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Microcredit and poverty reduction in Bangladesh: average effects beyond publication bias

SEFA AWAWORYI CHURCHILL, JEFFREY KORANKYE DANSO, and SAMUELSON APPAU

We review the empirical evidence on the impact of microcredit on poverty in Bangladesh. Drawing on evidence from eight empirical studies with 221 estimates, we examine the impact of microcredit on three proxies of poverty – income, assets, and consumption/expenditure. After addressing issues of publication selection bias, we find that the effect of microcredit on assets and income is statistically not significant. Evidence shows a positive but weak effect of microcredit on consumption/expenditure. Meta-regression analysis reveals that sources of variations in the existing literature such as study design, data characteristics and empirical methodology can explain the differences in reported estimates.

Keywords: Microfinance, Poverty, Bangladesh, Meta-analysis, Systematic Review
JEL Codes: G21, I32, I38

Introduction

The concept of microfinance has existed for centuries and can be traced back to the time of indigenous Rotating Savings and Credit Associations (ROSCAs), money-lenders, and local co-operatives (Armendariz de Aghion & Morduch, 2005). However, the emergence of the modern version of microfinance as it is known today is usually credited to Bangladesh's Mohammed Yunus, who in the 1970s started offering small loans to basket-weavers and bamboo furniture makers in rural Bangladesh to help them with their businesses. Yunus continued to give out these loans for nearly a decade, before forming the well-known Grameen Bank in 1983, with the aim of reaching out to a wider group of people.

With the emergence of the so-called microfinance revolution, Bangladesh is seen as a pioneer in the industry and is the home of several microfinance institutions (MFIs)

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and extensive microfinance operations throughout the world (Khandker, 2005). While the industry in Bangladesh has received much praise in terms of poverty reduction, others remain sceptical about the positive impact of microfinance. Thus, donors (both prospective and current), government agencies, policymakers, and stakeholders are all very interested in understanding what works and what does not in microfinance, hence the need for greater evidence to ascertain what the impacts of microfinance interventions are. Recent systematic reviews such as Duvendack et al. (2011), Stewart et al. (2010) and van Rooyen et al. (2012) conducted non-empirical syntheses of the existing literature on the impact of microfinance, and conclusions from these studies suggest no meaningful impact of microfinance.

In this study, we focus mainly on Bangladesh and examine if findings from an empirical synthesis would corroborate the findings from the existing systematic reviews. We focus on Bangladesh because it is the home of modern microfinance, and has benefited from several microfinance-related endowments. While several reports suggest a positive effect of microcredit, with the likelihood of publication bias it is important to know whether or not the impact of microcredit on poverty in Bangladesh is truly positive. Publication selection bias occurs when researchers, editors, and reviewers are predisposed to select only statistically significant results that are consistent with their existing theory. It has been established that publication selection bias is a threat to empirical economics (Stanley, 2008).

Subsequent studies such as those conducted by Card and Krueger (1995), Abreu et al. (2005), Doucouliagos (2005), and Stanley (2008) all raise concerns about publication bias. With regards to microfinance, this bias can actually extend to the predisposition to reject studies that report negatively on the impacts of microfinance interventions.

In addition, the problem of heterogeneity across studies makes it difficult to come to a general conclusion about the effects of microcredit on poverty. In this study, we consider three proxies for poverty in the existing literature – income, assets, and consumption/expenditure – and present a statistical approach to dealing with the issues of heterogeneity. We also address issues of publication bias, and examine whether genuine effect exists in the case of microcredit and poverty in Bangladesh. First, we provide fixed effect estimates of the weighted mean effects of the impact of microcredit on poverty, which provide an understanding into the overall evidence base that exists. Second, we conduct precision effect tests (PETs) and funnel asymmetry tests (FATs) to help determine a verifiable and reliable summary measure of the genuine effects of microcredit on poverty beyond publication bias, and towards a more informed evidence-based policymaking. Lastly, with a meta-regression analysis (MRA) that includes various moderating variables we examine the potential sources of variations in the literature.

Microfinance impact assessments – an overview

Most theories underlying the impact of microfinance assume that microfinance clients are operators of income-generating activities that are constrained by lack of capital or high marginal cost. Thus it is believed that access to 'cheap' capital will ease this constraint and allow for an increase in income and profit (de Mel et al.,

2008; Duvendack et al., 2011). This assumption is the fundamental basis on which positive effects of microfinance are argued.

