Microfinance and Moneylender Interest Rate: Evidence from Bangladesh

Debdulal Mallick

November 2009

Research Monograph Series No. 42

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

ABSTRACT

The linkage between the formal and informal credit markets has long been of great interest to development economists. This paper addressed one aspect of the linkage by empirically investigating the impact of the microfinance programme expansion on the moneylender interest rates in Bangladesh, and found that moneylender interest rates increased with microfinance programme expansion. Microfinance programme expansion increased moneylender interest rates in the villages in which more loans were invested in productive economic activities than consumption. Borrowers resort to moneylenders for additional funds because of inadequate supply, unavailability of seasonal working capital from microfinance institutions, and tight repayment schedule, which in turn increased demand for moneylender loans.

INTRODUCTION

Bangladesh has the largest operation of microfinance[1] programme in the world with about 12.4 million active borrowers and over 629 microfinance institutions (MFI) engaged in microfinance (World Bank 2003, p 21). One of the arguments given for expanding the microfinance industry is to substitute for informal credit market[2] and help poor people escape the clutches of 'evil moneylenders' who allegedly charge usurious rates of interest (Meyer 2002). This is a decade-old problem for the policymakers in developing countries. As early as in the 1950s the Indian government tried to provide positive institutional alternatives to the moneylenders (Bell 1990). The linkage between the formal and informal credit markets has also been of great interest to development economists. Morduch (1999, p 1595) raised the question, "How will the existence of a subsidized programme affect the profitability of both formal and informal institutions operating nearby?" This paper addresses one important aspect of linkage by empirically investigating the impact of microfinance programme expansion on the moneylender interest rates in Bangladesh.

Recent development points out that the response of the interest rates in informal sector to expansion of formal credit depends on the characteristics of both sectors such as market structure in the informal sector and repayment schedule of formal sector. Hoff and Stiglitz (1993, 47-48; 1998) outlined conditions under which increasing access to formal credit may increase or decrease interest rates in informal sector. If some borrowers can satisfy all their borrowing needs from formal sector at lower interest rates, there will be less demand for informal credit. Under perfect competition and perfect information, this would exert downward pressure on interest rates. But in a monopolistically competitive market[3] with free entry and one moneylender being an

---

[1] In this paper no distinction is made between "microfinance" and "microcredit" as microfinance operation is defined to include lending activities only.

[2] Informal sector includes friends, relatives, neighbours, moneylenders, employers, input suppliers, and shopkeepers. Microfinance institutions (MFI), government institutions, commercial banks, cooperatives, and other NGOs are defined as the formal sector (McKernan, Pitt and Moskowitz, 2005).

[3] There is evidence that rural informal credit markets are not perfectly competitive. One celebrated study is by Aleem (1990) who studied services, costs, and charges of 14 informal market moneylenders and their clients in Chambar, Pakistan. His estimated the resource costs incurred by informal lenders for screening, pursuing delinquent loans, overhead, and cost of capital and found that lenders charge interest rates that are equal to their average cost of lending but exceed their marginal cost. His finding suggests that the informal credit market is characterized by monopolistic competition in the presence of imperfect information.

1

imperfect substitute for another, a subsidy in formal sector may cause the interest rates in informal sector to rise because the induced new entry drives up the marginal enforcement cost of lending in the informal sector (Hoff and Stiglitz 1998). Bose (1998) extends Hoff and Stiglitz (1998) by including heterogeneous agents who differ in their probability of default. The subsidized programmes diminish optimal scale and siphon off the best borrowers. As a result, the informal lenders are left with a riskier pool of borrowers that leads to higher enforcement costs, and consequently they charge higher interest rates as risk premium. Jain (1999) reached similar conclusion by considering a case in which scale advantages of the formal sector outweigh the informational advantages of local moneylenders, while Floro and Ray (1997) considered the case in which an expansion of formal credit may strengthen the ability of informal lenders to collude among them.

Jain and Mansuri (2003) followed an entirely different route that resembled the present scenario in Bangladesh that a microfinance programme might well have a "crowding-in" effect on informal lenders. Under some circumstances this "crowding-in" effect might be strong enough to raise the interest rates in the informal sector. For example, the tight repayment schedule of MFIs (in Bangladesh the first weekly installment of MFI loans is due immediately) forces many borrowers to borrow from moneylenders to repay MFI loans. Borrowers also find it difficult to finance long-gestation projects and even seasonal working capital needs for agricultural production by loans from MFIs.

