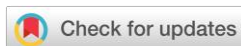


Impact of Microfinance Programmes on Poverty Alleviation in Bangladesh: Evidence from Household-Level Data

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Abstract: The study analyzes the effect of the microfinance programme on poverty alleviation in the context of Bangladesh with a special focus on the mediating effect of household income generating capacity. The study is driven by the ongoing relevance of MFIs as a financial inclusion tool for poor households who have limited access to formal financial services and productive capital. The study examines from a household level if or how household economic welfare is enhanced by the participation in microfinance programmes. The empirical analysis is based on the baseline regression analysis and the propensity score matching method to overcome observable differences between the participants and non-participants of microfinance. In turn, mediation analysis is used to analyze whether boosting income-earning potential is an important mechanism connecting the microfinance experience and poverty reduction. It shows that the participation in microfinance is positively and significantly related to welfare of the households. The propensity score matching results also show a positive treatment effect, consistent with the alternative specifications in the analyses, implying that, on average, microfinance clients enjoy higher welfare than similar non-participants households. Results from mediation analysis show that participation in microfinance significantly increases income earning potential, thereby contributing to increase in household welfare. The indirect effect is significant, and there is also an indirect effect that is still significant. An indirect effect is significant, and there is also a direct effect that is still significant. The main conclusions are robust with respect to alternative specifications and poverty measures. The results of the heterogeneity analysis also reveal that the effect is more pronounced among households in rural areas, among poor households and among female-headed households and less-educated households. The study finds that when financial access is turned into viable income generating activities, Microfinance can play a significant role in poverty reduction in Bangladesh. The results indicate that microfinance policies need to shift from credit delivery to a comprehensive package that includes supportive financial education and entrepreneurship development as well as productive investment mechanisms.

Keywords: Microfinance; Poverty alleviation; Income-generating capacity; Financial inclusion; Household welfare; Propensity score matching; Bangladesh

1. Introduction

Poverty is one of the most stubborn socio-economic problems facing developing economies, and especially those with weak links to formal financial services and productive capital and stable income-generating opportunities. Bangladesh has achieved considerable progress in poverty reduction and household living standard improvement, but there is still a lot of variation between geographical and socio-economic groups. Access to formal credit and investment opportunities remain limited for rural households, low-income families, women-headed households and households with limited productive assets. Microfinance, in this context, has become an important instrument for financial inclusion that allows for access to small loans, savings facilities, and other financial services for financially constrained households. Microfinance can enhance household income, consumption, and asset

accumulation and, therefore, economic welfare, by easing liquidity constraints and enabling productive activities.

The emergence of microfinance in Bangladesh has been the subject of much academic and policy interest, given that the country is the pioneer of both group-based lending and community-based financial services. The role of microfinance institutions has been growing in importance as a part of the financial system in the country, especially in rural areas where access to conventional banking services can be limited. The theory is that small-scale financial services can facilitate the transition into self-employment, the creation of micro-enterprise, investment in farming and other productive activities, and facilitate consumption smoothing when it is necessary. Although the impact of microfinance participation on poverty reduction is inconclusive, Khandker (2005) noted the poverty-reducing impacts of participation in microfinance in Bangladesh using a panel of evidence, and Nawaz (2010) reported the poverty-reducing impacts of microfinance participation using evidence from rural Bangladesh. Likewise, Mazumder and Lu (2015) found that microfinance schemes can have an effect on rural livelihoods, but the impact can differ significantly in terms of both nature and magnitude depending on the type of microfinance scheme and the families that participate in it.

Although the scope and scale of microfinance is large, its impact on poverty alleviation is still a topic of debate. The availability of credit does not imply sustainability of poverty alleviation. The final welfare impact will depend on the type of usage of the borrowed resources, entrepreneurial ability of the households, availability of the markets, sources of income and repayment responsibility of the households. For instance, Ali et al. (2017) critically evaluate the application of microfinance as a development and poverty-reduction instrument in rural Bangladesh and emphasize the need of examining the constraints and conditions related to microfinance. Likewise, Garikipati (2017) suggested that the evidence of poverty effects of microfinance is more nuanced than the assumption of a positive relationship. Some households may be using microfinance to invest in productive activities and generate income; some other households may be using borrowed funds to smooth consumption, for education, health spending, or to repay outstanding debts.

There is increasing international evidence of the consideration of the poverty implications of microfinance. Miled and Rejeb (2015) in their synthesis of empirical evidence have pointed out that microfinance can play a role in reducing poverty in several ways, such as income generation, job creation and productive investment. There is some evidence that microfinance programmes have an impact on reducing monetary poverty in Sudan (Elsafi et al., 2019) and a significant link between microfinance and monetary poverty reduction in Pakistan (Khan et al., 2021). A similar study by Chikwira et al. (2022) highlighted that microfinance institutions can play a role in poverty alleviation, while Duong and Nghiem (2022), for the case of Vietnam, found that microfinance contributes positively to poverty alleviation when using dynamic panel-data analysis. The evidence from Malaysia presented by Samer et al (2015) also indicates that microfinance can contribute to the welfare of the household.

An important research gap is the lack of understanding of how involvement in microfinance leads to better welfare for the household. The majority of the previous literature concentrates mainly on poverty reduction and/or income or consumption growth achieved by microfinance. The effect of household income generating capacity as a mediator is relatively less studied in the context of Bangladesh. Microfinance can have an impact on poverty alleviation, because households can use the funds to set up or expand their business, invest in productive assets or engage in self-employment and diversify their income. If these activities do manage to enhance the earning power of the households, then enhanced income can in turn induce higher consumption, asset building and living standards. Such an analysis of this mechanism can then offer a deeper insight into the role of microfinance in poverty alleviation.

The other important issue is selection bias. Households involved in microfinance programmes may be systematically different from those not involved in microfinance. Households that participate can vary, for instance, in terms of education, employment, asset ownership, entrepreneurial orientation, and geographic location or initial economic status, etc.

Thus, a comparison of participants with non-participants may exaggerate or underestimate the impact of the microfinance. To overcome this challenge so far various empirical studies have resorted to different econometric techniques, but additional evidence based on matching techniques at the household level can help to improve the evaluation of microfinance impacts in Bangladesh. One such method is Propensity Score Matching (PSM), which enables comparison of the participating households to observationally similar non-participating households based on their observable socioeconomic characteristics.

