COST-BENEFIT ANALYSIS OF TRADITIONAL VERSUS FLEXIBLE MICROFINANCE IN BANGLADESH

DR. SUBIR BAIRAGI, AGRICULTURAL ECONOMIST, INSTITUTE OF POLICY AND SOCIAL SCIENCES, AND POST-DOCTORAL FELLOW, INTERNATIONAL RICE RESEARCH INSTITUTE.
DR. WASEL BIN SHADAT, EXECUTIVE DIRECTOR, INSTITUTE OF POLICY AND SOCIAL SCIENCES AND LECTURER IN ECONOMETRICS, ECONOMICS, UNIVERSITY OF MANCHESTER.

Benefits and costs of altering microfinance systems in Bangladesh

COPENHAGEN CONSENSUS CENTER

SMARTER SOLUTIONS FOR BANGLADESH

brac

Cost-Benefit Analysis of Traditional Versus Flexible Microfinance in Bangladesh

Bangladesh Priorities

Dr. Subir Bairagi
Agricultural Economist, Institute of Policy and Social Sciences, and Post-doctoral fellow, International Rice Research Institute

Dr Wasel Bin Shadat
Executive Director, Institute of Policy and Social Sciences, and Lecturer in Econometrics and Economics University of Manchester

© 2016 Copenhagen Consensus Center
info@copenhagenconsensus.com
www.copenhagenconsensus.com

This work has been produced as a part of the Bangladesh Priorities project, a collaboration between Copenhagen Consensus Center and BRAC Research and Evaluation Department.

The Bangladesh Priorities project was made possible by a generous grant from the C&A Foundation.

Some rights reserved

This work is available under the Creative Commons Attribution 4.0 International license (CC BY 4.0). Under the Creative Commons Attribution license, you are free to copy, distribute, transmit, and adapt this work, including for commercial purposes, under the following conditions:

Attribution
Please cite the work as follows: #AUTHOR NAME#, #PAPER TITLE#, Bangladesh Priorities, Copenhagen Consensus Center, 2016. License: Creative Commons Attribution CC BY 4.0.

Third-party content
Copenhagen Consensus Center does not necessarily own each component of the content contained within the work. If you wish to re-use a component of the work, it is your responsibility to determine whether permission is needed for that re-use and to obtain permission from the copyright owner. Examples of components can include, but are not limited to, tables, figures, or images.

Abstract

Even though traditional microfinance has made an impact on Bangladeshi society to some extent, it is difficult to define the degree of impact of microfinance on the "ultra poor" because of prevailing rigidity in the system. In the literature, to make microfinance more effective, introducing more flexibility has been (widely) suggested as one of the smart interventions. This paper estimates the social benefits of an introduction of flexibility into the repayment system when borrowers are granted a grace period during the lean period and compared it with the equilibrium benefits from the traditional microfinance, using the NPV and BCR measures. The 2015 present value of the future net benefits is estimated to be between $4 and $51 billion under the flexible microfinance, depending on the discount rates, benefit coefficient, and the rate of credit adoption. Social benefits for the traditional microfinance are estimated to be between $5 and $52 billion. The BCR for flexible microcredit is estimated to be between 1.93 and 2.60, while for traditional microcredit it is between 1.31 and 2.09. The welfare gains to the borrowers due to the introduction of flexible microcredit are significantly higher compared to that of the traditional microcredit. We thus conclude that there is a potential of creating a new flexible microcredit market in Bangladesh.

Keywords: Microfinance, Bangladesh, Benefit Cost Ratio (BCR), flexible microfinance, Net Present Value (NPV).

Acronyms

ASA	Association for Social Advancement
BCR	Benefit-Cost Ratio
BRAC	Bangladesh Rural Advancement Committee
CDF	Credit Development Forum
DID	Difference-in-Difference
DWI	Disciplined Weekly Instalment
EI	Equal Amount of Each Instalment
FMF	Flexible Microfinance
FP	Fixed Repayment Period
GB	Grameen Bank
GDP	Gross Domestic Product
GL	Group Liability
InM	Institute of Microfinance
IRR	Internal Rate of Return
MFIs	Microfinance Institutions
NPV	Net Present Value
PKSF	Palli Karma-Sahayak Foundation
PV	Present Value
RCT	Randomized Control Trial
TMF	Traditional Microfinance

I. Introduction

Microcredit market in Bangladesh has expanded significantly and has been sustainably in operation during the last three decades. It has also substituted the informal moneylending market in rural Bangladesh, to a great extent (Islam *et al.* 2013). Professor Muhammad Yunus's Grameen Bank has pioneered this market model, which has expanded all over the world. As of 31 December 2014, some 693-licensed microfinance institutions (MFIs) are in operation, disbursing approximately $8.4 billion (Tk.647 billion) to their 34 million active borrowers (CDF, 2015). Note that approximately 20-25% of total microcredit market is captured by the Grameen Bank (GB) alone, while two other giant microfinance institutions, Bangladesh Rural Advancement Committee (BRAC) and Association for Social Advancement (ASA), together capture another 30-40% of market share[1] (Bairagi, 2014 and CDF, 2015).

The nature and extent of microcredit market have changed over time (MFIs' goal switched from a "welfare paradigm" to "rent-seeking paradigm"). A large number of for-profit microfinance institutions (MFIs)[2] have entered into the market and increased their economy of scale owing to the long-run sustainability and operational efficiencies (Yuge, 2011; Rishad, 2012). Moreover, non-profit MFIs have started to make a profit to compete with the for-profit MFIs. Bairagi and Azzam (2014) analysed the profit of GB and found that the profit situates approximately 3% above marginal cost, which is considerably dwarfed by commercial MFIs (97% to 165% above marginal cost, calculated based on the estimates of the commercial MFIs in 73 countries (*Assaf et al.,* 2013). A distribution of profit margin of Bangladesh's MFIs is presented in Annex Figure 1, which shows that about 75% of MFIs' profit margins[3] are in between 1% and 85%. However, most of MFIs' profit margins lie between 5% and 25%. This profit margin, surplus gain to the producers (MFIs), has increased as the microcredit market in Bangladesh expanded.

Microfinance contributed to the national economy approximately 10.4% of gross domestic product (GDP) in 2012 (Raihan *et al.,* 2012). It generates about 250,000 jobs for the economy, of which about 58% are directly related to microfinance (CDF, 2015). It is well documented that "less poor" borrowers, who have continuous income flows, have gained welfare from microcredit. Microcredit increases income and consumption, generating employment opportunities, empowering women, and ensuring

[1]These shares are based on number of active borrowers, disbursement loan, and loan outstanding.

[2]*Dr. Muhammad Yunus*, Nobel Peace Prize winner in 2006, wrote in a New York Times article title "Sacrificing Microcredit for Megaprofits" that he never imagined one day commercial microfinance would rise (Yunus 2013, Bairagi and Azzam 2014).

[3]The Mix Market reports the detailed information of only 77 for-profit and non-profit microfinance organizations.

food security.[4] Microfinance as an anti-poverty tool has also greatly captured the public imagination of the international development community.

Critics such as Meyer (2002), however, have raised the question about the microfinance model by asking whether "one-size is fit for all", bringing a critical prism to the "magic of microcredit". Scepticism about microcredit revolves around three major spectrums: (i) are vulnerable beneficiaries benefiting from microfinance? (Morduch, 1998; Roodman and Morduch, 2009 and 2013; Banerjee *et al.,* 2009; Pitt, 2011), (ii) are poorer borrowers trapped in a vicious debt circle? (Islam *et al.* 2013), and (iii) has microfinance lost its moral compass? (Hulme and Maitrot, 2014). Banerjee *et al.* (2015) also echoed the same criticism. To examine the effectiveness of microcredit, six randomized evaluations of microfinance in six countries (Bosnia and Herzegovina, Ethiopia, India, Mexico, Mongolia, and Morocco) were reviewed in their paper, which found that while microcredit sometimes leads to an increase in business activity, the effect on average business profits is much more muted. There is no effect on consumption over a period of one to three years. In other words, better access to microcredit does not seem to generate sustained consumption gains.