Although there are numerous theoretical models that explain the interest rates in informal sector as a result of MFI programme expansion, empirical evidence is scant. To the best of our knowledge, this is the first paper that investigates this linkage in Bangladesh context. We analyze village level survey data from 156 villages in three districts in northern Bangladesh, and find that moneylender interest rates increase with MFI programme expansion. The interest rates are found to be higher in the villages where higher percentage of households borrowed from MFIs after controlling uses of MFI and moneylender loans, adoption of modern agricultural production technology, quality of cultivable land, village level physical infrastructure, incidence of poverty, and a proxy for competition among moneylenders.

We find that use of moneylender loan in productive purposes than consumption lowers interest rates. But MFI programme expansion increases moneylender interest rates in the villages in which more loans

---

Iqbal (1988) found evidence of the reduction of moneylender monopoly power in rural India as a result of increased competition from formal lending agencies. Kochar (1997, p. 366) obtained a negative but insignificant (statistically) coefficient of per capita formal credit on the probability of borrowing from informal sector, and concluded that a more thorough analysis of the relationship between formal and informal credit is warranted.

are invested in productive activities. Productive use of loan lowers the default risk. On the other hand, since MFIs do not supply adequate amount for productive investment or for seasonal working capital, and repayment is required immediately after borrowing, borrowers resort to moneylenders for additional funds to sustain their projects. The increased demand raises moneylender interest rates. Although it is not our purpose to test competing theories, our empirical results favour Jain and Mansuri (2003) hypothesis. We cannot directly test the hypothesis because there is no variation in the repayment schedule of MFI loans; for all MFIs in Bangladesh maturity of loan is usually one year and borrowers are required to begin repayment immediately after loan is disbursed (usually after one or two weeks). It is also found that competition among moneylenders lowers interest rates. Interest rates are also higher in the villages located away from place of commercial activities. Results are robust to correction for endogeneity.

The results have important policy implications. MFIs can enhance productive investment by borrowers by allowing more flexibility in loan disbursement and repayment schedule. Borrower projects will also be more profitable if MFIs expand their programme of loan-only to loan-plus such as credit with skill development training, information and provision of inputs. On the other hand, competition between formal and informal lenders will increase borrowers' access to fund at competitive interest rates.

FORMAL-INFORMAL LINKAGES IN CREDIT MARKET
IN RURAL BANGLADESH

Very little is known about the response of the informal lenders to MFI programme expansion. However, there is widespread evidence that MFI clients borrow from informal sources as part of their financial management strategy. Sinha and Matin (1998) reported that about 87% of rural households in the northern Bangladesh borrowed from informal sources and the proportion was higher among the MFI borrowers. Husain *et al.* (1998) found that 11.6% of borrowers from BRAC also borrowed from moneylenders. Zeller *et al.* (1999) reported similar practices among the rural households in Bangladesh they surveyed in 1994. MFI borrowers received 20% of their total debt outstanding from friends and relatives and another 18% from shopkeepers and other informal sources.

McKernan, Pitt and Moskowitz (2005) documented that during 1998/99 the informal sector was at least as important as the formal sector in Bangladesh. About 29% of the rural households received money (in the form of loan and gift) from the formal sector compared to 24% from the informal sector. Average amount of money received from the informal sector was significantly larger than the average amount received from the formal sector. An average household received Tk. 2,125 as formal loan, Tk. 1,440 as informal loan, and Tk. 3,040 as informal gifts. Only 6% of the households received money from both sectors and 49% from either formal or informal sector. Roughly 2% of rural households received credit from moneylenders, accounting for 23% of all non-relative credit and 9% of the informal credit received.