The possibility of microfinance having negative effects has also been argued. For instance, Kabeer (2005) argues that credit can affect various indicators and that a general positive effect of microfinance cannot be assumed. Thus, a priori, microfinance can either have a negative or positive effect.

Owing to several potential biases, evaluating the impact of microfinance is known to be a very challenging task. Tedeschi (2008), for instance, presents several potential biases that may arise in microfinance impact assessments and suggests possible ways of controlling for such biases.

In an attempt to minimize potential bias in impact assessments, most studies resort to analysing how clients of microfinance institutions (MFIs) would have performed in the absence of microcredit or, alternatively, how non-clients would perform assuming they had access to microcredit (Berhane & Gardebroek, 2011). Most outcomes that researchers attempt to measure are based on 'unobservable variables' making it difficult to control for relevant variables empirically. Nonetheless, evidence presented in the recent literature (see, e.g., Armendariz de Aghion & Morduch, 2005; Morduch, 2005; Tedeschi, 2010; Tedeschi, 2008; Tedeschi & Karlan, 2010) suggest that such problems have been overcome, with most of the emerging impact studies making use of the control and treatment group approach.

Another strand of the existing literature makes use of quasi-experimental techniques and also cross-sectional data while employing instruments to deal with potential selection problems (see Pitt and Khandker, 1998) while some adopt a randomized experimental approach (see, e.g., Karlan and Zinman, 2007; Banerjee et al., 2009; Karlan et al., 2009; Feigenberg et al., 2010). However, these approaches have their own limitations (see Berhane & Gardebroek, 2011 for some discussions along these lines). A number of the impact assessments, such as Khandker (2005), Copestake et al. (2001), Berhane and Gardebroek (2011), Xia et al. (2011) and Imai and Azam (2012), make use of panel data in order to account for individual heterogeneity and control for unobservable variables.

Overall, studies that have examined the impact of microfinance interventions are mainly non-academic evaluations sanctioned by MFIs themselves and are usually descriptive in nature and, to a large extent, suffer from the problem of selection bias. For instance, literature reviews conducted by Chen (1992) and Sebstad and Chen (1996) reviewed several studies which examine the impact of microcredit; however, none of these studies corrected for selection bias. In addition, another problem with MFI-commissioned evaluations is that they may suffer from 'researcher allegiance', which may compel researchers to produce results that conform to commissioner interests.

Microfinance and poverty in Bangladesh – an overview

Spurred by the growth of the microfinance industry in Bangladesh, a significant number of studies have emerged (both empirical and non-empirical) that examine the impact of microfinance in Bangladesh. A number of these studies (see, e.g., Chemin,

2008; Pitt & Khandker, 1998) have been subject to various criticisms. However, we do not discuss these criticisms but rather focus on the results presented by these studies.

Despite the slight differences in case studies and methodologies used, the literature about the impact of microfinance on poverty in Bangladesh points to several specific conclusions. Various outcome measures or indicators for measuring poverty have emerged, and coupled with the variety of methodologies used from one study to another, the impact of microfinance on poverty is highly debatable. Some of the proxies used in the literature to measure poverty include income levels, assets, and consumption/expenditure, and a few studies that have developed indices for poverty. In what follows, we briefly discuss these proxies and the studies that adopted them.

Using assets, consumption, and expenditure as a proxy for poverty can be misleading if the dataset used in the analysis does not cover a sufficiently long period. The underlying logic is that after MFIs provide microloans, borrowers can spread out these loans over a short period of time for consumption or for the purchase of new items. In this case in the short run there is an increase in the consumption/expenditure level of borrowers, but in the long run there is a significant decline. On the other hand some borrowers put their loans into productive use, and as their income levels increase there is a corresponding increase in assets, consumption, and expenditure. Studies such as Pitt and Khandker (1998), Khandker (2005), Hoque (2004), Chemin (2008), and Imai and Azam (2012) examine the impact of microfinance on at least one of these proxies.

Pitt and Khandker (1998) found that microcredit has a very significant positive impact on consumption, but mainly for female borrowers. Subsequent studies such as Khandker (2005), Berhane and Gardebroek (2011), and Imai and Azam (2012) present evidence supporting the positive effect of microfinance on consumption. Similarly, using expenditure per capita as a proxy for poverty, Chemin (2008) found that microfinance had a positive impact on expenditure per capita as well as supply of labour. On the other hand, Hoque (2004) indicates that the effects of microfinance on consumption is insignificant.