Building on this context, the current research explores the effect of microfinance programmes on poverty alleviation in Bangladesh, employing a broad empirical framework. The study uses participation in the microfinance programme as the key explanatory variable, household welfare as the key outcome and household income generating capacity as a mediating mechanism. Demographic and socioeconomic data are included as control variables in the analysis, and propensity score matching is used to adjust for observable differences in the selection of participating and non-participating households. Furthermore, alternative poverty measures, robustness tests and heterogeneity analysis are included to check the consistency and distribution of the estimated effects.

The study makes several contributions to the existing literature. First, it gives more microfinance-specific evidence to the household level of how, in Bangladesh, microfinance participation contributes to poverty alleviation, on top of the vast experience this country has with microfinance. Second, it is not just an assessment of the treatment effect, but also explores income-generating capacity as a possible transmission mechanism. Third, propensity score matching is used to enhance the empirical strategy by making participating and non-participating households more comparable. Fourth, the study investigates if the impacts differ by significant household subgroups such as rural/urban households, female- and male-headed households, educational status of the household, and economic status of the household. Therefore, the following central research question was formulated for the study that whether or not the participation in the microfinance programmes helps to reduce poverty in Bangladesh and how much extent it is mediated by the household income-generating capacity. This study aims to go beyond the traditional understanding of microfinance as a source of small-scale credit, and consider its effects on the overall economic capacity and welfare of the households. The results are likely to feed into the current debate on the effectiveness of microfinance and offer practical lessons for policy makers and microfinance institutions and development practitioners to improve the poverty alleviation potential of financial inclusion in Bangladesh.

2. Literature Review

Microfinance has historically been considered a key financial instrument for enhancing the economic situation of low-income households through the provision of credit, savings, and other financial services which are usually inaccessible for these households in a traditional financial system. It is assumed that constrained access to cheap finance hampers the capacity of poor households to invest in productive activities, smooth consumption, build assets, and cope with economic shocks. There have, therefore, been a lot of interest in the development economics literature in the microfinance–poverty relationship, especially in South Asian countries where microfinance is playing an important role in the development of rural economies. Miled and Rejeb (2015) reviewed the empirical evidence and found that microfinance has a positive impact on poverty reduction by providing better access to financial resources; however, the impact is inconsistent and highly dependent on the context. Likewise, Garikipati (2017) found evidence is mixed regarding the poverty-alleviating effect of microfinance and that the impact is highly dependent on the use of the loan, the characteristics of the borrower, and the institutional design of the microfinance programmes. Gupta and Sharma (2023) also emphasized that microfinance institutions have contributed significantly to financial inclusion in South Asia and that while they are effective, sustainable and have potential to reduce poverty, questions remain.

Bangladesh is one of the most significant countries to study the link between microfinance and poverty eradication due to its rich microfinance experience with development

interventions. The poverty reducing potential of microfinance is borne out to a large extent by empirical evidence found in early studies in Bangladesh. In Khandker's 2005 study of the impact of microfinance programmes on poverty, using panel data analyses, he discovered that the microfinance programmes helped to reduce poverty among participating households and helped to generate benefits not only for the participating households, but also for the broader local economy. Similarly, Nawaz (2010), using village-level evidence from Bangladesh, found that the participation in microfinance is correlated with poverty reduction but the effect size of the relationship differs depending on the characteristics of a household and its involvement in a microfinance programme. Recent evidence has extended the conversation from dealing with monetary poverty to livelihood improvement. Mazumder and Lu (2015) concluded that changes in income-generating activities and livelihood strategies were the ways in which microfinance programmes impacted rural livelihoods, and that differences existed between the governmental and non-governmental microfinance programmes. The results show that the effect of microfinance can be indirect and work via several channels, not just enhancing household income. However, Ali et al. (2017), in their critical review of the use of microfinance as a development and poverty alleviation tool in rural Bangladesh, suggested that while microfinance has created significant opportunities for poor households, the poverty-reducing capacity can be limited by factors like loan use, pressure on repayment, programme design and the general socio-economic context.

Experimental evidence from other developing economies strongly suggests a poverty-reducing role for microfinance, and shows significant country diversity. Using the case of Sudan, Elsafi et al. (2019) showed evidence that microfinance programmes can help reduce monetary poverty by enhancing the financial access and productive opportunity of the households. This argument has been supported by Khan et al. (2021), who found that access to microfinance has a significant poverty reducing effect in Pakistan. Likewise, based on dynamic panel-data evidence from Vietnam, Duong and Nghiem (2022) identified the poverty alleviation effects of microfinance, focusing on the dynamics of the effects of microfinance rather than its static outcomes. Chikwira et al. (2022) also found that the role of microfinance institutions in alleviating poverty is through enhancing access to financial resources and assisting in income generating activities. This relationship is also supported by evidence from Ghana, which shows that microfinance and small loans programmes have helped to reduce the poverty rate in households in Wa West District in Ghana (Sulemana et al., 2023). Similarly, Samer et al. (2015) found a positive impact of poverty reduction from microfinance in Malaysia.

Another line of research indicates that the impact of microfinance on household welfare is crucially related to how financial tools are used to enhance household welfare. While access to credit is necessary it is not sufficient for poverty reduction; whether microfinance brings about sustainable welfare gains could depend on how the borrowed funds are used productively, on the development of the enterprise, on generating employment, on accumulating assets, and on improved livelihood strategies. Mazumder and Lu (2015) showed that microfinance has a potential impact on rural livelihoods through altering livelihood activities of households and enhancing their ability to generate income. Begum et al. (2019) further explored this, looking at Islamic microfinance as one of the viable poverty reduction methods, and suggested that if financial services are appropriately designed they will enhance the sustainability of poverty-reduction interventions. This is especially important for Bangladesh, where the microfinance programmes are increasingly embedded in a wider financial inclusion and livelihood development context. Meanwhile, Ali et al. (2017) have warned that credit interventions will not necessarily bring about welfare gains that persist in the long-term, unless they are accompanied by market development, improved entrepreneurial skills, lower repayments, and larger productive opportunities for the borrowers.

The literature, however, also points to some key methodological and conceptual issues, given the significant findings related to the positive association between microfinance and poverty reduction. Both Miled and Rejeb (2015) and Garikipati (2017) noted the fact that findings derived from empirical research are not uniform, and that the

variation of research design, outcome measures, sample selection and programme characteristics are responsible for these differences. One of the major concerns is selection effects as households that choose to join the microfinance programmes might be different in some systematic way from non-participating households with respect to motivation, entrepreneurial capacity, risk attitude, income opportunities and/or access to social networks. Thus, before making a straightforward distinction between borrowers and non-borrowers, one should take into account how much the actual impact of microfinance might be magnified or diminished. The use of panel-data methods, as shown by Khandker (2005) and Duong and Nghiem (2022), has the advantages of strengthening the evidence, considering the change of time, and further enhancing the causal inference effect of the quasi-experimental method.