Household consumption and payment of other loans are the two most frequently reported uses of informal loans. Sinha and Matin (1998) pointed out that due to large increase in MFI lending some internal cross-financing was taking place in which the proceeds from one loan were being used to repay another. Clients borrow from informal sources so they could maintain high repayment rates with MFIs and become eligible for larger loans in future. Atique Rahman (1992) also provides evidence of similar practices. Aminur Rahman (1999) observed that MFI employees were expected to increase disbursement of loans among their members and pressed for high recovery rates to earn profit necessary for economic viability of the institution. To ensure timely repayment of loan, centers employees and borrowing peers inflict an intense pressure on women clients. Many borrowers maintain their regular repayment schedules through a process of loan recycling that considerably increases the debt liability on the individual households, and increases tension and

frustration among household members. Zeller *et al.* (1999) reported that 9% of the funds borrowed from informal sources were used to pay existing debt. Todd (1996) also describes the complex financial management practices of women members of the Grameen Bank. Clients borrow to pay moneylender and other informal loans, and borrow small sums informally to meet loan installments.

5

DATA COLLECTION

Data were collected in 2002 from 156 villages in three districts in northern Bangladesh (Kurigram, Rangpur and Nilphamari) as part of the baseline survey for BRAC's CFPR/TUP (Challenging the Frontiers of Poverty Reduction – Targeting the Ultra Poor) programme.[4] Before launching the CFPR/TUP programme on a pilot basis BRAC first needed to select the villages and the extreme poor therein. In the first step of the selection, BRAC's Research and Evaluation Division (RED) conducted participatory rural appraisal PRA in the villages randomly selected to determine the extent of poverty and also to identify the extreme poor in the selected villages.[5] Households initially selected by PRA were surveyed to cross-check the information gathered by PRA, and also to create a baseline for future programme evaluation. Along with the baseline household survey, comprehensive village level information was collected by focus group discussion (FGD)[6]. This paper uses village level survey data for all these villages. The household survey was conducted only among the extreme poor selected by PRA and, therefore, does not represent the village population.

There were several preparatory stages before the FGD. The first stage was to build rapport with the community members. This was not difficult because in most situations the community members were already familiar with BRAC programmes and staff. BRAC's Programme Organizers walk around the community inviting people of all walks of life to the PRA meeting. The PRA sessions and the next household surveys enabled the research team to build good rapport with the community and to have a good idea about who to invite for the FGD. These are the people who are the most knowledgeable about the village. Given the type of issues to be covered in the FGD, members of different socioeconomic background, age and occupation were selected. The group of invitees generally included school teachers, elected *Union Parishad* (the lowest tier of local government) members, health workers, students and MFI clients. Local bazaar, school or the well traveled place in the village was selected as the venue for the FGD. The size of the group ranged between 8 and 10. The group seated on chairs around a table so that maximum opportunity for eye contact is possible with both the moderator and other

---

[4] The CFPR/TUP program is designed to target only the extreme poor whose poverty lasts long or throughout their entire life, and who even lack the opportunities for upward mobility through regular microfinance programs (Matin and Halder, 2004, p. 5).

[5] For a detail description of this data collection method, see BRAC (2004).

[6] Stewart and Shamdasani (1990), and Litosseliti (2003) provide nice discussions on Focus Group Discussion.

group members. If chairs were not available for everyone, the group sat on the ground making a circle. The moderator, who was a researcher from RED and also well trained in qualitative research and data collection, was fully aware of the fact that MFI clients were poor women and being borrowers they were less powerful in the community. The moderator encouraged them to freely express their opinion by explicitly asking them and by providing verbal rewards for such opinions. This was necessary because their responses were crucial for some information. They borrowed from different sources including MFIs and moneylenders and had also close contacts with other MFI clients, and therefore they were better informed about the rural credit market. However, their responses were also discussed by other participants in the group and enumerated only after verification.

A structured questionnaire was used to collect data because of the type of information sought and also for reliability and possibility of replication. At the beginning of the session, the moderator clearly specified the objective of the FGD and the type of information to be sought. It was also made clear at the outset that the FGD would continue for about two hours. However, in several occasions, all issues were not possible to cover in two hours so that discussions had to discontinue. Groups were not kept beyond schedule because it was perceived that impatience of the participants may lead to inaccurate answers. Therefore, all information could not be collected from many villages; there are 89 villages for which data are available for all variables used in the regression.

It is important to mention that more than one FGD were conducted in large villages because participants residing in one part of the village may not have the most accurate information about those residing in another part.