In the case of Bangladesh, most previous studies claimed that there is a positive effect of microcredit on borrowers' outcomes. To examine the impact of microcredit, Pitt and Khandker, PK's, (1998) attempted to measure the impact of microcredit on consumption (Schroeder 2014). Using quasi-experimental data, they found that microcredit increases households' consumption. A similar study by Khandker (2005) also came to the same conclusion. However, using the same dataset as PK (1998), Morduch (1999) found no impact on consumption. Chemin (2008), using the same data, found a positive, but lower than PK (1998) but greater than Morduch (1999), effect of microfinance on expenditure per capita, supply of labour, and level of school enrolment for boys and girls. Schroeder (2014) claimed that effect of microcredit might be more effective than he previously thought. He estimated that an increase of 1% in the amount borrowed, from the GB and similar institutions, would increase per capita household consumption by 0.18-0.21%. Employing a dynamic model with panel survey data spanning over 20 years, Khandker and Samad (2014) found that this elasticity would range between -0.022 and 0.018%. They concluded that microfinance increases income and expenditure, the labour supply, non-land asset, and net worth as well as boys' and girls' schooling. It was also found that it reduces poverty.

[4]Hossain 1984, 1988; Hume and Mosley 1996; Pitt *et al*. 1999; Pitt *etal*. 2006; Pitt *et al*. 2014; Khandhker 1998, 2003, 2005; Zaman 2004; Khandaker*et al.* 2010;MRA 2010;Osmani 2012;Sharmin 2014; Wadud 2013;Chemin 2008; Pakrashi*et al.* 2014; Rahman 2007.

It is widely reported that the traditional microcredit market suffers from a set of problems, such as high interest rates, overlapping loans, insufficient repayment time, less attention to ultra poor, unfavourable loan product characteristics, delinquency and default rates, and others (Yuge, 2011; Zaman, 2013; Mokhtar *et al.,* 2012; Meyer, 2002)). The rigidity in the contract of microfinance has been identified as one of the critical underlying problem (Field *et al.,* 2009, Karlan and Mullainathan, 2009). Yuge (2011) pointed out that these problems of traditional microcredit could have been addressed if flexibility was allowed in the system (traditional microcredit to flexible microcredit), which might play the key role of a welfare improvement policy. Note that several studies have proposed different strategies of flexibility in microfinance and tested its impact theoretically and empirically [5] on borrowers and implementers (i.e., MFIs). Previous research studies on flexible microfinance show that borrowers/consumers surplus may increase, though implementers may be worse off[6]. In this regard it is worth mentioning Tsukada (2012), who showed that flexibility of lending contract has both benefits and costs. Field and Pande (2008) found that in India a more flexible schedule (weekly to monthly) could reduce transaction costs significantly without increasing client default rate. In Bangladesh, Shonchoy and Kurosaki (2014) found that granting a temporary moratorium to repayments during the Monga period had positive impact on food consumption. They also found statistically insignificantly difference between the traditional and flexible default rates.

Therefore it is of our interest to examine potential welfare impact of flexible microfinance in Bangladesh. To the best of our knowledge, there is no study that has attempted to estimate the aggregate welfare (in terms of monetary benefits) to Bangladesh from traditional microfinance and/or flexible microfinance. In this paper, therefore, we provide an empirical estimate of benefits and costs for traditional microfinance in Bangladesh that will provide a benchmark for comparison. Secondly, we estimate the potential net benefits of granting a grace period, which would bring flexibility to the traditional microfinance, to the borrowers during the lean business season.

The rest of the paper is organized as follows: Section II discusses the conceptual framework and methodological issues related to the two interventions under consideration, namely the traditional microfinance and the flexible microfinance (grace period in repayment during lean business period). Section III presents the results and discussion, while Section IV concludes. All tables and figures are relegated to the Appendix.

[5]Field and Pande 2009; Czura *et al.* 2011; Feigenberg *et al.* 2011;Gine and Karlan 2011; Laureti and Hamp 2011; Yuge 2011; Tsukada 2012; Field *et al.* 2012; Field *et al.* 2013; Weber and Musshoff 2013; Weber *et al.* 2014; Labie *et al*. 2013.
[6]Labie (2013) provided an excellent review on flexible microfinance.

II. Methodology

II.1 Methods to estimate costs-benefits of an intervention

II.1.1 Intervention-1: introduction to the traditional microcredit

Social benefits

Due to the introduction of traditional microfinance (TMF) market, benefits to society can be modelled by assuming that microfinance institutions act as a profit maximiser and offer homogeneous product, loan/credit, to their beneficiaries/borrowers:

$$w^{TMF} = \sum_i \pi_i^{TMF} + CS^{TMF} (1),$$

where, w^{TMF} is the social welfare that a country gain due to the intervention of traditional microfinance, which is a sum of the producers and consumers surplus; π_i^{TMF} is the profit of the $i-th$ microfinance industry; CS^{TMF} is the consumers surplus that gain due to the intervention of microcredit market. We include only two main stakeholders, MFIs and borrowers, in our analysis. Benefits to the other stakeholders as well as redistributive welfare gains are ignored in this model. Only borrowers' profit, π_B^{TMF}, from his/her enterprises is considered, so $CS^{TMF} \equiv \sum_B \pi_B^{TMF}$. The benefits to society can also be presented in a diagrammatic representation (Annex Figure 3), employing a multi-market setting, a partial equilibrium technique. If there were no microcredit market, the demand and supply schedules of loan/credit would have intersected at the equilibrium point "0" (left top panel). Because of the introduction of microcredit market, derived demand for loan faced by microcredit organization shifts outward from zero and intersects with its marginal cost curve, assumed to be increasing. Therefore, both the producers and consumers would gain their surplus.

Borrowers/Consumers

When a household is credit constraint, it is expected that borrowers' profit will be higher for those who have access to credit than those who do not. Suppose a representative borrower's profit maximization function is defined as:

$$\begin{aligned} \pi_B^{TMF} &= p'y - r_1 l_1 - w'x \\ s.t. \qquad & y \leq f(l_1, x), \\ l_1 &= g(GL, DWI, EI, FP) (2) \end{aligned}$$

Where π_B^{TMF} is the profit that a borrower earns from his/her enterprises investing the loan borrowed; p and y are the vector of prices of goods (normalized to one) and quantities of respective goods,

respectively; r_1 is the interest rate paid to the implementer and l_1 is the amount of borrowing; x and w are the vector of traditional productive inputs (i.e. land, labour, capital, and others) and their prices, respectively. The loan is also a function of group liability (GL), frequent/disciplined weekly instalment (DWI), equal amount of each instalment (EI), and fixed repayment period (FP). Note that a portion of each repayment amount is deposited to the borrowers' savings account.

The shadow price of traditional microcredit (should reflect the market price of loan, interest rate), derived from the first order condition of the above constrained optimization problem, can be written as: $r_1 = p\frac{\partial f}{\partial l_1} = p.MP_{l_1} = VMP_{l_1}$[7], which implies that borrowers should keep borrowing loan until its marginal revenue product falls to its interest rate. If $VMP_{l_1} < r_1$, then input is overused — to raise the profits its use should be reduced, and conversely if $VMP_{l_1} > r_1$, then input is underused — to raise the profits its use should be increased. We assume that borrowers follow this condition and behave as a rationale consumer, as maximum profit or minimum cost can be obtained when $r_1 = VMP_{l_1}$.

Implementers/Producers

Profit function of a representative microfinance institution, which offers a menu of traditional products, TMF, can be expressed as:

$$\pi^{TMF} = \alpha_1 r_1 \sum_k l_{1k} + (r_1 - s_1)S_1 - \sum C_j^{TMF} \quad (3),$$

where, $r_1$is the price of loan (interest rate) charged from borrowers, a market average rate, which is assumed to be constant; $l_{1k}$is the amount of loan disbursed to the k-th borrower; α_1 is the repayment rate, $\alpha_1 \leq 1$; C_j^{TMF} is the total cost of *j-th* inputs, where $j = x_{own}$, x_{lab}, and, x_{other}, where, x_{own} is the quantity of own inputs provided by the microfinance institutions, x_{lab} is the labour, and x_{other} is the other inputs that are required to produce loan products (Annex Figure 3); s_1 is the rate of interest on savings paid to the borrowers, which to be lower than the interest rate, $s_1 < r_1$, and S is the amount of total savings from borrowers. Note that fixed costs are ignored in the analysis.