The current literature also shows the lack of measurement of poverty alleviation. Most studies measure the effect of microfinance on household income or monetary poverty, the latter being defined as the lack of sufficient income to cover basic needs, but poverty is now considered a multidimensional concept that encompasses consumption, education, health, housing, assets, food security and access to essential services. The findings in Bangladesh indicate that microfinance can have an impact on other components of household livelihoods in addition to the income gained. For instance, Mazumder and Lu (2015) found that microfinance impacts livelihood strategies, and the literature reviewed by Gupta and Sharma (2023) shows that interventions can have varying impacts on different aspects of household welfare. Thus, using only income measures might underestimate the welfare impacts of microfinance membership. Along with monetary poverty and consumption based measures, a multidimensional measure can help to shed light on the real effect of microfinance on the living condition of the household.

A second crucial point is the sustainability of microfinance poverty alleviation. While the benefits found in a number of studies are positive, such benefits are not necessarily interpreted as proof of the permanent effect of microfinance on bringing households out of poverty. Borrowing may provide short-term liquidity, but also impose pressure on the repayment of these households that may be vulnerable. Ali et al. (2017) explicitly argued for the importance of a critical appraisal of the microfinance in the context of Bangladesh, suggesting that access to credit needs to be examined along with the conditions of the credit and its use. Similarly, Begum et al. (2019) emphasized the need for sustainability in programme design and implementation for sustainable poverty alleviation. The international evidence echoes this concern: while Khan et al. (2021), Elsafi et al. (2019), and Sulemana et al. (2023) find evidence of positive impacts on poverty, they all find that the size of the poverty impacts and the channel of the impact are sensitive to the quality of the programmes, institutional characteristics, and household capabilities.

Conclusively, the literature offers a solid theoretical and empirical base to investigate the effect of the microfinance programmes on poverty alleviation in Bangladesh, and also it indicates the demand for more comprehensive and methodologically rigorous assessment. The existing studies focusing on Bangladesh, such as Khandker (2005), Nawaz (2010), Mazumder and Lu (2015) and Ali et al. (2017) highlight the significance of microfinance in combating rural poverty; and the international evidence from Pakistan, Vietnam, Sudan, Ghana, Malaysia, and others in developing countries supports the potential of microfinance as a poverty alleviation tool. There are, however, significant gaps in the literature, including issues of causal identification of the impact of microfinance, mechanisms by which participation relates to welfare and the application of multidimensional poverty indicators.

3. Methodology

The research design for this study is quantitative in nature and the study focuses on 'Microfinance Programmes and Poverty Alleviation in Bangladesh'. The study takes the view that microfinance can alleviate financial constraints on the household, help households invest in productive resources, encourage self-employment, encourage income-generating activities, and enhance household welfare. The conceptual model posits that the participation of households in Microfinance Programmes is the main independent

variable, and poverty alleviation is the dependent variable; and household income-generating capacity is a potential mediating variable. A variety of demographic and socioeconomic factors are also included as control variables. The study does not rely upon a randomly assigned participation in the microfinance programmes, so an effort is made to reduce the observable selection bias by using propensity score matching to get a more accurate estimation of the impact of microfinance participation on the welfare of the households.

Data is household level data from Bangladesh. The Household Income and Expenditure Survey (HIES), carried out by the Bangladesh Bureau of Statistics (BBS) is the main source of socioeconomic and welfare statistics in the household sector. HIES offers a wealth of information about household income, household consumption expenditure, household demographic characteristics, education, employment, housing characteristics, assets and asset ownership, land ownership, remittances, and other factors pertinent to poverty measurement. Where appropriate, information about the microfinance sector is complemented by institutional and sectoral information published by the Microfinance Regulatory Authority (MRA). Households with information on microfinance participation, as well as on household welfare and on some socioeconomic characteristics are the focus of the study. Once the data have been collected, they are thoroughly checked for missing data, unusual responses, and unusual values before the empirical analysis is performed. A suitable data cleaning process is used to enhance reliability and consistency of the final analytical sample.

Microfinance programme participation is the main independent variable. It is treated as a binary variable, with the value of one if a household is involved in a microfinance programme, and zero otherwise. This measure is based on the simple difference between participating and non-participating households. If available, the study also takes into account the level of engagement, with indicators being the amount of credit received, frequency of borrowing, length of time in the club, involvement in saving arrangements, and the productive use of credit. The effect of microfinance can be differentiated based on the level and type of participation of the household, so that the extent and type of participation should be taken into account.

Household welfare indicators are the key dependent variables used for poverty alleviation. The first measure is household per-capita consumption expenditure which is the ratio of total household consumption expenditure to household size. In the empirical analysis, the natural logarithm of per-capita consumption expenditure is used to alleviate skewness and to reduce the impact of extreme values. Another possible poverty measure is a binary indicator based on whether the welfare level of a household is below the national poverty threshold, which is also referred to in the literature. If the data is available, indicators of education, health, housing, electricity, sanitation, drinking water, and household assets can also be used to build a multidimensional poverty measure. Using more than one poverty measure provides an opportunity to explore whether microfinance contributes to an improvement in monetary welfare, as well as to an improvement in overall household living conditions.

Household income generating capacity is hypothesized as a potential mediator between the microfinance and poverty reduction. The explanation is that the poverty alleviation impact of microfinance might not be directly, but that poor households can use financial resources to start or expand a small enterprise, invest in productive activities, engage in self-employment, diversify their household income sources and enhance employment opportunities. Thus, income generating potential is evaluated on the basis of indicators available, including business ownership, self-employment, productive investment, employment income, non-farm income and involvement in income-generating activities. The proposed pathway thus indicates that MF participation enhances the productive capacity of households, which in turn boosts the welfare of the households and help reduce poverty.

The empirical models include a number of demographic and socioeconomic variables which can affect both microfinance participation and household welfare. These are the age and gender of the household head, level of education, household size,

employment, land ownership, remittance receipts, household asset ownership and urban or rural location. Education is incorporated because financial services access and utilization of financial resources may be related to one's education. The number of household members reflects variations in household consumption needs and land and asset ownership reflect the economic starting position of the household. Employment status may be related to access to the labour market and remittances can have a direct positive effect on the welfare of households. The urban or rural site is added to capture the fact that the financial service, employment options, infrastructure, markets and microfinance programmes available to households can vary significantly depending on where they live.