Meta-analysis

Data

The data used in this study is empirical results retrieved from existing studies that have been included in our study. Our review draws on guidelines proposed by the Meta-Analysis of Economics Research Network (MAER-NET), which reflect transparency and best practices in meta-analyses (see Stanley et al., 2013).

The primary criteria used in study selection focus on determining whether or not studies are (a) empirical and (b) examine the impact of microcredit on poverty in Bangladesh. For a study to be included in this meta-analysis, it had to be an empirical study focused on Bangladesh and report on the effects of microcredit on any of our three proxies of poverty (income, assets, and consumption/expenditure). We found eight studies that met these criteria. We extracted and coded relevant estimates alongside study characteristics, and these are later discussed in our meta-regression section.

Fixed effects estimates (FEEs)

To allow for comparability of studies and estimates, we first calculate partial correlation coefficients (PCCs) that measure the association between microcredit and our outcome variables. PCCs are used because they are comparable across different studies as they are independent of the metrics used in measuring both the dependent and explanatory variables (Ugur, 2014). PCCs are based on regression coefficients and thus may be flawed, particularly when primary studies from which they are drawn do not control for all relevant covariates. In fact, if regression models in primary studies are mis-specified, PCCs will be biased as they will have been drawn from regression coefficients associated with mis-specified models. Nonetheless, this limitation does not make PCCs irrelevant. Elasticities are viable alternatives to the use of PCCs but primary studies do not report all relevant information to allow for the calculation of elasticities. As a result, PCCs are mostly used in meta-analysis (see, e.g., Alptekin and Levine, 2012; Ugur, 2014).

The PCC for each effect estimate is calculated as follows:

$$r_i = \frac{t_i}{\sqrt{t_i^2 + df_i}} \tag{1}$$

Similarly, the standard error of the above coefficient is calculated as

$$SE_{ri} = \sqrt{\frac{1 - r_i^2}{df_i}} \tag{2}$$

where r_i and SE_{ri} represent the PCC and the standard error of the PCC respectively. The standard error represents the variance which is attributed to sampling error and it is used in the calculation of the fixed effects estimates (FEEs) for the study-based weighted means. t_i represents the t-statistic which is associated with the given effect-size estimate, and df_i is the degrees of freedom that corresponds with the estimates as reported in the studies.

We calculate FEEs for the reported estimates. In this study, we take FEEs as a reliable overview of the evidence base on the association between microcredit and the various outcome variables. FEEs are less affected by publication selection bias compared to random effects weighted averages (see, e.g., Henmi and Copas, 2010; Stanley, 2008; Stanley and Doucouliagos, 2014). We calculate FEEs using equation (3) below.

$$\bar{X}_{FEE} = \frac{\sum r_i \left(\frac{1}{SE_{ri}^2} \right)}{\sum \frac{1}{SE_{ri}^2}} \tag{3}$$

Where $\bar{X}_{FEE}$ is the fixed effect estimate weighted mean, and r_i and SE_{ri} remain as they are above. The FEEs account for the within-study variations by distributing weights, such that estimates that are less precise are assigned lower weights, while higher weights are assigned to more precise estimates. Thus, they are more reliable compared to the simple means. On a study-by-study basis, the use of the FEEs, which can also be referred to as the study-specific weighted means, provide relevant

information for understanding the differences and similarities between the findings that have been reported by the original studies.

Table 1 presents an overview of studies included in this meta-analysis alongside their simple and fixed effect weighted means. Three studies with a total of 30 estimates report on the association between microcredit and income. Of the three studies, one study with 13 estimates (43.33% of total estimates) presents a weighted average that is statistically not significant, while the remaining two studies with 17 estimates (56.67% of total estimates) present a positive and significant weighted average. The overall weighted average for the studies combined is given as 0.0165.

Seven studies with a total of 150 estimates report on the association between microcredit and consumption/expenditure in Bangladesh. Of the seven studies, four studies with a total of 113 estimates (75.33% of total estimates) present weighted averages that are positive but statistically not significant. The remaining three studies with 37 estimates (24.67 of total estimates) present positive and statistically significant weighted averages. The net weighted average for all six studies is given as 0.0165.