II.1.2 Intervention-2: introduction to flexible microfinance

Borrowers/Consumers

In the case of flexible microfinance, the flexibility would arise from allowing the nature and extent of any variables or any combination of the set of variables to change or vary, incorporated in the

[7]In case of two inputs, loan and another production input, and one output, profit maximization problem, substituting the constraints into the profit equations, can be written as: $\pi_B^{TMF} = pf(l_1(.), x_1) - r_1 l_1(.) - w_1 x_1$. First order conditions are:$\frac{\partial \pi_B^{TMF}}{\partial l_1} = p\frac{\partial f}{\partial l_1} - r_1 = 0$ and $\frac{\partial \pi_B^{TMF}}{\partial x_1} = p\frac{\partial f}{\partial x_1} - r_1 = 0$.

previously defined loan equation, $g(GL, DWI, EI, FP)$; e.g., weekly to monthly payment, variable repayment period with monthly instalment, etc. However, in this paper the focus will be limited only to changing the *FP* parameter. This implies that with the flexible system borrowers are granted a grace period (no repayment during the period), so the repayment period would be longer than the traditional system, called a variable period, *VP*.[8] Under this flexible system, borrowers will maximize the following constrained profit maximization problem:

$$\begin{aligned} \pi_B^{FMF} &= p'y - r_2 l_2 - w'x \\ s.t. \quad & y \leq f(l_2, x), \\ & r_2 \leq r_1, \\ l_2 &= g(GL, DWI, EI, VP) \end{aligned} \qquad (4)$$

All variables are defined above. The shadow price of flexible loan, derived from the first order condition of the above constrained optimization problem, can be written as, $r_2 = p\frac{\partial f}{\partial l_2} = p.MP_{l_2} = VMP_{l_2}$, which is assumed to be higher than $VMP_{l_2} > VMP_{l_1}$, so under the flexible system borrower's profit from their enterprises will be strictly greater than the profit under traditional system, $\pi_B^{FMF} > \pi_B^{TMF}$.

Implementers

Profit function of a representative microfinance institution, which will offer a menu of flexible products, FMF, can be expressed as:

$$\pi^{FMF} = \alpha_2 r_2 \sum_m l_{2m} + (r_2 - s_2)S_2 - \sum C_j^{FMF} - OC \qquad (5),$$

where, $l_{2m}$is the amount of loan disbursed to the $m-th$ borrower, which is a combination of $k-th$ borrower and a new cohort9; and assumed to be $m-th > k-th$; α_2 is the repayment rate, which is assumed to be strictly less than the repayment rate under the traditional system, $\alpha_2 < \alpha_1$. As it is expected that default rate is likely to increase if borrowers are not disciplined, implementers' costs

[8] Suppose, an amount of BDT 3,000 is given to a borrower with a credit contract of total 45 weekly instalments of repayments—each would be at BDT 75. A borrower has to repay of total BDT 3375, including gross interest payment of BDT 375 within a year under the traditional system. Under the new system, a borrower is allowed a moratorium (grace period) of one or more than one months without repayment of instalment during that period. Borrower would be start paying the same amount (at BDT 75 each instalment) after the grace period. In this system, total repayment period would be longer (more than one year).

[9] It is evidenced that the very poor people often do not participate in microfinance (Ghalib).

under flexible system would be higher than traditional system, $C_j^{FMF} > C_j^{TMF}$. In other words, implementers' interest income would be lower under the flexible system; OC is the opportunity cost of waiting the grace period, which is a time value of money. All other variables are defined before.

Considering these assumptions, profit of implementers under flexible system might be higher or lower than the existing microcredit system. Social benefits due to the flexible microfinance might also be higher or lower than the traditional system.

II.2 Measuring Costs and Benefits

There are three widely used measures of evaluating the payoff of any investment that can be found in the literature, namely (i) Net Present Value (NPV), (ii) Benefit-Cost Ratio (BCR), and (iii) Internal Rate of Return (IRR). We apply the BCR, suggested by the Copenhagen Consensus Centre, and NPV measures to evaluate the social welfare (pay off) due to the introduction of traditional versus flexible microfinance market in Bangladesh.

II.2.1 Net Present Value (NPV)

The net present value is defined as the sum of the present value of benefit and cost streams over a period of time. We will use it as a measure to evaluate the contribution of an intervention. This following specification of NPV is somewhat different than the standard specification by Alston *et al.*, 1995. The second term implies that the benefits from any intervention will last forever, and there will be some costs as the microfinance institutions work as financial intermediaries. The NPV is expressed as:

$$NPV = \sum_{t=0}^{T} \frac{B_t - C_t}{(1+\delta)^t} + \frac{B_{T+1} - C_{T+1}}{\delta}\left(\frac{1}{(1+\delta)^{T+1}}\right) \qquad (6)$$

where, B_t represent benefits due to the intervention of microfinance in year t, calculated as $w_t * a_t$, where w are aggregate welfare gains with full adoption or full capacity utilized, a_t is the adoption/utilization rate in year t; B_{T+1} is the annual benefit that occurs every year (perpetuity) starting in period $T+1$, calculated as $w_{t+1} * a_{t+1}$ where $a_{T+1} = 1$; C_t is the annual expenditure in year t, C_{T+1} is the annual cost that occurs every year (perpetuity) starting in period $T+1$, as microfinance institutions will have to pay fee and interest on the funds they borrow that is assumed to be decreasing over time; and δ is the discount rate. In our case, $w_t = B_t - C_t$.

II.2.1 Benefit Cost Ratio (BCR)

BCR is a relative measure of benefit-cost analysis that can be calculated by dividing total compounded/discounted benefits by total compounded/discounted costs.

$$BCR = \frac{\left(\sum_{t=0}^{T} \frac{B_t}{(1+\delta)^t} + \frac{B_{T+1}}{\delta((1+\delta)^{T+1})}\right)}{\left(\sum_{t=0}^{T} \frac{C_t}{(1+\delta)^t} + \frac{C_{T+1}}{\delta((1+\delta)^{T+1})}\right)} (7).$$

All parameters are defined before.

II.2.2 Adoption path of microcredit

In the previous adoption literature, three mathematical models are widely used to represent the diffusion process of an innovation: logistic model, Gompertz model, and Bass model (Teng *et al.,* 2002; Bairagi, 2015 a). We posit a logistic model of microcredit adoption in this paper to find the shape of a_t. The logistic adoption of microcredit can be expressed as following the specification by Fox and Weisberg (2011):

$$a_t = \frac{\emptyset_1}{1 + exp^{[(\emptyset_2 - x)/\emptyset_3]}} (8),$$

where, $\emptyset_1$ is the upper asymptote, $\emptyset_2$ is the value of *x* (time) at which the response is half of its asymptotic value, and $\emptyset_3$ is a scale parameter (adoption parameter here in our case). The probable adoption path for microcredit in Bangladesh is presented in Annex Figure 2. Loan portfolio (in million USD) is proxy for explaining adoption rate of microcredit. Actual loan portfolio for period 1996 to 2013 are gathered from the www.mixmarket.org,[10] while 2014 and onward are estimated using (8), assuming $\emptyset_2 = 4$ and $\emptyset_3 = 20$ years, respectively. The adoption rate for flexible microcredit is assumed to be the same as traditional microcredit — beginning year would be 2015 instead of 1996 and follow the same adoption path.

II.2.3 Sensitivity Analysis

We have conducted a sensitivity analysis by creating an optimistic and pessimistic scenario with respect to the reference or benchmark scenario. The details of the assumptions are presented in Table 1 (see Annex).

III. Results and discussions

III.1 Intervention-1: introduction to traditional microfinance

We compared welfare gains due to the introduction of microcredit market in Bangladesh with the absence of such a market. Shift in demand schedule due to the microcredit intervention is measured through the concept of producers and consumers surplus employing in a partial equilibrium setting.

[10]www.mixmarket.org provides global and reliable financial and social performance Data from 2000 + MFI's.

Theoretically, the concept of the "returns to own inputs" can be employed to measure producers' surplus. Hence, surplus to MFIs' can be realized from its own inputs markets; similarly borrowers' surplus from either land or labour markets depending on what inputs they own (Annex Figure 3).