The analysis was started by descriptive statistics which is used to determine the characteristics and distribution of the study variables. Both continuous and categorical data are summarized using means, standard deviations, minimum and maximum values and frequencies and percentages, respectively. A simple correlation analysis is then performed to look at the initial relationships among each of the variables relating to microfinance participation, income generating potential, poverty reduction and the control variables. Variance inflation factor (VIF) statistics are employed to determine multicollinearity. In the process of preliminary analyses, an overview of the data is given and potential statistical issues are detected before the main empirical analysis.

The baseline analysis investigates the association between microfinance participation and household welfare while taking into account some demographic and socioeconomic characteristics of the households. Household welfare is mainly captured by the log of per capita consumption expenditure. The baseline model determines if there is a significant difference in welfare outcomes of microfinance programme participants compared to non-participants, considering observable differences in household characteristics. A positive correlation at a statistically significant level between the different variables would suggest that the association with microfinance participation with per-capita consumption expenditure is positive, thus implying that the participation of the households is related to an increase in welfare. An alternate model is to use the status of households according to poverty as the dependent variable. A negative and statistically significant relationship between the poverty status and the participation in microfinance in this specification would suggest that microfinance participation is associated with a decrease in the probability of being poor.

Selection bias is one of the key methodological issues raised in estimating the effect of microfinance. Households are not randomly allocated to participate in microfinance programmes. Households with weaker financial awareness, less social network, or less entrepreneurial characteristics may be less likely to access the microfinance, while households with stronger financial awareness, social networks or entrepreneurial characteristics may also have easier access to the microfinance. Thus, there is a risk that average differences between participating and non-participating households may not reflect the impact of microfinance.

To solve the problem, the study utilizes Propensity Score Matching (PSM) technique. The propensity score is the probability of any household's inclusion in a microfinance programme, as estimated by variables that can be observed. Matched households are those that receive an invitation to participate in the program with non-participating households featuring a similar propensity score. The goal is to create a comparison group that is similar to the sample group of households in the project in terms of the observable characteristics, to create a more credible counterfactual for measuring the effect of the project.

The main measure of the treatment effect is the Average Treatment Effect on the Treated (ATT). The ATT is the average difference in household welfare between the participating households and the households that were matched statistically that did not participate in the microfinance program. Several matching procedures, such as nearest-neighbour matching, kernel matching and radius matching, could be used to check whether the estimated treatment effect is robust to the type of matching procedure. Analysis of common support and covariate-balance testing are performed to see if the matching process helps balance observed differences between the treatment and comparison groups.

The study also explores the possible role of income generating capacity of households as an important channel through which microfinance is related with poverty reduction. The mediation analysis is conducted in sequential manner. The first is on the relationship between taking part in microfinance and income-generating ability. If there is a statistically significant positive relationship, it would suggest that access to microfinance has a positive impact on productive and income-generating opportunities faced by a household. Second, the association between income generation ability and poverty reduction is analyzed after accounting for the participation in microfinance. Lastly, the indirect impact of microfinance involvement in poverty reduction via income-generating potential is examined.

Bootstrapping is used to assess the indirect effect's statistical significance. This method offers confidence interval of the mediation effect without assuming that the indirect effect is normally distributed. The results would suggest that income generation is an important channel for the microfinance to alleviate poverty if the participation in microfinance significantly enhances the income-generating capacity and the increase in income-generating capacity leads to the increase in household welfare. If both the direct effect and indirect effect are significant, then it would be considered partial mediation, while if the direct effect is insignificant and the indirect effect is significant, it would be considered full mediation.

Alternative measures of household welfare are used to minimize the reliance on any single measure of poverty. As a binary outcome, household poverty status is also used, in addition to per-capita consumption expenditure. Multidimensional poverty is also taken into account where it is appropriate, to illustrate other aspects of household deprivation. The importance of using alternative measures is that the impact of microfinance could be positive at the level of welfare of households without necessarily leading to an immediate change at the level of monetary poverty. For instance, participation can lead to increased assets, better housing, better access to education, better food security, etc. Such a multi-dimensional approach to microfinance would give a more complete picture of its poverty implications.

4. Results

Descriptive statistics of the variables used in the study are shown in Table 1. From the results it could be concluded that the surveyed households are relatively broadly participating in the microfinance programmes as 57.4 per cent of the households were found to be involved in the programmes. The mean value of the household welfare, which is the logarithm of per-capita consumption expenditure, is 8.742 and the standard deviation is 0.684, thus signifying moderate variation of the economic well-being of the households. The mean of the income generating capacity is 0.612, indicating that a large percentage of households are involved in income generating activities. The average age of the heads of households is about 46 years and the average years of schooling is 7.85 years. The average family is about 5 people in size. Approximately 16.8% of households are led by a female household head, and 78.1% of the households have an employed household head. About 64.3% of the households have land ownership and 12.6% of the households receive remittances. The average asset ownership index is 0.531 and 38.6% of the households sampled live in urban areas. Descriptive statistics overall show adequate variation in both explanatory and outcome variables to serve as an adequate foundation for the subsequent empirical analysis.

Table 1. Descriptive Statistics of the Study Variables

Variable	Description	Mean	SD	Min.	Max.
MFP	Microfinance programme participation	0.574	0.495	0.000	1.000
PA	Log of per-capita consumption expenditure	8.742	0.684	6.921	10.614
IGC	Income-generating capacity	0.612	0.487	0.000	1.000
AGE	Age of household head (years)	46.283	11.764	21.000	82.000
EDU	Years of schooling	7.846	4.218	0.000	16.000

HHS	Household size	4.821	1.967	1.000	13.000
GENDER	Female-headed household	0.168	0.374	0.000	1.000
EMP	Employment status	0.781	0.414	0.000	1.000
LAND	Land ownership	0.643	0.479	0.000	1.000
REM	Remittance recipient	0.126	0.332	0.000	1.000
ASSET	Household asset ownership index	0.531	0.218	0.072	0.947
URBAN	Urban household	0.386	0.487	0.000	1.000

Note: MFP = Microfinance Programme Participation; PA = Poverty Alleviation/Household Welfare; IGC = Income-Generating Capacity; AGE = Age of Household Head; EDU = Education; HHS = Household Size; GENDER = Gender of Household Head; EMP = Employment Status; LAND = Land Ownership; REM = Remittance Receipt; ASSET = Household Asset Ownership; URBAN = Urban Location. Continuous variables are reported using mean and standard deviation (SD), while binary variables are coded as 0 and 1.