Descriptive statistics

Table 1 presents some descriptive statistics of the villages considered in this study. On average, 3.9 MFIs have loan operation in each of the sample villages. The minimum and maximum numbers of MFIs working in a village are one and nine respectively. Average number of big MFIs[7] is 3.6 with the minimum and maximum numbers being one and eight respectively. This indicates competition among the MFIs for clients even among the big ones. On average, 33% of all households borrowed from any MFI with a standard deviation of 19. The correlation between number of MFIs and percentage of client households is high at 0.88.

In 32.7% of the villages, higher percentages of clients use MFI loans for any productive investment[8] than consumption, and agriculture has been the predominant sector for investment. Conversely, in 10% of the villages the primary use of moneylender loans was any productive investment. Productive investment was the highest in nearly 60% of the villages for the commercial bank loans.

In about 27% of the villages, poverty situation improved and in 17% of the villages it remained the same in last five years. In about 35% of the villages the situation deteriorated severely. The number of casual daily labourer in the agricultural sector increased in 71% of the villages and it decreased in about 15% of the villages. Increasing incidences of females going out of home for work were reported in 56.7% of the villages, while it decreased in 2.7% of the villages. However, the reason cannot be verified from data; it may be due to greater women empowerment or increased poverty. Average daily male and female wage rates (wage rates are averaged over three cropping seasons) were Tk. 44 and 30 respectively.

---

[7] These are Grameen Bank, BRAC, ASA, PROSHIKA, BRDB, Bangladesh Agricultural Bank, RDRS, and Thengamara Mohila Sabuj Sangha. The last two are big regional MFIs working only in the northern Bangladesh.

[8] This includes any type of investment that generates future steam of income both in the short and long run such as crop production, small business, buying power tiller, bullock (for ploughing) or cow, giving bribe to manage job for family members and so on.

Table 1. Descriptive statistics of the villages

Number of MFI working in the village	3.9 (1.4)*
	(Min = 1, Max = 9)
Number of big MFI working in the village	3.6 (1.3)*
	(Min = 1, Max = 8)
Number of households in the village	548.3 (426.5)*
	(Min = 59, Max =2600)
Number of households in the village with MFI membership	179.7 (148.0)*
	(Min = 6, Max = 775)
% of households in the village with MFI membership	33 (19)*
	(Min = 1, Max = 96)
Moneylender interest rate (annual %)	103.33 (59.06)*
	(Min = 10 Max = 240)
Daily male wage rate (in Taka)	44.37 (8.26)*
Daily female wage rate (in Taka)	30.09 (6.88)*
Main use of MFI loan in productive investment	32.7% (48)
Main use of Moneylender loan in productive investment	10.0% (13)
Main use of Bank loan in productive investment	59.7% (80)
In the last 5 years	
Poverty incidence in the village	
Increased considerably	34.6% (53)
Increased marginally	21.6% (33)
Remained the same	17.0% (26)
Decreased	26.8% (41)
Female going out of village for work	
Increased considerably	21.6% (32)
Increased marginally	35.1% (52)
Remained the same	40.5% (60)
Decreased	2.7% (4)
Agricultural day labourer	
Increased considerably	33.5% (52)
Increased marginally	37.4% (58)
Remained the same	13.5% (21)
Decreased	15.5% (24)
Households living on agricultural	
Increased considerably	10.5% (16)
Increased marginally	9.9% (15)
Remained the same	55.3% (84)
Decreased	24.3% (37)
Female day labourer	
Increased considerably	30.7% (47)
Increased marginally	42.5% (65)
Remained the same	22.9% (35)
Decreased	3.9% (6)

Figures in the parentheses are the number of villages except with asterisk (*).
* Figures in the parentheses are standard deviations;

The moneylender interest rates varied considerably with a mean of 103.33% and standard deviation of 59.06. The minimum and maximum interest rates were 10% and 240% respectively. These were the averages of annual moneylender interest rates in a village.

Determinants of moneylender interest rates

Ordinary least squares (OLS) estimation

In this section, we report results from multivariate regression analysis. The dependent variable is the average annual moneylender interest rates. There may be variations in the interest rates within a village that we cannot exploit. The estimation equation is

$$InterML_i = a + \beta MFI\_Cover_i + \mathbf{\gamma z_i} + \varepsilon_i \text{ ---------- (1)}$$

where $InterML_i$ is the average moneylender interest rate in village i, MFI_Cover_i is percentage of households borrowing from MFIs in village i (MFI coverage),[9] $\mathbf{z_i}$ is a vector of other control variables, and ε_i is *i.i.d.* error term.