Benefits to the borrowers

Estimating benefits to the borrowers, we assume perfect competitive market or zero profit condition, $\pi_B^{TMF} = 0$. Hence, their surplus would be returns to their own inputs that are used to produce an output bundles. In Bangladesh, cost shares of land and labour to revenue income for producing rice are 35% and 31%, respectively (estimates based on 20 empirical studies during 1994 to 2014 period by Bairagi, 2015b). It is assumed that microcredit participants invest the loan borrowed from the microfinance institutions for productive purposes. The targeted microcredit beneficiaries in Bangladesh are small or marginal farmers and business entrepreneurs. If they own land, their surplus would be returns to their land; if they invest their labour for productive purposes, then their surplus would be returns to their labour. As the shares of land and labour for rice cultivation are almost the same, we use a common rate of revenue share of 30% to estimate the returns to borrowers/microcredit participants' own inputs. Surplus to microcredit participants would be: $R_B^{OI} = 0.3 * I$, where I is the borrowers' household income, $I \equiv py$. Household income from the enterprises is calculated as: $I = PCI * FS$, where *PCI* is per capita income, and *FS* is the average family size, which is assumed to be 4.5.[11] Production costs are assumed to be the same for both the participants and non-participants.[12]

Benefits to the microcredit participants are calculated as: $B_B^{TMF} = R_B^{OI} - R_{NB}^{OI}$. Chemin (2008) estimated that microcredit participants spend 3% more than the non-participants, which is lower than PK's (1998) estimates but greater than Murduch (1999) estimates. We used Chemin's (2008) estimate, assuming income equals consumption, to calculate the benefits for participants over non-participants, as the reference point. Non-participants' returns to own inputs are: $R_{NB}^{OI} = \frac{R_B^{OI}}{1.03}$, consequently, $B_B^{TMF} = R_B^{OI} - \frac{R_B^{OI}}{1.03}$. Aggregate benefit to microcredit participants over non-participants are estimated as: $B^{TMF} = B_B^{TMF} * N$, where, N is the number of female borrowers, gathered from the MIXMARKET (2005).

[11]According to HEIS 2005 (Household Expenditure and Income Survey by BBS), national average household size in Bangladesh is 4.85.

[12]To estimate the loan cost, rl, average interest rate is assumed, which is though a crude assumption. Note that the interest rates of microcredit vary widely among the microfinance institutions in Bangladesh (Mahmud and Khalily 2008, cited in Bairagi 2014). MFIs' revenue income per borrower, gathered from MIXMARKET (2015), is considered as loan cost for borrowers. Other production costs are estimated as: $I - rl - R_B^{OI} => 0.7 * I - rl$.

Plugging in all the above functions into the aggregate benefit function, we came up with the following equation, which is defined as borrowers net-benefits function due to microcredit:

$$B^{TMF} = \left(\frac{0.009}{1.03}\right) PCI * FS * N \qquad (9)$$

All variables are defined before.[13] A flow of income for 1998 to 2013 period is estimated given the loan response elasticities and amount of loans disbursed during these years. Per capita income for fiscal years 1998-99 and 2010-11 were gathered from Khandker and Samad (2014) — $126 and $187 (in nominal dollars), respectively. They estimated 10 functional specifications to find the loan response to income, consumption, and other outcome variables. They found the loan response elasticities[14] ranged between -0.022 and 0.018 (five of 30 were negative signed). Roodman and Morduch (2009) bootstrapped the PK (1998) estimator based on their data and found the loan response elasticity to consumption to be between -0.04 and -0.06. In our analysis, we used 0.001 for 1998-99 to 2008-09 period and 0.002 for 2010-11 to 2012-13 period to estimate the levels of per capita income. This will constitute the reference per capita income flows. We estimated change in loan using the annual data on loan portfolio, gathered from the MIXMARKET (2015).

Benefits to the microfinance institutions

The microfinance institutions earn income as interest and fee that are collected from the borrowers, called financial revenue. The MIXMARKET reports financial revenues by MFIs after deducting the amount of default loan. We used year-wise (1996 to 2013) aggregate financial revenue after adjusting it with GDP deflators by the World Bank. Note that the cumulative repayment rates of most of the MFIs in Bangladesh are above 95% (Charitonenko and Rahman 2002). In other words, default rate is less than 5%.

Costs to the microfinance institutions

Three types of costs that the microfinance institutions face are considered in our analysis: (i) financial expenses (interest and fees they repay to sources of funds or donors), (ii) operating expenses (personnel expense, depreciation and amortization, and administrative expense and (iii) impairment loss.[15] Year-wise costs by microfinance institutions are gathered from the MIXMARKET (2015). These costs for 1998-2013 periods by microfinance institutions are gathered from the MIXMARKET (2015).

---

[13] An example is given: For 2014, the estimated benefits to the microcredit participants, using (9), would be $97 billion (=[(0.009/1.03)187*4.5*13.2]). In 2014, total number of active female borrowers was 13.2 million.

[14] $\mu = dln\ PCI / dln\ l$, which implies the percentage change in income due to a percentage increase in loan amount.

[15] This is a non-cash expense calculated as a percentage of the value of the loan portfolio that is at risk of default. The definition can also be found at http://www.mixmarket.org/about/faqs/glossary.

The data show that on an average operating cost accrues approximately 40% to the revenue income, followed by financial cost (31%), and impairment cost (7%).

To estimate future cash flows (2014 to 2035 period), we use this following method. Revenue income realized when adoption reach to 100% is estimated using the ratio of average (2011-2013) revenue to adoption rate[16]. The estimated revenue income is then used to obtain the flows of revenue incomes for 2014 to 2034 periods multiplying by the adoption profile with it. Estimating future flows of costs, assuming decreasing average cost, we multiply cost shares to the estimated flows of revenue incomes. Average (2011-2013) cost to revenue share, 0.8, is used for the first ten years', while 0.7 is used for second ten years. For 2034 and onwards 0.6 is used to estimate flows of costs, as operating cost is assumed to be constant since adoption rate approaches to around 90%. Cash flows are then discounted with three different social discount rates (3%, 5%, and 10%) to estimate the net present values.

The results show that the 2015 present value of compounded net benefits from the traditional microcredit market in Bangladesh for 1998-2014 period is estimated to be between 1.5 billion and 11.0 billion US dollars, depending on the discount rates, rate of microcredit participants' net-benefit over non-participants' benefit, default rates, and the loan response elasticity (Table 2). The contribution to society would have been even larger if we were to estimate the life-long benefits because of the intervention of microcredit market, assuming benefits from microcredit to society will last forever. We assume that current adoption rate of credit is about 32%. We estimated a flow of benefits and costs for 2015 to 2035, using an estimated adoption path—fully adoption would be realized in 2035 (Annex Figure 2). For onward 2036, we estimated the present value of perpetuity. We also estimated the net present value for 2015-lifelong period (discounted), to be between 5 and 52 billion US dollars, which will be compared with the estimated present value from flexible microfinance.

Net-benefits are disaggregated at the stakeholders' level and presented in Table 5. The esimtated 2015 net-benefits to the microcredit participants are estimated between 0-23 billion US dollars, depending on the assumptions in Table 1. While 5-25 billion US dollars are estimated for microfinance institutions in Bangladesh.

The benefit-cost ratio (BCR) is also estimated for the traditional microfinance, which we found to be between 1.32 and 2.09 (Table 4). Sinha *et al.* (2008) estimated the cost-benefit for BRAC's CFPR program and found it to be between 3.12 and 6.23, depending on discount rates as well as span of

[16] Suppose, the borrowers' benefit for 2013 is 130 million USD. The estimated adoption rate of that year is 0.38. For 2035, when adoption reach to 100%, benefit to borrower is estimated as $\frac{130}{0.38}$.

benefit years. Aghion and Morduch (2005) cited Khandker (2003) estimates of cost-benefit ratio of Grameen's effectiveness, which was 1.57; 2.59 to 3.53 for the microfinance programme of BRAC. The benefit-cost ratio of BRAC's ultra-poor program is found to be 5.4 if life-long benefit years are considered (Bandiera, undated). It should be mentioned here that the redistributive effect, empowerment impact and many aspects of complex social benefits have not been considered in our estimation. Possible inclusion of these factors, which is beyond the scope of this paper, would certainly inflate the BCRs of traditional microfinance. The estimated BCRs could have been even larger, if the benefits to all MFIs were to be included in the analysis. As mentioned above, we only included the information of 77 MFIs in Bangladesh, which are reported by the MIXMARKET.

III.2 Intervention-2: introduction to flexible microfinance

Competition among microfinance institutions (MFIs) in Bangladesh has increased over time (Khandker and Samad, 2014; Ashraf, 2014; and Ferdous and Uddin, 2010, cited in Zohir, 2014). However, as previously mentioned, three giants (GB, BRAC, and ASA) capture approximately 50-65% of total market share. These MFIs have already started to offer the heterogeneous products as well as flex-term loan to exert the market power. The main target group of the flex-term loan is the ultra poor households. Some of the noticeable flex-programs are offering monthly repayment instead of weekly ((BRAC's ultra-poor program, and PKSF's PRIME[17] (Khandker *et al.* 2013)). Since 2008, the PRIME program has been implementing flexible microcredit through 16 PKSF's partner organizations. The products that they offer are flexible microcredit and emergency loans. As of June 2013, the cumulative amount of 123 million US dollars (Tk. 9.644 billion) flexible microcredit has been disbursed to 512 thousands borrowers of 50 Upazilas in Bangladesh (PKSF 2014). The Institute of Microfinance (InM, 2012) evaluated the effectiveness of PRIME intervention after four years of that program's implementation. They found, using the difference-in-difference (DID) technique, that the annual income of the PRIME participants had increased about 8.3% in 2010 compared to the benchmark households. In our analysis, benefit to the participants of flexible microcredit is considered 8% higher than the non-participants' benefit, called the reference benefit.