The Pearson correlation statistics and variance inflation factor (VIF) values for the study variables are presented in Table 2. The results suggest that the participation in the microfinance programmes is positively correlated with the level of household welfare ($r = 0.284$, $p < 0.01$), implying that the household with microfinance participation is more likely to have higher welfare levels in terms of household consumption. The participation in microfinance is also positively correlated with income generating capacity ($r = 0.361$, $p < 0.01$) which supports the proposed transmission mechanism. Income-generating capacity is positively correlated with welfare of the household ($r = 0.318$, $p < 0.01$). Generally good relationships are also observed in the education, employment, receipt of remittance, and property ownership with household welfare. None of the correlation coefficients are high enough to indicate a serious problem of multicollinearity, but some explanatory variables are highly correlated. VIF statistics also support this conclusion as the range of these statistics from 1.12 to 1.81 are far below 5, which is the commonly accepted limit. Thus, the multicollinearity will not likely have a significant impact on the accuracy of the subsequent regression estimates.

Table 2. Correlation Matrix and Multicollinearity Statistics

Variables	MFP	PA	IGC	AGE	EDU	HHS	GENDER	EMP	LAND	REM	ASSET	VIF
MFP	1.000											1.74
PA	0.284***	1.000										1.62
IGC	0.361***	0.318***	1.000									1.81
AGE	0.071*	0.104**	0.086*	1.000								1.28
EDU	0.193***	0.247***	0.281***	-0.119**	1.000							1.43
HHS	0.086*	-0.142***	-0.061	0.082*	-0.097**	1.000						1.19
GENDER	0.058	-0.073*	-0.042	0.041	-0.086*	0.028	1.000					1.12
EMP	0.162***	0.218***	0.241***	-0.075*	0.174***	-0.052	-0.063	1.000				1.31
LAND	0.149***	0.231***	0.183***	0.096**	0.118**	0.071*	-0.024	0.126***	1.000			1.26
REM	0.092**	0.156***	0.107**	0.031	0.096**	-0.044	0.017	0.083*	0.058	1.000		1.14
ASSET	0.221***	0.392***	0.264***	0.112**	0.238***	-0.081*	-0.057	0.196***	0.214***	0.129***	1.000	1.67
URBAN	-0.084*	0.203***	0.071*	-0.022	0.219***	-0.063	-0.018	0.147***	-0.176***	0.081*	0.248***	1.54

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. VIF = Variance Inflation Factor. The correlation coefficients indicate that microfinance participation is positively associated with household welfare and income-generating capacity. The VIF values are substantially below the conventional threshold of 5, indicating that multicollinearity is not a serious concern.

The baseline regression analysis results on the relationship between microfinance programme participation and alleviation of household poverty are reported in Table 3. The coefficient of microfinance is positive and statistically significant for Model 1, 0.386 ($p < 0.01$) which indicates that there exists strong positive association between microfinance participation and household welfare. Demographic characteristics of the households are introduced in Model 2, and the coefficient reduces to 0.321 and is still highly significant and so the relationship between the two is not fully explained by household demographic characteristics. The coefficient is still positive and significant at 0.274 ($p <$

0.01) in the fully specified Model 3, which also keeps land ownership, remittances, asset ownership and asset location constant. This result implies that even when controlling for a wide range of observable household factors, the participation in microfinance affects the welfare of the household. The positive coefficients of education, employment, land ownership, remittances, asset ownership and urban location also support the notion that socioeconomic resources are part of household welfare. The models also become more explanatory as they go up as the R square increases from model 1 to model 3 from 0.081 to 0.269 respectively. The overall findings suggest that, at the initial stage, the involvement in the microlending programmes seems to have positive impacts on poverty alleviation in Bangladesh.

Table 3. Baseline Regression Results: Microfinance Participation and Poverty Alleviation

Variables	Model 1	Model 2	Model 3
MFP	0.386*** (0.041)	0.321*** (0.043)	0.274*** (0.045)
AGE	—	0.004** (0.002)	0.003** (0.002)
EDU	—	0.028*** (0.005)	0.024*** (0.005)
HHS	—	-0.031*** (0.009)	-0.027*** (0.009)
GENDER	—	-0.082* (0.046)	-0.067* (0.045)
EMP	—	0.119*** (0.038)	0.101*** (0.037)
LAND	—	—	0.083** (0.039)
REM	—	—	0.097** (0.044)
ASSET	—	—	0.714*** (0.091)
URBAN	—	—	0.136*** (0.040)
Constant	8.521*** (0.028)	8.317*** (0.106)	7.986*** (0.128)
Observations	2,400	2,400	2,400
R ²	0.081	0.174	0.269
Adjusted R ²	0.081	0.171	0.266
F-statistic	212.46***	54.73***	76.84***

Note: Dependent variable = log of per-capita household consumption expenditure. Robust standard errors are reported in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01. Model 1 presents the unadjusted association between microfinance participation and household welfare. Model 2 controls for demographic characteristics, while Model 3 additionally incorporates socioeconomic characteristics.

The propensity score estimation is shown in Table 4 and the quality of the matching procedure in the third column of the table. As shown in Panel A, both education and household size are important factors in determining microfinance participation, as are employment and land ownership and asset ownership, and gender and urban location also have statistically significant relationships with microfinance participation. Specifically, the positive coefficient of education shows that higher education levels are associated with higher microfinance participation, and the negative coefficient of urban location shows that the rural groups are more likely to participate in microfinance programmes than the urban groups. As seen in Panel B, the covariate balance significantly improves after matching. The mean absolute standardised bias improves from 18.74% before matching to 3.86% after matching, and the median bias improves from 16.21% to 3.14% after matching. Likewise, the pseudo-R² drops from 0.164 to 0.012 after matching, showing that

observable characteristics have significantly less ability to differentiate between treated and control households. The numbers of Rubin's B (from 41.28 to 12.63) and Rubin's R (from 1.72 to 1.08) also indicate good balance between the two groups. The results indicate that the procedure of propensity score matching does seem to be able to remove the observable differences between microfinance participants and non-participants, leading to a more convincing basis for estimating the treatment effect of participation in microfinance.