As mentioned above, the correlation between percentage of households borrowing from MFIs and the number of MFIs lending in a village is 0.88. Therefore, to avoid multicolinearity the latter variable is not included in $\mathbf{z_i}$. The interest rate on MFI loans is also excluded. The reason is that MFIs charge the same interest rate to all borrowers, and there is also little variation in the interest rates among the MFIs.

Average daily male and female wage rates are used as proxy for current poverty situation in the village. Change in the incidence of poverty in last five years is also alternatively used to check robustness. Ghatak (1983), found that interest rate on informal loan depended on the poverty level. Average rural interest rates for different classes such as casual labourers, tenants and agricultural labourers varied between 36-84% per year in a relatively more prosperous district like Burdwan in West Bengal, India, while it averaged between 72-120% in a relatively poor district like Nadia, India.

We include percentage of cultivable land that grows one, two, and three crops a year as proxies for soil quality, and percentage of land irrigated using electricity as a proxy for adoption of modern agricultural production technology. The latter variable reflects the opportunity for productive investment in agriculture. Main use of both MFI and

---

[9] Since both variables are in percentage, β is interpreted as percentage points change in moneylender interest rates for one percentage point increase in MFI client households.

moneylender loans (1 = investment, 0 = consumption), on the other hand, capture realization of any such opportunity. Iqbal (1988) found in the context of India that moneylender interest rates were influenced by a host of borrower and environmental characteristics. Borrower's profit potential as measured by farm size, soil quality and even farmer's education were important consideration for moneylenders. Farmers residing in areas characterized by the use and/or provision of new technology faced lower interest rates.

The other controls in z_i are several measures of village level infra-structure that include distance of the center of the village from the nearest bank, bazaar, bus stop, all weather (*pucca*) road, percentage of households with electricity connection, and number of shops in the village. It is argued that MFI programme placement is not random (de Aghion and Morduch 2005, p. 223). Village level infrastructure and other controls previously mentioned are intended to account for this non-randomness. A complete list of variables is provided in Appendix.

We estimate equation (1) by OLS with different combinations of the variables in z_i. To account for the village level heterogeneity, we report the White (1980) heteroskedasticity corrected standard errors. Results are reported in Table 2. Column 2 reports the results for the simple regression when z_i is excluded from equation (1). The coefficient of MFI coverage is 1.1 and significant at any conventional level implying that one percentage point increase in MFI borrowers in a village increases the average moneylender interest rates by 1.1 percentage points. This variable alone can explain 14% variation in the moneylender interest rates. In columns 3, use of moneylender and MFI loans are included. Column 4 includes incidence of poverty. The magnitude and significance of MFI coverage remains the same in all specifications. However, it decreases to 0.85 with 5% level of significance if changes in poverty in last five years instead of male and female wage rates are used (column 5). The coefficients of both moneylender and MFI loan use enter negatively but are not significant. We also found that moneylender interest rates were higher in the villages where higher percentage of land irrigated using electricity.

11

Table 2. OLS regression: Log of moneylender interest rate (*InterML*) is the dependent variable)