Shonchoy and Kurosaki (2014) conducted a randomized control trial (RCT) experiment applying a temporary moratorium to repayments during the designated Monga period in Bangladesh. The authors treated it with an inflexible traditional microcredit. The results showed that borrowers with flexible microcredit had positive impact on food consumption after one year of intervention. However, there is no evidence of statistically significant difference between the traditional (10%) and flexible (11-12%) default rates. Field *et al.* (2014) reported that granting grace period might increase default

[17]Programmed Initiatives for Monga Eradication.

rates. They conducted an experimental design to examine the effect of introducing two-month grace period on business outcome. They found that household income increased 17%, but default rate increased too, from 2% to 10%. Weber *et al.* (2014) found that the delinquency rates were significantly different between seasonal farmers with flexible repayments schedules and non-farmers. Therefore, we considered MFIs' revenue forgone due to the additional default rate, 10% is considered for a pessimistic case.

Flexible microfinance will be more attractive to the existing as well as new (the very poor) consumers. So the number of borrowers will increase because of flexibility (Wright, 2001; Woller, 2002). Weber *et al.* (2014) found the inclusion of small farmers in Madagascar was possible with flexible microfinance. Because of flexible microfinance in Bangladesh, the derived demand for loan will shift outwards, which means that more loans will be disbursed/supplied compared to the traditional market. We assume approximately an addition of 2.5% new consumers will enter the microcredit market (Table1). Consequently, total amount of loan disbursement will increase; so will MFIs' profit. However, their financial expenses might increase. The financial cost is assumed to be increasing at 2.5% under the flexible system than the traditional system. Estimating additional benefits to the implementers, we multiply the current benefits of implementers by the increased numbers of borrowers.

Because of the introduction of the grace period, MFIs have to wait longer to get the return of principal along with interests than without grace period. So there is an opportunity cost of waiting in the grace period. However, implementers can save some costs related to loan collections, as loan collectors do not have to visit the field to collect loan during the grace period. Both these benefits and costs are minimal, and are neglected in our analysis.

The results show that under the flexible microcredit regime (2015 to life-long) potential welfare gains to the society are almost the same as the welfare gains under the traditional microcredit regime (2015-life-long). However, flex borrowers benefit significantly more than under the traditional microcredit system. The 2015 present value due to the intervention of flexible microfinance is estimated to be between 4 billion and 51 billion US dollars (Table 3), depending on the discount rates, rate of credit adoption, as well as other assumptions in Table 1. Potential net-benefits to the flex borrower are estimated to be 3-36 billion US dollars. It is worth mentioning that discounted life-long net-benefit of flex loan borrowers are significantly higher than MFIs' net-benefit. We also found that the estimated benefit-cost ratio for flexible microcredit is between 1.93 and 2.60 (Table 3), which is about 25-45% higher than the benefit-cost ratio for the traditional microcredit.

IV. Conclusions

This paper estimates the social benefits of the intervention of traditional microcredit, and compared it with the benefits from introducing of flexible microcredit (borrowers are granted a grace period during the lean period under traditional microcredit system). The NPV and BCR measures are applied to compare the net benefits estimated with different social discount rates (3%, 5%, and 10%) as well as three different scenarios in Table 1. We posit a logistic pattern of credit adoption path—full adoption is assumed to be realized within 40 years. Both the traditional and flexible microcredit follow the same adoption path. It is assumed that the net benefits from microcredit will last forever.

Our analysis reveals that under the flexible microcredit regime potential welfare gains to society are almost the same as the welfare gains under the traditional microcredit regime. However, flex borrowers would benefit significantly more than under traditional microcredit regime. The estimated present value of net benefits is between 17 billion and 59 billion US dollars under flexible microcredit, depending on the discount rates, rate of credit adoption, as well as the assumptions in Table 1. In contrast, the net benefits for the traditional microcredit are estimated to be between 5 billion and 52 billion US dollars. The benefit-cost ratio for flexible microcredit is estimated to be between 1.93 and 2.60 while for traditional microcredit it is to be between 1.32 and 2.09. Therefore, creating a new flexible microcredit market in Bangladesh for the very poor (a new cohort) as well as the existing borrowers would be beneficial for the country. Microfinance institutions might think of introducing a menu of flexible products in the market. However, a detailed cost-benefit analysis of each flexible program is required.

References

Aghion, B.A., and J. Morduch (2005). *The Economics of Microfinance*. The MIT Press, Cambridge, Massachusetts, London, England.

Alston, J.M., G.W. Norton, and P.G. Pardey. 1998. *Science under scarcity: Principles and practice for agricultural research evaluation and priority setting*. Wallingford, UK: CAB International.

Ashraf, M.A. (2014) *Understanding the Nature of Dropouts in MFIs: Evidence from Rural Bangladesh*. *European Journal of Business and Management*, Vol.6 (7): 62-70.

Assefa, E., Hermes, N. and Meesters, A. (2013) Competition and the performance of Microfinance Institutions, *Applied Financial Economics*, 23, 767–82.

Baiiragi, S. (2014) Productivity and Efficiency of Microfinance Institutions (MFIs) in Bangladesh. MPRA Paper 67917, University Library of Munich.

Bairagi, S. (2015 a). Ex-ante Economic Assessment of Research: High Omega-3 Soybean Oil for Mariculture. Unpublished PhD Thesis, Department of Agricultural Economics, University of Nebraska-Lincoln.

Bairagi, S. (2015 b). Welfare Impact of Import Duty in Rice Market of Bangladesh. Paper was prepared for to present the 2016 AAEA annual meeting.

Bairagi, S. and A. Azzam (2014) Does the Grameen Bank Exert Market Power Over Borrowers? *Applied Economics Letter* 21:866-869.

Bandiera, O., M (undated). BRAC's Ultra-Poor Programme: Graduation in the Longer Term. Available at: http://www.theigc.org/wp-content/uploads/2015/08/bandieraIGC-7y.pdf

Banerjee, A, E.Duflo, R.Glennerster, and C.Kinnan. (2009) "The Miracle of Microfinance? Evidence from a randomized evaluation." Working paper.

Banerjee, A., D. Karlan, and J. Zinman. (2015). Six Randomized Evaluations of Microcredit: Introduction and Further Steps. *American Economic Journal: Applied Economics*, Vol. 7(1): 1–21.

CDF (2015) Bangladesh Microfinance Statistics 2014-15. Dhaka: Credit Development Forum (CDF).

Charitonenko, S. and S.M. Rahman (2002).Commercialization of Microfinance in Bangladesh. Manila: Asian Development Bank. Philippines.

Chemin, M. (2008) The Benefits and Costs of Microfinance: Evidence from Bangladesh. *Journal of Development Studies*, 44 (4): 463-484.

Czura, K., D. Karlan, and S. Mullainathan (2011). Does Flexibility in Microfinance Pay Off? Evidence from a Randomized Evaluation in Rural India. Working Paper, Goethe University Frankfurt.

Feigenberg, B., E. Field, and R. Pande (2011) The Economic Returns to Social Interaction: Experimental Evidence from Microfinance. Harvard University.

Ferdous, F. and Uddin, G. M. (2010). Microfinance. First News, 8 August: 36 – 47.

Field, E. and R. Pande, (2008). Repayment Frequency and Default in Micro-Finance: Evidence from India. Journal of the European Economic Association. Vol. 6 (2-3): 501-509.

Field, E., A. Holland, and R. Pande (2014). Microfinance: Point of Promise. Available at: http://www.hks.harvard.edu/fs/rpande/papers/microcredit_chapter_2014_09_12_2.pdf (accessed 12 March 2016).

Field,E., R.Pande, and J. Papp, (2009). Does Microfinance Repayment Flexibility Affect Entrepreneurial Behavior and Loan Default?

