.078 (3.03)
R ²	0.214	0.258	0.466	0.663	0.192	0.068	0.072

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: Figures in parentheses are t-statistics based on standard errors clustered at the village level. Regressions include more control variables at the household level (e.g., age, sex, and education of household head and log of land asset) and village level (e.g., price of consumer goods, male and female wages, infrastructure availability [e.g., electricity and schools], and proportion of village land irrigated).

Table A2. Impacts of Microcredit Borrowing: Propensity Score–Weighted Household FE Estimates after Controlling for Initial Conditions
(N_{HH} = 1,509)

Microcredit borrowing variable	Log per capita, total income (Tk./month)	Log per capita, farm income (Tk./month)	Log per capita, non-farm income (Tk./month)	Log per capita, total expenditure (Tk./month)	Log per capita, food expenditure (Tk./month)	Log per capita, non-food expenditure (Tk./month)	Moderate poverty	Extreme poverty
Household males	-0.018 (-0.27)	-0.037 (-0.37)	0.090 (0.86)	0.041 (1.80)	0.017 (1.10)	0.081 (1.72)	-0.015 (-0.55)	-0.037 (-1.52)
Household females	0.024 (0.66)	0.014 (0.24)	0.160 (2.18)	0.001 (0.07)	-0.007 (-0.61)	0.031 (0.90)	-0.006 (-0.31)	-0.039 (-2.51)
R ²	0.137	0.097	0.206	0.389	0.281	0.458	0.314	0.355

Table A2. (Continued)

Microcredit borrowing variable	Log household, male labor supply (hours/month)	Log household, female labor supply (hours/month)	Log household, non-land asset (Tk.)	Log household, net worth (Tk.)	Log household, debt-asset ratio	Boys' school enrollment (ages 5–18)	Girls' school enrollment (ages 5–18)
Household males	0.139 (1.33)	-0.056 (-0.48)	0.326 (4.83)	0.138 (2.29)	-0.251 (-3.36)	-0.079 (-2.21)	0.066 (1.53)
Household females	0.241 (3.69)	0.374 (4.03)	0.285 (4.63)	0.089 (1.88)	-0.492 (-9.71)	0.059 (2.55)	0.089 (2.95)
R ²	0.233	0.245	0.457	0.633	0.202	0.088	0.084

Sources: World Bank–BIDS surveys, 1991/92 and 1998/99; World Bank–InM survey, 2010/11.

Note: Figures in parentheses are t-statistics based on standard errors clustered at the village level. Regressions include more control variables at the household level (e.g., age, sex, and education of household head and log of land asset) and village level (e.g., price of consumer goods, male and female wages, infrastructure availability [e.g., electricity and schools], and proportion of village land irrigated).