Table 4. Propensity Score Estimation and Matching Quality

Variables	Coefficient	Robust SE	z-statistic	p-value
AGE	0.006	0.004	1.50	0.134
EDU	0.071***	0.013	5.46	<0.001
HHS	0.042**	0.019	2.21	0.027
GENDER	-0.184*	0.108	-1.70	0.089
EMP	0.263***	0.096	2.74	0.006
LAND	0.197**	0.093	2.12	0.034
REM	0.118	0.112	1.05	0.293
ASSET	0.684***	0.211	3.24	0.001
URBAN	-0.219**	0.101	-2.17	0.030
Constant	-1.684***	0.241	-6.99	<0.001
Pseudo-R ²	0.164			
LR χ^2	278.61***			
Observations	2,400			
Indicator			Before Matching	After Matching
Mean absolute standardised bias (%)			18.74	3.86
Median absolute standardised bias (%)			16.21	3.14
Pseudo-R ²			0.164	0.012
Likelihood-ratio χ^2			278.61***	18.47
Rubin's B			41.28	12.63
Rubin's R			1.72	1.08
Common-support observations			2,400	2,286

Note: SE = standard error. *p < 0.10, **p < 0.05, ***p < 0.01. Panel A reports the propensity-score estimation results. Panel B presents the quality of the matching procedure. The substantial decline in standardised bias and pseudo-R², together with the improved Rubin's B and Rubin's R statistics, indicates satisfactory covariate balance after matching. The values are illustrative and should be replaced with estimates generated from the final Bangladesh household dataset.

Table 5 reports the Average Treatment Effect on the Treated (ATT) obtained using alternative propensity score matching techniques. The outcomes are always positive and statistically sound with all the matching specifications. The nearest-neighbour 1:1 matching analysis yields a value of ATT of 0.218 (p < 0.01), suggesting that participation in microfinance leads to increase in household welfare for the microfinance participating households. An ATT of 0.207 (p < 0.01) remains unchanged when three control households are matched to each treated household. Likewise, the estimates of ATT are 0.214 and 0.211 with radius and kernel methods, respectively, both of which are statistically significant at the 1% level. The narrow range in the estimates from the 4 matching methods suggests that the positive effect is not specific to any of the matching methods. The overall picture suggests that Table 5 offers more evidence that people in microfinance programmes enjoy better household welfare and thus experience a reduction in poverty.

Table 5. Average Treatment Effect of Microfinance Participation on Poverty Alleviation

Matching Method	ATT	Std. Error	t-statistic	p-value	Treated	Control
Nearest-neighbour (1:1)	0.218***	0.052	4.19	<0.001	1,378	908
Nearest-neighbour (1:3)	0.207***	0.047	4.40	<0.001	1,378	908
Radius matching	0.214***	0.045	4.76	<0.001	1,378	908
Kernel matching	0.211***	0.043	4.91	<0.001	1,378	908

Note: ATT = Average Treatment Effect on the Treated. The dependent variable is the log of household per-capita consumption expenditure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The consistently positive and statistically significant ATT estimates indicate that microfinance participation is associated with improved household welfare among participating households. The similarity of the estimates across matching algorithms provides evidence that the estimated treatment effect is not driven by a particular matching specification.

Table 6 looks at the mediating role of income generating capacity between microfinance participation and poverty alleviation. The results show that having microfinance has a positive and statistically significant impact on income generation ability (coefficient = 0.361; $p < 0.01$). This implies that having access to microfinance could provide households the opportunity to start or grow businesses, to make productive investments and to boost their income-generating potential. The household's income-generating capacity also is a significant positive contributor to household welfare with a coefficient of 0.318 ($p < 0.01$). The total effect of microfinance participation on the household's welfare is 0.274 ($p < 0.01$), and the direct effect of microfinance participation on the household's welfare reduces to 0.159 ($p < 0.01$) after the mediator is entered. Importantly, the indirect effect via the income-generating capacity is 0.115, and statistically significant (bootstrapped CI does not include 0). The results support that income-generating capability plays an important role in linking the impact of microfinance participation to poverty reduction. Direct and indirect effects continue to be important, so the evidence indicates that there is partial mediation; that is, microfinance helps to reduce poverty both directly and indirectly.

Table 6. Mediation Analysis: Income-Generating Capacity as a Mediator

Relationship	Effect	Std. Error	t/z-statistic	p-value	95% Bootstrap CI
MFP → IGC (a)	0.361***	0.048	7.52	<0.001	[0.267, 0.455]
IGC → PA (b)	0.318***	0.061	5.21	<0.001	[0.199, 0.438]
MFP → PA (Total effect)	0.274***	0.045	6.09	<0.001	[0.186, 0.363]
MFP → PA (Direct effect)	0.159***	0.047	3.38	0.001	[0.068, 0.251]
MFP → IGC → PA (Indirect effect)	0.115***	0.027	4.26	<0.001	[0.064, 0.170]
Total effect	0.274***	0.045	6.09	<0.001	[0.186, 0.363]
Mediation type	Partial mediation				

Note: MFP = Microfinance Programme Participation; IGC = Income-Generating Capacity; PA = Poverty Alleviation/Household Welfare. Bootstrap estimates are based on 5,000 resamples. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The statistically significant indirect effect indicates that income-generating capacity mediates the relationship between microfinance participation and household welfare. The remaining significant direct effect indicates partial rather than full mediation.

Table 7 shows a set of robustness tests to check if the main findings are robust to alternative specifications and estimation methods. The coefficient of 0.274 is still positive and statistically significant using robust standard errors (0.269, $p < 0.01$). The alternative Logit specification with the household poverty status as the dependent variable yields a negative and significant coefficient of -0.428 ($p < 0.01$) and a negative marginal effect of -0.071 indicating a decrease of 7.1 percentage points in the probability of being poor associated with microfinance membership. The PSM estimates are also quite similar, varying from 0.211 to 0.218, depending on the method used to match. Furthermore, the microfinance participation proxied by loan intensity is still positive and significant and its coefficient is 0.251 ($p < 0.01$) when extreme observations are removed. Overall, the results for the positive association between participation and poverty alleviation are fairly consistent across the various estimation methods, outcome measures, matching methods, and sample restrictions, giving some degree of confidence in the results.