Lastly, three studies with a total of 41 estimates report on the association between microcredit and assets. Here, all three studies present positive and statistically

Table 1 Overview of evidence base per study – simple and fixed effect weighted means

Study	*No. of estimates*	*Simple mean*	*Weighted mean (FE)*	*Significance*	*Confidence interval*
Income					
Imai and Azam (2012)	13	0.0097	0.0076	No	(–0.0060, 0.0212)
Islam (2011)	12	0.0458	0.0465	Yes	(0.0290, 0.0639)
Rahman et al. (2011)	5	0.1649	0.1624	Yes	(0.1045, 0.2203)
	30	***0.0499***	***0.0165***		
Consumption/expenditure					
Alam (2012)	77	0.0081	0.0081	No	(–0.0013, 0.0176)
Hoque (2004)	6	0.0199	0.0201	No	(–0.0512, 0.0913)
Imai and Azam (2012)	9	0.0259	0.0230	Yes	(0.0115, 0.0346)
Islam (2009)	18	0.0141	0.0054	No	(–0.0095, 0.0202)
Islam (2011)	12	0.0394	0.0476	No	(–0.0107, 0.1059)
Pitt and Khandker (1998)	24	0.0239	0.0237	Yes	(0.0130, 0.0344)
Schroeder (2010)	4	0.0671	0.0671	Yes	(0.0375, 0.0968)
	150	***0.0169***	***0.0165***		
Assets					
Islam (2011)	6	0.0482	0.0458	Yes	(0.0328, 0.0588)
Pitt and Khandker (1998)	30	0.0415	0.0408	Yes	(0.0273, 0.0544)
Rahman et al. (2011)	5	0.1593	0.1505	Yes	(0.0996, 0.2013)
	41	***0.0568***	***0.0438***		

significant weighted averages. The overall weighted average for all three studies is given as 0.0438.

PET/FAT Analysis

Although FEEs can be considered efficient estimates in some contexts, we use them as descriptive evidence of the literature. This is because of the risk posed by publication selection bias. Primary studies may be subject to publication selection bias and/or within-study dependence between reported effect-size estimates (De Dominicis et al., 2008). Thus, the reported FEEs cannot be taken as measures of 'genuine' effect in the presence of publication bias. We therefore examine whether reported estimates are tainted with publication bias, and correct them if necessary. A common trend in the existing literature is to adopt funnel plots for the association between microcredit and our outcome variables. Funnel plots are scatter graphs of PCCs against their precision ($1/SE_{ri}$). Figure 1 shows a funnel plot for the effect of microcredit on our outcome variables.

A visual inspection of the funnel plot reveals not much sign of asymmetries with regards to our reference lines. This suggests that publication bias may not be an issue in the microcredit–poverty literature in the case of Bangladesh. However, while funnel plots may be useful in determining the absence or presence of publication bias, visual inspection alone is not sufficient as the magnitude and direction of bias may not be visible in funnel plots.