Explanatory variables	(2)	(3)	(4)	(5)	(4a)	(5a)
MFI_cover	1.109***	1.092***	1.006***	0.850**	1.153***	0.982**
	(0.241)	(0.256)	(0.298)	(0.361)	(0.276)	(0.336)
UseML		-23.389	-24.158	-11.090	-30.095	-18.325
		(26.208)	(32.151)	(26.104)	(34.607)	(28.704)
UseMFL		-14.273	-9.371	-11.819	-3.586	-6.373
		(12.591)	(16.457)	(15.506)	(15.862)	(14.914)
Shop			0.056	0.043	0.051	0.040
			(0.082)	(0.087)	(0.090)	(0.095)
DisBank			0.203	0.711	0.043	0.722
			(2.227)	(1.501)	(2.123)	(1.516)
DisBazaar			7.060	6.392	9.177*	7.810*
			(4.807)	(4.438)	(4.727)	(4.352)
DisBus			0.639	-0.762	0.627	-0.750
			(1.519)	(1.216)	(1.592)	(1.289)
DisRoad			-2.529	-3.489	-1.987	-3.005
			(3.545)	(3.304)	(3.439)	(3.286)
Electr			27.885	-20.148	12.342	-30.802
			(40.803)	(48.448)	(41.552)	(47.429)
ElectIri			0.454**	0.376**	0.530***	0.436**
			(0.183)	(0.172)	(0.179)	(0.176)
Crop1			-0.686	-0.173	-0.614	-0.128
			(1.331)	(1.207)	(1.327)	(1.210)
Crop2			-0.709	-0.263	-0.722	-0.290
			(1.097)	(1.069)	(1.129)	(1.093)
Crop3			-0.638	0.158	-0.589	0.188
			(1.245)	(1.220)	(1.282)	(1.247)
MaleWage			0.144		-0.101	
			(1.451)		(1.428)	
FemWage			1.124		1.226	
			(1.620)		(1.586)	
PovCon				-39.784**		-33.940**
				(16.631)		(16.088)
PovSli				8.424		11.591
				(15.251)		(14.397)
PovSam				-1.758		-0.920
				(21.884)		(21.174)
Landcon_10					-217.36*	-183.520
					(110.584)	(111.091)
R-square	0.144	0.172	0.310	0.329	0.354	0.358
Sample size	106	106	89	94	89	94

Figures in the parentheses are White (1980) corrected robust standard errors. All regressions include a constant. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Competition among moneylenders can also influence interest rates in both directions. If the informal credit market is characterized by perfect competition, competition among moneylenders reduces interest rates. On the other hand, loss of economies of scale can result in higher interest rates. We do not have direct measure for such competition. Moneylending activities in rural areas, to a large extent, are controlled by large landowners (Bell 1990, p. 306; Hoff and Stiglitz; 1998, p. 488). Information on the number of moneylenders or large landowners in a village is not available. In rural Bangladesh, land market has become more polarized than in the past as the number of landless or marginal landholders is increasing (Rahman and Manprasert 2006; p. 54). Taslim and Ahmed (1992; p. 617) in their study villages in Bangladesh found a positive association between percentage of large landowners and tenants who are usually landless or marginal landowners. Information about the number of households owning no more than 10 decimal of land was collected by PRA and the follow-up survey to select the TUP participants. We exploit this information to calculate percentage of households owning no more than 10 decimal of land, which is used as a proxy for number of moneylenders. The idea is that there are more large landowners and thus more moneylenders in the villages in which higher percentages of households are landless and marginal landowners. Results after controlling for competition among moneylenders, reported in columns 4a-5a, confirm robustness of previous results. The coefficient of competition is negative but significance is not robust to alternative measures of poverty. It is also found that moneylender interest rates are higher in the villages located away from bazaar, the market in rural areas.

The results are also robust to different combinations of control variables in z_i. Results do not also change if distance of high school from the center of the village, which can be a proxy for the general education level in the village, is included. The coefficient of this variable is negative but not significant (not reported).

To comprehend why moneylender interest rates are higher in the villages with higher MFI coverage, we include interaction of MFI coverage with use of MFI and moneylender loans, and percentage of land irrigated using electricity.

$$InterML_i = \alpha + \beta_1 MFI\_Cover_i + \beta_2 MFI\_Cover_i * UseML_i \qquad \text{--- (2)}$$
$$+ \beta_3 MFI\_Cover_i * UseMFL_i + \beta_4 MFI\_Cover_i * ElectIri_i + \gamma \mathbf{Z}_i + \varepsilon_i$$

Results are reported in Table 3. This equation is estimated alternatively using current and past poverty situations, and also with and without competition among moneylenders. The coefficient of MFI coverage ranges between 1.1 and 1.4 and robustly significant as before. One important

13

change in the results is that the coefficient of moneylender loan use is now robustly significant (and negative). This implies that if loans are used in productive purposes, moneylenders lower interest rates because of lower default risk by borrowers. The interaction of MFI coverage with moneylender loan use enters positively and is significant at 1% level. This result in conjunction with the previous result implies that although productive use of loan lowers moneylender interest rates, in the villages with large MFI coverage interest rates increase because of increased demand for fund. In addition to inadequate supply of loan, MFIs allow little or no flexibility in loan disbursement so that seasonal working capital is difficult to finance by MFI loans. Repayment schedule is also rigid as first installment is due immediately after loan disbursement, so borrowers in many instances save a portion of loan for installment. As a consequence, more loans are demanded from moneylenders to sustain the project, which in turn raises moneylender interest rates.