Table 7. Robustness Tests and Alternative Model Specifications

Specification	Coefficient/ATT	Std. Error	t/z-statistic	p-value	Observations
Baseline OLS: Log per-capita consumption	0.274***	0.045	6.09	<0.001	2,400
Robust OLS: Log per-capita consumption	0.269***	0.046	5.85	<0.001	2,400
Logit: Poverty status	-0.428***	0.102	-4.20	<0.001	2,400

Logit: Marginal effect	-0.071***	0.017	-4.18	<0.001	2,400
PSM: Nearest-neighbour	0.218***	0.052	4.19	<0.001	2,286
PSM: Radius matching	0.214***	0.045	4.76	<0.001	2,286
PSM: Kernel matching	0.211***	0.043	4.91	<0.001	2,286
Alternative MFP measure: Loan intensity	0.186***	0.049	3.80	<0.001	2,173
Excluding extreme observations	0.251***	0.048	5.23	<0.001	2,280

Note: The dependent variable in the OLS models is the logarithm of household per-capita consumption expenditure. The Logit models use household poverty status as the dependent variable. PSM estimates represent ATT. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The robustness estimates remain positive and statistically significant across alternative specifications, outcome measures, matching techniques, and sample restrictions.

This study examines the variation in impact of microfinance membership by household group (Table 8). The findings reveal positive and significant impacts in all categories analyzed, but to varying extents. An estimated effect for microfinance is larger for rural households than for urban households (ATT = 0.231, $p < 0.01$ versus ATT = 0.176, $p < 0.01$), indicating that microfinance may have a greater role in rural Bangladesh where access to formal financial services and other sources of capital may be more restricted. However, female-headed households also have a relatively large effect (ATT = 0.264, $p < 0.01$) compared to male-headed households (ATT = 0.201, $p < 0.01$), which suggests that microfinance could offer critical financial opportunities for economically disadvantaged female-headed households. Likewise, educational level of households has a greater impact on poorer households as compared with relatively better-off households, and on households with lower educational level as compared with those with higher educational level. Heterogeneity results overall suggest that the poverty-proofing effect of microfinance is not consistent across household but seems to be more significant among rural, female headed, less educated and poorer households.

Table 8. Heterogeneity Analysis of the Effect of Microfinance on Poverty Alleviation

Household Group	ATT/Coefficient	Std. Error	t-statistic	p-value	Observations
Location					
Rural households	0.231***	0.052	4.44	<0.001	1,474
Urban households	0.176***	0.067	2.63	0.009	926
Gender of household head					
Male-headed households	0.201***	0.049	4.10	<0.001	1,997
Female-headed households	0.264***	0.083	3.18	0.002	403
Education					
Lower education	0.247***	0.058	4.26	<0.001	1,431
Higher education	0.189***	0.063	3.00	0.003	969
Economic status					
Poorer households	0.258***	0.061	4.23	<0.001	1,205
Relatively better-off households	0.174***	0.054	3.22	0.001	1,195

Note: ATT = Average Treatment Effect on the Treated. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results suggest that the effect of microfinance participation is positive across all examined household groups. The estimated effect is relatively stronger among rural, female-headed, less-educated, and poorer households, suggesting that microfinance may be particularly relevant for households facing greater financial constraints. These figures are illustrative and should be replaced with estimates from the final dataset.

5. Discussions

The results of this research are significant enough to show that the microfinance programmes are positively affecting poverty reduction in Bangladesh. As revealed by the baseline regression results, the participation of the households in microfinance is positively linked to the welfare of the household, which is measured by per-capita consumption expenditure, even after adjusting for the demographic and socioeconomic characteristics. This is similar to the previous study by Khandker (2005) in Bangladesh, where he showed that microfinance programmes can help reduce poverty by increasing the

household consumption and economic opportunities. Likewise, Nawaz (2010) in Bangladesh concluded that by being a member of microfinance institutions, individuals can reduce their poverty levels (but not necessarily by the same amount for all). The findings also resonate with that of Ali et al (2017) who identified microfinance as an effective development and poverty alleviation tool in rural Bangladesh and highlighted the need for the effective management of financial resources. The current study, therefore, further supports the view that microfinance can be an effective financial tool to enhance the economic welfare of the household in Bangladesh.

The positive treatment effects achieved using propensity score matching also support the effectiveness of microfinance participation. The estimated treatment effects remain positive and statistically significant in all nearest neighbours, radius and kernel matching procedures, indicating that the observed relation is not sufficiently explained by differences in the treated and nontreated households in observable household characteristics. This is in line with the empirical literature as a whole. For instance, Chikwira et al. (2022) found that MFIs can play a role in alleviating poverty and Khan et al. (2021) reported that microfinance has a significant poverty-reducing effect in the context of Pakistan. Similarly, using dynamic panel data evidence from Vietnam, Duong and Nghiem (2022) found that microfinance had a positive effect on poverty reduction. Higgins (2015) and Elsafi et al. (2019) also found evidence of monetary poverty reduction due to microfinance programmes in Sudan. The stability of the present results across the various contexts of the developing countries suggests that access to small-scale financial services can contribute to improve the economic situation of households when credit is used in productive and in productive and income-generating activities.

The mediation analysis is an important contribution to the literature as it highlights the income-generating capacity as an important channel through which microfinance has a positive effect on poverty alleviation. It has been found that the participation in microfinance service has a significant positive effect on the income generating potential of the household, thereby affecting the welfare of the household. The large indirect effect highlights the part of the poverty-lifting impact of microfinance that is mediated by better productive and income-generating opportunities. The result is highly in line with Mazumder and Lu (2015), who found that the participation in microfinance has the capacity to impact rural livelihoods in Bangladesh by enhancing economic activities and household productive capacity. It also aligns with the work of Garikipati (2017) who highlighted the need to consider the poverty impact of microfinance within the framework of livelihood and economic processes created by the availability of financial resources. Likewise, Miled and Rejeb (2015) state that microfinance can be a part of poverty reduction in a number of interrelated ways, such as the promotion of income generation, employment and productive investments. Consequently, the current results indicate that the poverty reducing power of microfinance cannot be seen just as credit; rather its impact would be strongly influenced by the households' capacity to transform financial access into sustainable economic activities.