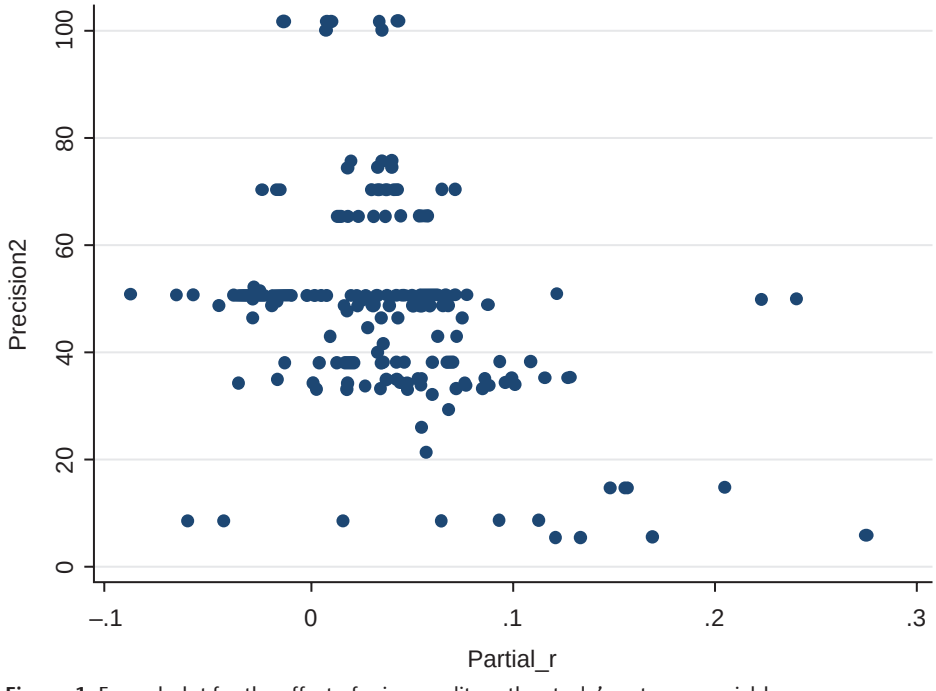

Figure 1 Funnel plot for the effect of microcredit on the study's outcome variables

Thus, we resort to a more thorough empirical approach to address issues of publication bias. The risk of publication bias and data dependence is dealt with by conducting an analysis which involves precision effect tests (PETs) and funnel asymmetry tests (FATs). Conducting these analyses makes it possible to ascertain whether the PCCs which have been derived from the reported estimates in the original studies are subject to publication selection bias and also whether or not they represent true measures of genuine effects beyond bias. Models of publication selection bias attempt to establish whether published values of a given relationship – in our case microcredit and poverty – are selected to be either significantly positive or negative. This bias can be driven by various factors. An example of such factors includes the differences in study population among the different studies.

The PET/FAT analysis involves the estimation of a bivariate model. Stanley (2008) proposes that the WLS model (4) can be used to test for both publication selection bias (which is the FAT) and for genuine effect beyond selection bias (the PET).

$$t_{ij} = \alpha_0 + \beta_0 \left(\frac{1}{SE_{rij}} \right) + \varepsilon_{ij} \tag{4}$$

Here, the *t*-value is the dependent variable and the coefficient of the precision ($1/SE_{ri}$) is the measure of genuine effect. The PET and FAT analysis involves testing for $\beta_0 = 0$ and $\alpha_0 = 0$, respectively. We estimate equation (4) adjusting for heteroscedasticity.

Table 2 reports results from our PET/FAT analysis. From panel 1 of Table 2, we find that the coefficient of the precision is statistically not significant, indicating that there is no evidence of a genuine effect between microcredit and income. From panel 2, we find evidence of genuine effect. The coefficient of the precision is positive at 0.0166 and significant. The coefficient of the bias is not significant, however. Thus beyond publication bias we find evidence of a positive association between microcredit and consumption/expenditure. However, drawing on guidelines presented by Cohen (1988) this coefficient is small and has very little practical relevance. Cohen indicates that PCC represents a small effect if its absolute value is less than 0.10. Turning to the association between microcredit and assets, from panel 3, we find no statistically significant association.

Table 2 PET/FAT analysis

Variables	*(1)* *Income*	*(2)* *Con/Exp*	*(3)* *Assets*
Precision (β_0)	0.0056	0.0166*	–0.0132
	(0.0194)	(0.0084)	(0.0122)
Bias (α_0)	2.7431***	–0.0001	2.3306***
	(0.5515)	(0.4576)	(0.4644)
Observations	30	150	41

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Meta-regression

The use of the PET/FAT analysis makes it possible to make precise inferences regarding the existence of genuine effects and publication bias. However, they do not include moderating variables. Thus, we also conduct a multivariate meta-regression (MRA), which takes into account various moderating variables. To address issues of heterogeneity and include moderating variables, we estimate the following model (5):

$$t_{ji} = \alpha_0 + \beta_0 \left(\frac{1}{SE_{jri}} \right) + \sum \beta_k \frac{(Z_{ki})}{SE_{jri}} + \epsilon_j + u_{ji} \tag{5}$$

Here, t_{ji} is the ith t-value from the jth study, while Z_{ki} is a vector of moderator variables that are likely to account for the heterogeneity in the microcredit-poverty evidence base. k represents the number of moderator variables. ϵ_j and u_{ji} are error terms, normally distributed around the PCCs' mean values such that $\epsilon_j \sim N(0, SE_{ri}^2)$, where SE_{ri}^2 is the square of the standard errors associated with each effect-size estimate, and $u_{ji} \sim N(0, \tau^2)$, where τ^2 is the estimated between-study variance. ϵ_j is the study-specific error term.