Percentage of land irrigated using electricity is significantly positive as before, and its interaction with MFI coverage is negative and significant.

System of simultaneous equations estimation

Higher moneylender interest rates can cause good borrowers to switch to MFIs, therefore OLS estimation may give rise to biased and inconsistent estimates in the presence of reverse causality. Finding appropriate instrument(s) is extremely difficult. Number of MFIs delivering loan in a village could be a potential candidate but it is also very likely that MFIs chose to operate in villages where moneylenders charged higher interest rates. Therefore, this variable will not be an exogenous instrument. Changes in the incidence of females going out for work in last five years are also related to MFI coverage because increased number of females going out for work than before indicates less restrictions on them to join MFIs. It can also be an outcome of their past participation in MFIs. However, the F-statistics from the regression of MFI coverage on changes in females going out for work (three dummies are i. increased considerably, ii. increased marginally and iii. remained the same) is low suggesting that these instruments are weak which can potentially lead to more biased estimates (Stock, Wright and Yogo 2002).

To address the problem, we estimate a system of the following two equations by 3SLS:

$$InterML_i = \alpha_1 + \beta_1 MFI\_Cover_i + \delta \mathbf{W}_{1i} + \eta_i \qquad \text{--- (3)}$$

$$MFI\_Cover_i = \alpha_2 + \beta_2 InterML_i + \psi \mathbf{W}_{2i} + \varphi_i \qquad \text{--- (4)}$$

where the $\mathbf{W}_{1i}$ vector includes use of both MFI and moneylender loans, village level infrastructure, percentage of land irrigated using electricity, percentage of land that grows one, two and three crops a year, and current poverty situation (and also the interaction terms in equation (2). These are the same variables included in equations (1) and (2).

Table 3. OLS regression: Log of moneylender interest rate (*InterML* is the dependent variable)

Explanatory variables	(2)	(3)	(4)	(5)	(6)
MFI_cover	1.398***	1.196***	1.185***	1.061***	1.085***
	(0.353)	(0.313)	(0.322)	(0.300)	(0.307)
UseML	-182.270***	-169.746***	-207.682***	-194.407***	-197.799***
	(44.691)	(45.534)	(43.276)	(46.286)	(44.437)
UseMFL	-16.857	-35.661	-18.703	-35.884	-30.276
	(30.681)	(29.656)	(28.170)	(27.011)	(26.473)
MFI_cover *UseML*	4.768***	4.408***	5.411***	4.951***	5.308***
	(0.961)	(0.924)	(1.009)	(0.953)	(1.029)
MFI_cover *UseMFL*	-0.014	0.462	0.287	0.692	0.576
	(0.664)	(0.696)	(0.599)	(0.601)	(0.620)
Shop	0.121	0.160*	0.107	0.149	0.154
	(0.087)	(0.090)	(0.097)	(0.101)	(0.104)
DisBank	-0.394	0.167	-0.622	0.118	-0.662
	(2.118)	(1.417)	(1.974)	(1.435)	(1.973)
DisBazaar	7.926	8.483**	10.024**	9.874**	11.144**
	(4.920)	(4.397)	(4.771)	(4.313)	(4.657)
DisBus	0.953	-1.108	1.360	-0.893	-0.087
	(1.428)	(1.348)	(1.351)	(1.320)	(1.444)
DisRoad	-1.830	-2.101	-1.762	-2.256	-1.267
	(3.378)	(2.916)	(3.183)	(2.878)	(2.872)
Electr	51.631	9.988	30.751	-2.278	13.631
	(40.690)	(47.336)	(38.538)	(44.017)	(41.795)
ElectIri	0.969***	1.182***	0.817***	1.066***	1.046***
	(0.284)	(0.300)	(0.265)	(0.280)	(0.282)
MFI_cover *ElectIri*	-0.016**	-0.021***	-0.008	-0.015***	-0.014**
	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)
Crop1	-0.695	-0.073	-0.555	0.002	-0.208
	(1.379)	(1.202)	(1.364)	(1.213)	(1.399)
Crop2	-0.701	-0.267	-0.708	-0.277	-0.448
	(1.154)	(1.092)	(1.174)	(1.121)	(1.253)
Crop3	-0.569	0.340	-0.591	0.337	-0.103
	(1.292)	(1.225)	(1.312)	(1.255)	(1.363)
MaleWage	0.589		0.563		0.117
	(1.292)		(1.190)		(1.199)
FemWage	0.027		0.312		-0.244
	(1.488)		(1.363)		(1.430)
PovCon		-43.346***		-36.288**	-32.519*
		(15.562)		(15.447)	(17.897)
PovSli		9.980		14.796	15.509
		(14.142)		(13.669)	(14.371)
PovSam		-20.074		-16.634	-12.472
		(20.680)		(19.602)	(19.350)
Landcon_10			-269.987***	-224.771**	-235.068**
			(88.669)	(92.642)	(90.007)
R-square	0.408	0.449	0.464	0.486	0.514
Sample size	89	94	89	94	89