Field, E., R. Pande, J. Papp, and N. Rigol (2013). Does the Classis Microfinance Model Discourage Entrepreneurship Among the Poor? Experimental Evidence from India. American Economic Review, 103(6): 2196-2226.

Field, E., R. Pande, J. Papp, and Y.J. Park (2012). Repayment Flexibility Can Reduce Financial Stress: A Randomized Control Trials with Microfinance Clients In India. PLoS One, Vol. 7(9).

Fox, J., and S. Weisberg. 2011. *An R Companion to Applied Regression*, second edition, Thousand Oaks, California: SAGE Publication Inc.

Gine, X., and D. Karlan (2011) Group versus Individual Liability: Short and Long Term Evidence from Philippine Microcredit Lending Groups. Economic Growth Centre, Yale University, New Haven, CT, USA.

Hossain, M. 1984: "Credit for the Rural Poor, The experience of Grameen Bank in Bangladesh, Research Monograph No. 4, BIDS, Dhaka.

Hossain, M. 1988: Credit for Alleviation of Rural poverty: The Grameen Bank in Bangladesh', Research Report 65, International Food Policy Research Institute, Washington, D.C.

Hulme, D., and P. Mosley (1996). *Finance Against Poverty*. Routledge, London.

InM. (2012). Effectiveness for PRIME Interventions in Greater Rangpur at the Household Level and Institutional Level: A Longitudinal Approach. Dhaka: Institute of Microfinance (InM).

Islam, A., C.N.H. Nguyen, and R. Smyth. 2013. Does microcredit change informal lending in village economies? Evidence from Bangladesh.

Karlan, D. and S. Mullainathan (2009). Is Microfinance Too Rigid? VoxEU December 2007.

Khandker, S. R. 2003, Micro-finance and Poverty: Evidence Using Panel Data from Bangladesh, World Bank Policy Research Working Paper 2945.

Khandker, S.R. and H.A. Samad (2014). Dynamic Effect of Microcredit in Bangladesh. Policy Research Working Paper, No. 6821.The World Bank.

Khandker, S.R., B. Khalily,and H. Samad, (2010). "Vulnerability to Seasonal Hunger and Its Mitigation in Northwest Bangladesh," Working Papers 4, Institute of Microfinance (InM).

Khandker, S.R., M.A. B. Khalily, and H. A. Samad. (2013) Seasonal Hunger and Its Mitigation in Northwest Bangladesh. The World Bank.

Khandker, Shahidur R. (2005). Microfinance and Poverty: Evidence Using Panel Data from Bangladesh. The World Bank Economic Review, 19(2), 263-286.

Laurreti, C. and M. Hamp. (2011). Innovative Flexible Products in Microfinance. *Savings and Development* Vol. 35 (1): 97-129.

Lebei, M., C. laureti, and A. Szafarz. (2013) Flexible Products in Microfinance: Overcoming the Demand-Supply Mismatch.

Meyer, R.L. 2002. The Demand for Flexible Microfinance Products: Lessons from Bangladesh. *Journal of International Development*, Vol. 14 (3).

Mokhtar, S.H., G. Nartea, and C. Gan. (2012). Determinants of microcredit loans repayment problem among microfinance borrowers in Malaysia. *International Journal of Business and Social Research*, Vol. 2 (7): 33-45.

Morduch, J. (1999) "The Microfinance Promise." *Journal of Economic Literature* Vol. 37: 1569-1614.

Morduch, J. 1998. “Does Microfinance Really Help the Poor? New Evidence from Flagship Programs in Bangladesh” (mimeo).

MRA (2010), NGO-MFIs in Bangladesh, Vol. 7, Microcredit Regulatory Authority, Dhaka, Bangladesh.

Osmani, S.R. (2012) Asset Accumulation and Poverty Dynamics in Rural Bangladesh: The Role of Microcredit. Working Paper No. 11, Institute of Microfinance, Dhaka.

Pakrashi, D., C. Maitra, and A. Islam. 2014. Microcredit Program Participation and Household Food Security in Rural Bangladesh. Available at: http://www.isid.ac.in/~epu/acegd2014/papers/DebayanPakrashi.pdf

Pitt, M. M. 1999. “Reply to Jonathan Morduch's 'Does Microfinance Really Help the Poor? New Evidence from Flagship Programs in Bangladesh'.” (mimeo).

Pitt, M. M. 2011. Response to Roodman and Morduch’s “The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence.” Brown University.

Pitt, M. M. 2014, “Re-Re-Reply to “The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence”. World Bank Policy Research Working Paper No. 6801.

Pitt, M. M. and S. R. Khandker. 1998. “The Impact of Group-based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter?” *Journal of Political Economy*, 106 (June): 958-996.

Pitt, M. M., S. R. Khandker, and J. Cartwright. 2006. “Empowering Women with Micro Finance: Evidence from Bangladesh,” *Economic Development and Cultural Change*, Vol. 54 (4): 791-831.

PKSF (2014). Annual Progress Report: PRIME and LIFT 2012-13. Dhaka: Palli Karma-Sahayak Foundation (PKSF).

Rahman, S. 2007. The Impact of Microcredit on Poverty and Women's Empowerment: A Case Study of Bangladesh. PhD Thesis, Submitted to the School of Economics and Finance, College of Law and Business, University of Western Sydney.
Raihan, S., S.R. Osmani, and M.A. Baqui Khalily (2015).Contribution of Microfinance to the Gross Domestic Product (GDP) of Bangladesh. InM Working Paper, No. 44. Dhaka: Institute of Microfinance.

Rishad, S. S. (2012) Do Profit Incentives Matter in Microfinance Programs? MRA 2016. List of Licenced MFIs as of 31 December'2015. Available at: http://www.mra.gov.bd/images/Licensed_NGO_MFIs/le311215.pdf (accessed on 27 January 2016).

Roodman, D. and J. Morduch. (2009). The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence. Revised in 2011. Available at: http://www.cgdev.org/files/1422302_file_Roodman_Morduch_Bangladesh_2.pdf

Roodman, D. and J. Morduch. (2013). The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence. *The Journal of Development Studies*, Vol. 50(4): 583-604.

Schroeder, Elizabeth (2014) The Impact of Microcredit Borrowing on Household Consumption in Bangladesh. Mimeo, Georgetown University Economics Department.

Shonchoy and Kurosaki (2014). Impact of Seasonality-adjusted Flexible Microcredit on Repayment and Food Consumption: Experimental Evidence from Rural Bangladesh. IDE Discussion Paper No. 460. Japan: Institute of Developing Economies.

Sinha, S., J. Gidwani, and N.C. Das. (2008). Cost-benefit Analysis of CFPR. Dhaka: Bangladesh Rural Advancement Committee (BRAC).

Teng, J.T.C., V. Grover, and W. Guttler. 2002. Information Technology Innovations: General Diffusion Patterns and its Relationship to Innovation Characteristics. IEEE Transaction on Engineering Management 49(1): 13–27.

Tsukada, K. (2012). Microfinance Revisited: Towards a More Flexible Lending Contracts, Ch. 2. In *Abu Shonchoy ed., Seasonality Adjusted Flexible Micro-Credit: An Randomized Experiment in Bangladesh*, Interim Report, Chosakenkeu Hokokusho, IDE-JETRO 2012.

Wadud, A. (2013). "Impact of Microcredit on Agricultural Farm Performance and Food Security in Bangladesh," Working Papers 14, Institute of Microfinance (InM).

Weber, R., and O. Musshoff. (2013). Can Flexible Microfinance Loans Improve Credit Access for Farmers? Agricultural Finance Review, Vol. 73 (2): 255-271.

Weber, R., O. Mushoff, and M. Petrick. (2014). How Flexible Repayment Schedules Affect Credit Risk in Agricultural Microfinance. Discussion Paper, No. 1404.Department für Agrarökonomie und Rurale Entwicklung, Georg-August Universität Göttingen.

Woller, G. 2002. "From Market Failure to Marketing Failure: Market Orientation as the Key to Deep Outreach in Microfinance." Journal of International Development 4: 305-324.

Wright, G.A.N. 2001. “Dropouts and Graduates: Lessons from Bangladesh.” Microbanking Bulletin 6: 14-16.

Yuge, Y. (2011) The Current Situation of Microfinance in Bangladesh: A Growing Concern about Overlapping Loan Problems – From a Field Visit to Rajshahi and Comilla. Student Research Series, March 2011, The Fletchers School, Tufts University.