The moderating variables included in the meta-regressions capture the various dimensions of the research field, and factors that are likely to affect the association between microcredit and poverty. Given that we have very few observations we are not able to run independent MRAs for our assets, consumption/expenditure and income clusters, we therefore ran a combined MRA and control for income and assets estimates. Table 3 presents our MRA results. We provide results for heteroscedasticity robust estimates and cluster robust estimates. Our preferred results are those from the cluster robust estimation as they account for study variations.

With regards to moderating variables, we control for methodologies used by primary studies as well as the study design. With regards to study design, various designs such as randomized control trials, quasi-experiments and observational data studies are often used in determining the impact of microcredit. In this study, we control for quasi-experiments, leaving out other study designs as base. Results are positive and significant for quasi-experiments dummy. This indicates that compared to the excluded category, studies that use quasi-experiments tend to report more positively on the effects of microcredit.

Considering empirical methods, we include a dummy for studies that control for endogeneity using instrumental variable techniques, and exclude those that do not as base. It is a well-known fact that in the presence of endogeneity, the use of ordinary least squares (OLS) may lead to bias and inconsistent results. Thus, it is worthwhile to control for this in our meta-regression to examine if any systematic differences exists in the nature of reported estimates between studies that control for endogeneity and those that do not. Results here also reveal that, compared to studies that do not control for endogeneity, those that control for endogeneity tend to report more positively on the effects of microcredit.

Next, we capture some important characteristics of microcredit programmes. In this category, we first control for the type of loan given (household or individual). We include a dummy for estimates reported based on household loans, and exclude

Table 3 MRA results

Variables	*(1)* *Robust*	*(2)* *Cluster robust*
Precision	–0.2184***	–0.2184***
	(0.0710)	(0.0288)
Consumption/expenditure	–0.0067	–0.0067
	(0.0101)	(0.0061)
Income	–0.0075	–0.0075**
	(0.0105)	(0.0023)
Control for endogeneity	0.0056	0.0056*
	(0.0134)	(0.0027)
Household loan	–0.0331**	–0.0331***
	(0.0138)	(0.0080)
Journal	0.0470**	0.0470***
	(0.0203)	(0.0061)
Female loan	0.0051	0.0051
	(0.0071)	(0.0139)
Productive loan	0.0194**	0.0194***
	(0.0085)	(0.0050)
Quasi-experiment	0.1532***	0.1532***
	(0.0499)	(0.0228)
Publication year (<2005)	0.1589***	0.1589***
	(0.0543)	(0.0200)
Constant	2.6789***	2.6789***
	(0.7416)	(0.3884)
Observations	221	221
R-squared	0.1124	0.1124

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

individual loans as base. We also control for loan productivity. In the existing literature, productive loans are those used by borrowers to promote business-related activities. While loans are generally given for use in business-related activities, some borrowers tend to use received loans for daily consumption which has the potential of pushing them further into debt. We control for studies that report estimates on productive loans, and exclude those that report on unproductive loans as base. The coefficients for household loans are negative and significant. This suggests that the issuance of household loans, as opposed to individual loans, is associated with more adverse effects of microcredit on poverty. On the other hand, we find a positive and significant coefficient for the productive loans dummy. This suggests

that studies that report on the effects of productive loans tend to report more positively on the effects of microcredit.

We also control for loans extended to female clients as opposed to male clients. Women are often considered to be good credit risks, as it is argued that they are less inclined to misuse loans (Garikipati, 2008). Thus some microcredit interventions are targeted at women, so some studies examine the impact of loans extended to women. We include a dummy for studies that report on credit extended to women, and exclude other studies as base (i.e., those that capture credit extended to men and also both men and women together). We find that the dummy controlling for studies that issued credit to women is statistically not significant.

Finally, we control for publication characteristics, and examine if journal articles produce systematically different estimates compared to other publication types such as working papers and theses. Thus, we include a dummy for estimates reported in journal articles, leaving out other publication types as base. Evidence suggests that compared to other publication types, journal articles tend to report more positive effects of microcredit. We also control for publication year. The publication years of studies included in this meta-analysis ranges from 1998 to 2012. Thus, we consider the mid-point and include a dummy for studies published after 2005 to represent newer studies. We exclude other studies as base. Results indicate that relatively newer studies tend to report more positively on the impact of microcredit.