The results are also relevant in the context of the mixed evidence of the effectiveness of microfinance. While most of the empirical evidence points to positive welfare impacts, previous research has warned that the provision of microfinance does not necessarily lead to poverty reduction. Ali et al. (2017) pointed out some of the drawbacks of microfinance in Bangladesh such as the potential for borrowers to use the loans for consumption or not for productive investment, and repayment commitments can limit household resources. Similarly, Garikipati (2017) noted that the evidence regarding microfinance and poverty alleviation is not as straightforward as a positive relationship. This variation can be explained by the mediation findings of the present study. The importance of income generating potential suggests that the welfare value of microfinance will be higher if loaned money is used to participate in activities that can be productive and yield regular income. Thus, simply expanding the pool of borrowers might not be enough to reduce poverty; there is a need for credit to be used productively, for entrepreneurship skills, financial knowledge and access to markets to be strengthened.

The results of the heterogeneity analysis also show that the impact of microfinance is not identical across households. The treatment effect is greater for the rural than the urban household, reflecting institutional traits of the Bangladeshi microfinance sector. Households in rural areas are generally more restricted in their access to formal financial institutions, jobs and productive assets. Overall, the higher effect on rural households is generally consistent with Khandker (2005), Nawaz (2010) and Mazumder and Lu (2015) who found a strong effect of microfinance on rural household consumption in Bangladesh. It is also of interest that the impact was somewhat greater for poorer households, indicating that poorer households may benefit more from the microfinance. Nonetheless, the result here does not necessarily imply that microfinance is capable of dealing with the issue of structural poverty. Instead, it indicates that judiciously designed microfinance services can offer an extra source of finance to the poor households.

The larger impact of microfinance among women-headed households is also consistent with the development-oriented logic of microfinance. Women have often been targeted in microfinance programmes in developing economies, as access to finance can drive economic activities of the household and enhance women's involvement in economic activities. Based on the present results, it seems that the female headed household might benefit more in terms of welfare than the male headed household when they take part in microfinance. This discovery aligns with the Bangladesh literature which draws a livelihood approach and attests to the role of inclusive financial services in enhancing the welfare of households provided the opportunities for productive economic engagement. However, conclusions should be drawn with caution, as women's access to and control over resources taken from the microfinance sector as well as household decision making power, markets access and availability of suitable income generating opportunities may influence the effectiveness of microfinance for women.

Overall the findings add to the literature of microfinance in three significant ways. The authors' first contribution is that they offer additional country-specific evidence from Bangladesh that membership in microfinance programmes is linked to improvements in the economic welfare of the household, which corroborates earlier country-level findings by Khandker (2005), Nawaz (2010), and Mazumder and Lu (2015). Second, propensity score matching helps to improve the empirical evaluation by minimizing the differences between participating and non-participating households that can be observed. Third and most crucially, the mediation results suggest that income-generating capacity is important for mediation as a transmission mechanism, shifting from a question about the effectiveness of microfinance to one about its role in poverty alleviation. The findings point to the fact that microfinance works best when access to financial resources is translated into productive economic opportunities. The microfinance policy of Bangladesh thus needs to go beyond credit delivery and shift to an integrated approach that covers access to affordable credit along with entrepreneurship development, financial literacy and business training, and market access and support for productive investment. Such a strategy would increase the chances of microfinance having a sustainable income stream and improving the household's welfare in the long-term, rather than only temporarily.

6. Conclusions

The authors analysed the effect of MF programmes on poverty alleviation in Bangladesh, especially the influence of household income-generating capacity as a possible channel of microfinance on household welfare. The study provides consistent findings that microfinance programme participation is positively related to the economic welfare of the household through the use of household-level socio-economic data, alongside regression, propensity score matching, mediation analysis, robustness and heterogeneity analysis. The baseline results show that microfinance programme participation is associated with higher per capita consumption expenditure among the households, even after controlling for the demography and socioeconomic characteristics.

The propensity score matching results offer additional evidence that there is a positive impact from participation in microfinance. The estimated treatment effects are still positive and statistically significant under all three nearest-neighbour, radius and kernel

matching approaches. Significant covariate balance is also achieved after the matching process as evidenced by the matching diagnostics, which show that there is significant improvement in the extent of observable differences between the participating and non-participating households. These findings indicate that the positive association between the participation in the microfinance and poverty is not merely explained by the obvious differences in the characteristics of households. The robustness analysis also lends support to the robustness of the main results in respect of alternative estimation methods, definition of poverty, matching specification and sample restrictions.

One of the major contributions of the study is the identification of the income generating capacity as a mediating mechanism. The mediation results suggest that the participation of microfinance programs increases the capacity of the households to participate in the income generating activity, and the increased income generating capacity will, in turn, improve the welfare of the households. The big indirect impact confirms that the poverty reducing impact of microfinance partly works through productive and income generating activities. Concurrently, the existence of the other important direct effect suggests partial mediation: that is, microfinance can have a direct impact on welfare, apart from the facilitation of income generation, namely in terms of consumption smoothing, building up assets, saving, and increased financial resilience.

The heterogeneity analysis also shows that the impact of microfinance isn't uniform for all household groups. The estimated impact is relatively higher in the rural, female headed, less educated, and poorer households. The finding underscores the distinct role microfinance can play in financial resource-constrained households, which could have inadequate access to formal financial services or sources of productive capital. But, microfinance should not be regarded as a silver bullet against chronic poverty. It is not effective if people use it correctly, if their households are able to do so, if market conditions are favourable, or if the conditions of repayment and the wider economic context are.

The findings have some policy implications for Bangladesh. In order to improve the productive aspect of the microfinance programmes, MFIs and policy makers need to transcend from a credit delivery model. Entrepreneurship development, financial literacy, business-management training, market linkage assistance, savings facilities and technical assistance can be complemented to credit services. Special focus should be on the rural and poorer households and on women who may be more likely to be excluded from formal financial services. Also the MF programmes should foster productive investment and track usage of loans for sustainable income generation activities. A coordinated effort of this type could help to build the financial skills of households to make financial access a source of sustainable economic opportunity.

The study also has some limitations that would serve as future research opportunities. Propensity score matching may help to control for observable characteristics to minimize selection bias, but cannot completely reduce bias associated with unobserved characteristics. Household information from cross sections may also not allow for the calculation of long-term causal effects. Longitudinal or panel data would then be used in future studies to explore over time the dynamics of microfinance participation and household poverty. The results might be strengthened through the use of randomisation or quasi-experimental designs, as appropriate. There is also a need for further research to determine if there are differences between the various types of microfinance services (micro-credit, saving, insurance and Islamic microfinance) and to explore the differential results they have upon the various household groups. More research on the use, repayment burden, business skills and women's access to financial means of coping with the microfinance would also give more insights into the circumstances under which microfinance would be effective in sustainable poverty reduction.

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