Yunus, M. (2013) Sacrificing microcredit for mega profits, New York Times (1 January). Available at http://www.nytimes.com/2011/01/15/opinion/15yunus.html?_r=0 (accessed 19 November 2015).

Zaman, H. (2004).Microfinance in Bangladesh: Growth, Achievements, and Lessons. The World Bank.

Zaman, M. (2013).Achievement and Problems of Microfinance of Two Leading MFIs in Bangladesh: A Case Study of GB and ASA. ASA University Review, Vol. 7 (2): 183-198.

Annex

Table 1. Assumptions of sensitivity analysis

	Participant's benefit over non-participants	Loan response elasticity		Default rate	No. of borrowers	Financial cost
		1998-2010	2011-2014			
TMF						
Pessimistic	0% higher	0.001	0.002	10%		
Reference	3% higher	0.001	0.002	5%		
Optimistic	5% higher	0.001	0.011	5%		
FMF						
Pessimistic	6% higher	0.001	0.002	10%	Same as TMF market	Same as TMF market
Reference	8% higher	0.001	0.002	5%	2.5% more than TMF market	2.5% more than TMF market
Optimistic	10% higher	0.001	0.011	5%	2.5% more than TMF market	2.5% more than TMF market

Note: all other variables are same for both the traditional and flexible microfinance markets.

Table 2. The 2015 present value of net benefits of traditional microfinance

(Billion USD)

Scenarios	Present value (PV)	Traditional microfinance (TMF)		
		$\delta = 3\%$	$\delta = 5\%$	$\delta = 10\%$
Pessimistic	PV (1998 to 2014)	1.36	1.56	2.26
	PV (2015 to 2035)	7.10	5.69	3.50
	PV of perpetuity (2036 and onward)	15.80	6.33	1.19
	PV (2015 to lifelong)	22.90	12.02	4.69
Reference	PV (1998 to 2014)	4.59	5.32	7.80
	PV (2015 to 2035)	13.91	11.39	7.39
	PV of perpetuity (2036 and onward)	24.58	9.85	1.85
	PV (2015 to lifelong)	38.49	21.24	9.25
Optimistic	PV (1998 to 2014)	6.56	7.58	11.08
	PV (2015 to 2035)	19.61	16.13	10.57
	PV of perpetuity (2036 and onward)	32.32	12.95	2.44
	PV (2015 to lifelong)	51.93	29.07	13.01

Source: Authors' estimation (2015).

Table 3. The 2015 present value of net benefits of flexible microfinance

(Billion USD)

Scenarios	Present value (PV)	$\delta = 3\%$	$\delta = 5\%$	$\delta = 10\%$
Pessimistic	PV (2015 to 2035)	14.71	9.30	3.57
	PV of perpetuity (2036 and onward)	17.77	4.94	0.38
	PV (2015 to lifelong)	32.48	14.24	3.96
Reference	PV (2015 to 2035)	18.70	11.92	4.67
	PV of perpetuity (2036 and onward)	21.50	5.98	0.46
	PV (2015 to lifelong)	40.20	17.90	5.13
Optimistic	PV (2015 to 2035)	24.08	15.27	5.89
	PV of perpetuity (2036 and onward)	27.21	7.56	0.59
	PV (2015 to lifelong)	51.29	22.84	6.47

Source: Authors' estimation (2015).

Table 4
Forward looking analysis (in 2015 prices) of microfinance market in Bangladesh: 2015 to lifelong

	Discount rate, $\delta = 3\%$			Discount rate, $\delta = 5\%$			Discount rate, $\delta = 10\%$		
	Benefit	Cost	BCR	Benefit	Cost	BCR	Benefit	Cost	BCR
Pessimistic									
TMF	68.60	45.71	1.50	40.00	27.98	1.43	19.21	14.52	1.32
FMF	62.48	30.00	2.08	28.47	14.23	2.00	8.21	4.26	1.93
Reference									
TMF	86.15	47.66	1.81	50.23	29.00	1.73	24.13	14.88	1.62
FMF	72.33	32.13	2.25	33.04	15.14	2.18	9.59	4.46	2.15
Optimistic									
TMF	99.59	47.66	2.09	58.07	29.00	2.00	27.89	14.88	1.87
FMF	83.42	32.13	2.60	37.98	15.14	2.51	10.93	4.46	2.45

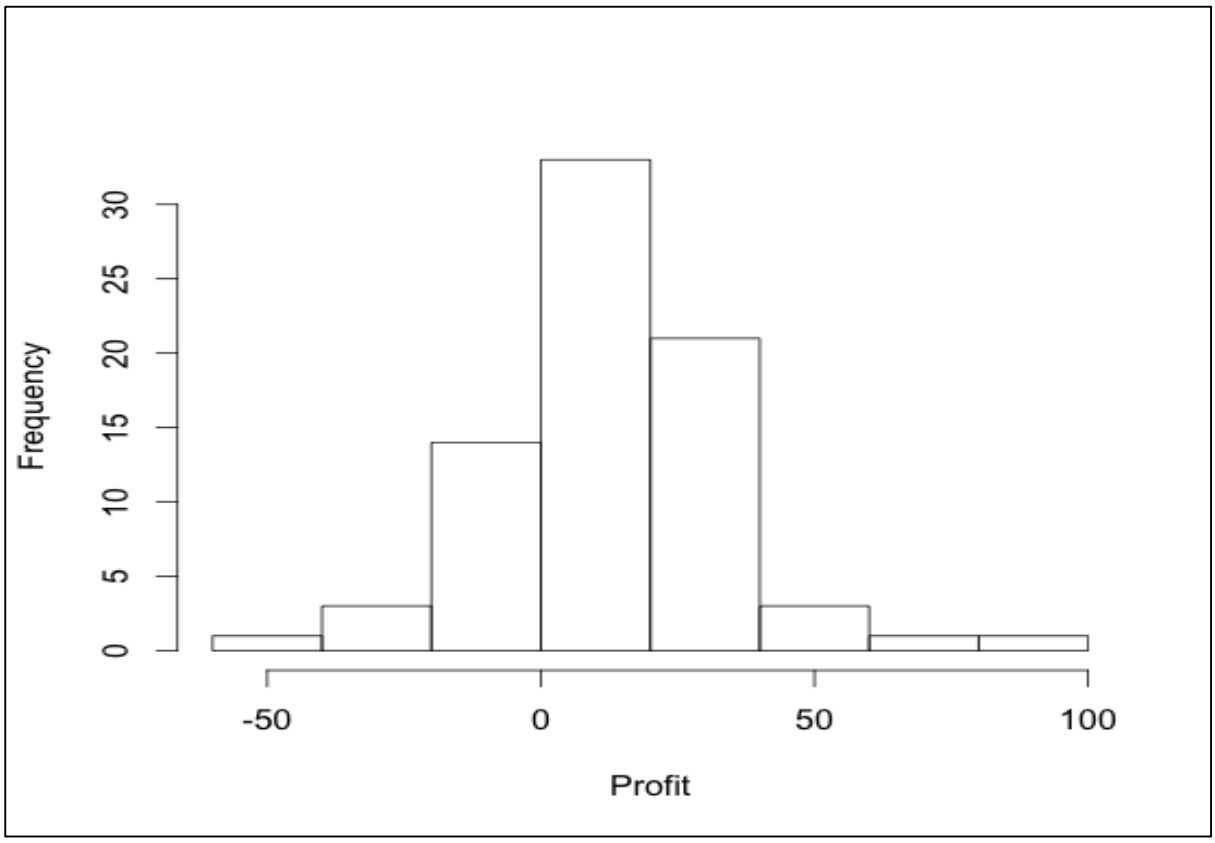
Source: Authors' estimation (2015).

Table 5. Stakeholder-wise net-benefit (in 2015 prices) of microfinance market in Bangladesh

	Borrowers net-benefits			MFIs' net-benefits		
	$\delta = 3\%$	$\delta = 5\%$	$\delta = 10\%$	$\delta = 3\%$	$\delta = 5\%$	$\delta = 10\%$
Pessimistic						
TMF	0	0	0	22.90	12.02	4.69
FMF	18.25	8.61	2.73	14.23	5.63	1.22
Reference						
TMF	13.73	8.01	3.85	24.76	13.23	5.40
FMF	24.48	11.55	3.66	15.72	6.34	1.47
Optimistic						
TMF	27.18	15.85	7.61	24.76	13.23	5.40
FMF	35.57	16.49	5.00	15.72	6.34	1.47

Source: Authors' estimation (2015).