Conclusion and discussions

This paper evaluates the empirical evidence on the impact of microcredit on poverty in Bangladesh to determine whether genuine effects exist beyond publication bias. We examine the impact of microcredit on three proxies of poverty, namely assets, consumption/expenditure, and income. We use meta-analysis tools to deal with publication selection bias and potential issues of heterogeneity that help explain variations in the existing empirical literature. The PET/FAT analysis results indicate that beyond publication bias, microcredit has no statistically significant impact on income and assets, however a marginal significant positive association is found between microcredit and consumption/expenditure.

Overall, the effects of microcredit on income and assets are not significant, which is consistent with results from recent systematic reviews on the impact of microfinance. This finding is also consistent with Banerjee et al., (2015), which considers six randomised control trials and finds no evidence of microcredit increasing household income. On the other hand, there is a significant and positive effect of microcredit on consumption/expenditure, with an effect size of 0.0166. This effect size, based on the guidelines presented by Cohen (1988), suggests that the effect of microcredit on consumption/expenditure, although statistically significant, is small and may not present any practical relevance. Contrary to the positive effect observed on consumption/expenditure, Banerjee et al. (2015) find no evidence of an increase in consumption/expenditure. While we find a positive effect, as indicated earlier, the effect size carries no practical relevance based on Cohen's guidelines.

Thus to some extent the findings from this study tie in with results from Banerjee et al. (2015). Sample differences may explain the slight variation in observed results, however. Specifically, studies evaluated in Banerjee et al. (2015) cut across various countries including India, Mongolia, and Morocco, which operate under different conditions.

The lack of evidence on the impact of microcredit could be a result of study designs, which often examine the short-term impact of microcredit. Some clients invest in businesses that would only yield returns in the long term. Thus studies which do not capture data from a sufficiently long period may not capture any visible impact of microcredit. Furthermore, the weak positive impact of microcredit on consumption/expenditure may be as a result of consumption smoothing. Specifically, while loans are given for investing in small-scale businesses, some individuals fail to invest their loans but use them for consumption purposes. When this occurs, clients may record relatively high expenditures in the short term, but this reverts in the long term. Thus, microcredit may promote consumption smoothing but perhaps not any visible income-generation prospects in the long term if loans are not used for their intended purpose. This ties in with the need for more research that focuses on the impact of microcredit in the long term, and also the need for MFIs to adopt strict monitoring schemes to ensure loans are used for productive purposes.

Further, the conclusions emerging from our study do not represent the effect of microfinance in general, as we only focus on microcredit. Thus, it is likely that while microcredit alone does not present any visible impact on the proxies of poverty used here, the introduction of other relevant microfinance services may alter the observed dynamics. For instance, Duvendack et al. (2011) argue that beyond the provision of microcredit, which eases credit constraints, the poor also require other financial services such as savings and training that promotes their microenterprise ventures. Several microfinance institutions now provide these services, and therefore future studies can consider the impact of other microfinance services. In fact, robust empirical evidence on the impact of microfinance in Bangladesh is lacking, and this is one of the major constraints faced by this study. While there appears to be several studies examining the impact of microfinance, a closer look at the literature actually reveals that empirical evidence is lacking in the area, and thus there is a need for more studies.

With regards to sources of heterogeneity, we find evidence of study and research dimensions that are likely to affect the reported effect sizes. Specifically, evidence suggests that study design, empirical approach, data characteristics, publication outlet, and loan type are all likely to affect the nature of reported estimates. For instance, evidence shows that the nature of reported estimates is altered when loans issued to female clients is used as a measure of microcredit. Thus, it would be good practice for researchers to distinguish between female loans and male loans in their research. This allows for a clearer understanding of the contexts in which microfinance works.

Furthermore, evidence from the meta-regressions also show that studies that report estimates on the effects of productive loans, as opposed to those that do not,

report more favourably on the effects of microcredit. To an extent this finding suggests that pooling together all microloans (both productive and unproductive) and drawing a conclusion on the effects of microcredit could be misleading. Given that some microloans are used for productive purposes, it is likely these loans could positively impact borrowers. On the other hand, unproductive loans may worsen the plight of the poor. Thus, without some appropriate distinction, the true effect of microcredit may not be known, and inferences could be misleading. Future studies on the impact of microcredit should consider examining the impact of productive and unproductive loans separately.

A major limitation faced by this study has to do with the few empirical studies on the impact of microcredit on poverty in Bangladesh. However, even in this context, we show that meta-analysis tools are effective in synthesizing evidence when the evidence base is accompanied by a high level of heterogeneity.

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