Figure 1. Profit margin earned by the microfinance institutions in Bangladesh



Notes: Historical average of profits by microfinance institution are considered. Profit margin, defined by the Mix Market, is: Net Operating Income/Financial Revenue, which can be found at: http://www.mixmarket.org/about/faqs/glossary. **Source:** Authors' estimation using equation 8.

Figure 2. Adoption path of microcredit in Bangladesh

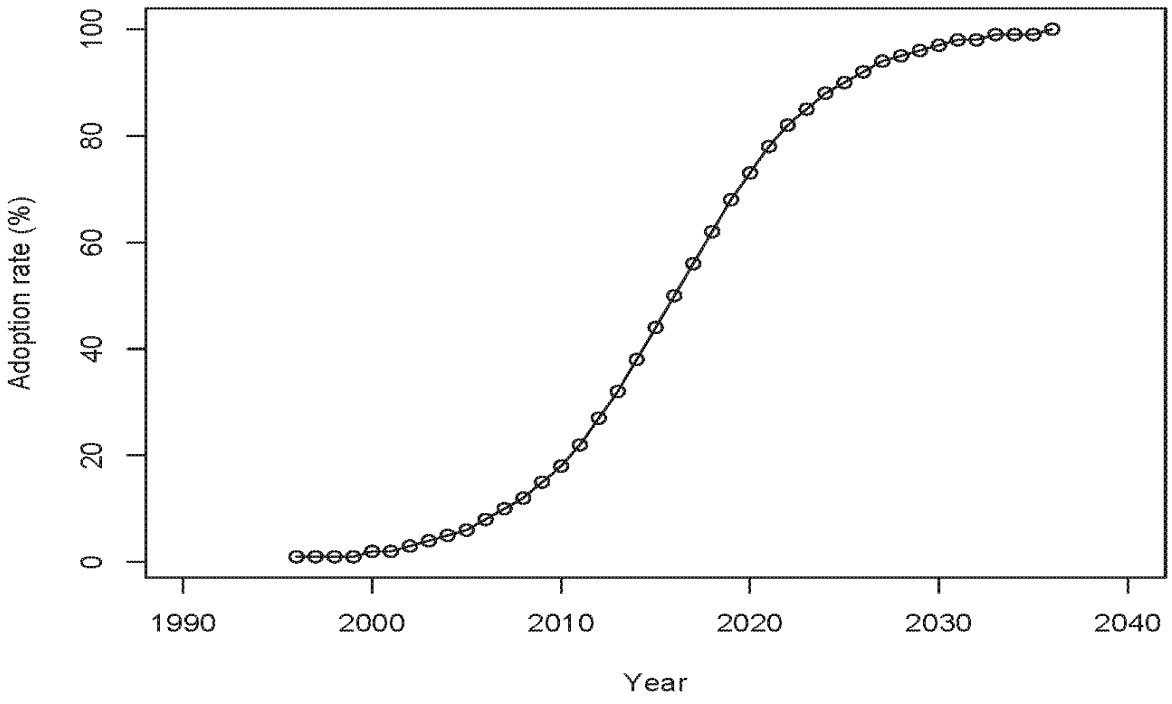
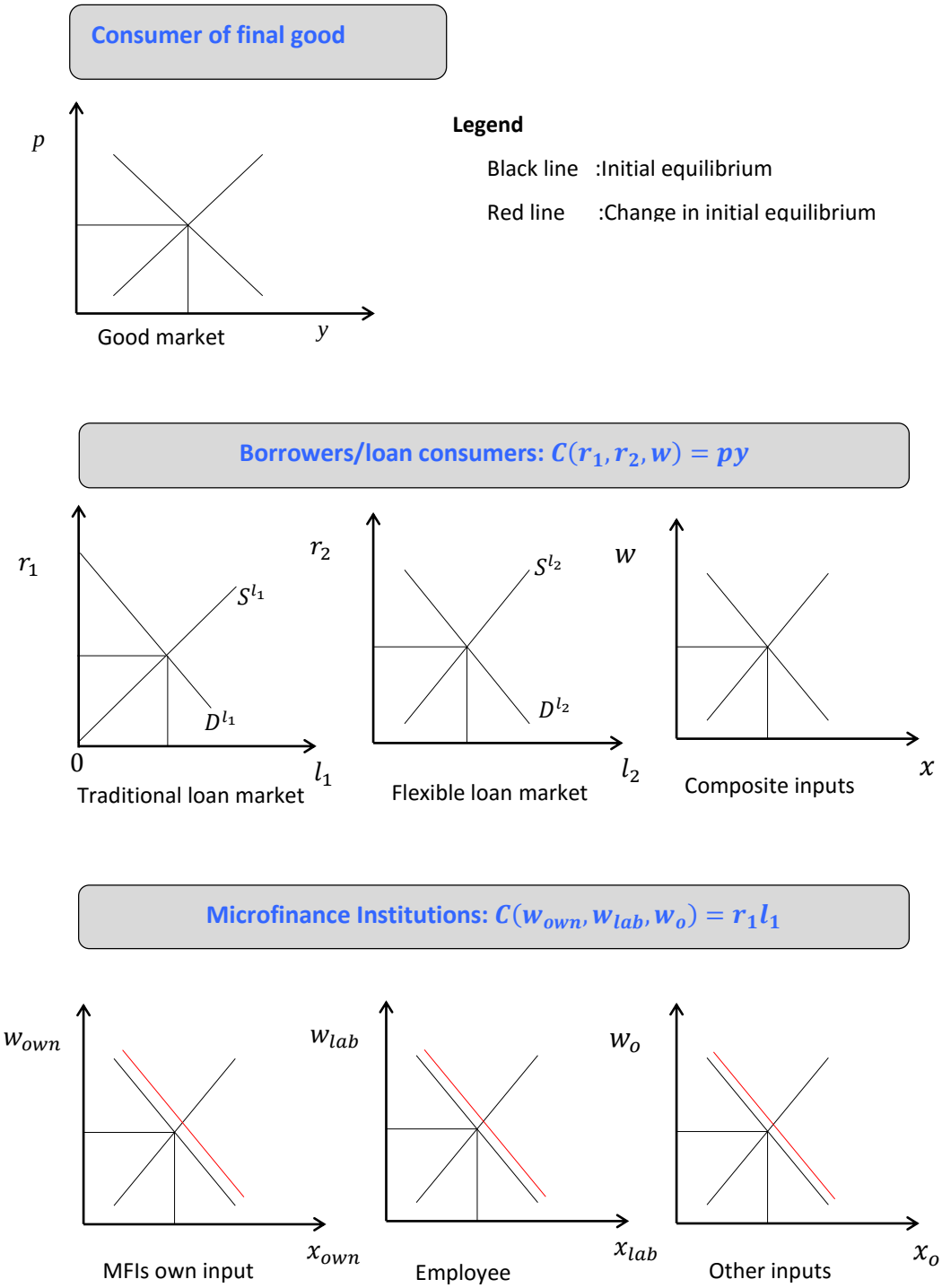


Figure 3. Impact of flexible microfinance in Bangladesh



Bangladesh, like most nations, faces a large number of challenges. What should be the top priorities for policy makers, international donors, NGOs and businesses? With limited resources and time, it is crucial that focus is informed by what will do the most good for each taka spent. The Bangladesh Priorities project, a collaboration between Copenhagen Consensus and BRAC, works with stakeholders across Bangladesh to find, analyze, rank and disseminate the best solutions for the country. We engage Bangladeshis from all parts of society, through readers of newspapers, along with NGOs, decision makers, sector experts and businesses to propose the best solutions. We have commissioned some of the best economists from Bangladesh and the world to calculate the social, environmental and economic costs and benefits of these proposals. This research will help set priorities for the country through a nationwide conversation about what the smart - and not-so-smart - solutions are for Bangladesh's future.

SMARTER SOLUTIONS FOR BANGLADESH

For more information visit www.Bangladesh-Priorities.com

COPENHAGEN CONSENSUS CENTER

Copenhagen Consensus Center is a think tank that investigates and publishes the best policies and investment opportunities based on social good (measured in dollars, but also incorporating e.g. welfare, health and environmental protection) for every dollar spent. The Copenhagen Consensus was conceived to address a fundamental, but overlooked topic in international development: In a world with limited budgets and attention spans, we need to find effective ways to do the most good for the most people. The Copenhagen Consensus works with 300+ of the world's top economists including 7 Nobel Laureates to prioritize solutions to the world's biggest problems, on the basis of data and cost-benefit analysis.

© Copenhagen Consensus Center 2016