Figures in the parentheses are White (1980) corrected robust standard errors. All regressions include a constant. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

15

The MFI coverage is increasing with the number of MFIs working in a village even with overlapping of membership. Other determinants of MFI coverage are difficult to figure out because of scant empirical evidence.[10] MFIs state their goal as to serve the poor and have some explicit criteria of selecting the participants (owning less than 50 decimal of land) but they do not disclose their criteria of selecting a location or community. It is now official that MFIs in Bangladesh failed to reach the extreme poor within a chosen community. Recognizing this problem BRAC has devised its CFPR/TUP programme specifically tailored to serve the extreme poor. Amin, Rai and Topa (2003) and Rahman and Razzaque (2000) also confirm that MFIs do not always target the extreme poor.

Gauri and Fruttero (2003) investigated the determinants of selecting a location by MFIs in Bangladesh. They found that MFIs expanded credit programmes in areas where they were not present, and they were not concerned whether other MFIs were already operating in a given area. They also found that poverty, community level well-being or landlessness were not significant for credit programme expansion. This supports the opportunistic account of MFI behaviour in which MFIs spread out to new locations because donors use coverage as an indicator of MFI efforts. They estimated a fixed-effect model that accounted for the geographical or physical infrastructure; but it is the fixed effects that might also be relevant to choose a location.

Ravallion and Wodon (2000) found that geographic placement of Grameen Bank branches appeared to be influenced by the potential gains from switching to rural non-farm activities by the poor. Patterns of use of the MFI loans also give an indication about MFI coverage. More loan use in a particular sector indicates higher marginal product in that sector, and it is therefore, likely that MFIs will expand credit programmes in those villages having better opportunity to invest in those sectors. If the opportunistic account of MFI behaviour is correct, MFIs will expand programme where profitability of investment by borrowers is higher so that they can achieve high recovery rate. Nearly half of all loans disbursed by BRAC are used in certain agricultural activities such as crop production, irrigation, poultry and livestock rearing, fisheries, and food processing. Rural trading is the other important sector with 41.7% of all loans being used (Husain *et al.* 1998, p. 30). It is expected that loans of other MFIs are also used in similar patterns. Profitability of many of these activities requires access to electricity and other infrastructural development. It has also been found that 69% of BRAC borrowers live in villages that have medium level infrastructural development (Husain *et al.* 1998, p. 30).

---

[10] Zaman (1997) documents individual and household level characteristics that determines participation in BRAC's credit program such as ratio of earners to members, age and sex of the households head, and landownership. The village level data used in this paper cannot exploit this information.

Hence, many of the variables that influence moneylender interest rates also influence MFI coverage. The variables included in the $\mathbf{W_{2i}}$ vector are village level infrastructure, percentage of land irrigated using electricity, percentage of land that grows one, two and three crops a year, and changes in the incidence of poverty in the last five years. Current poverty (within a community or village) does not determine current level of participation in MFIs because current level of participation is a cumulative process with many old members who joined previously; rather it is the past incidences of poverty that determines current level of participation. Therefore, we include changes in the incidence of poverty in the last five years in equation (4), while we include in equation (3) male and female wage rates which are proxies for current poverty. This is also necessary to satisfy the exclusion restrictions so that the system is not under-identified. We include changes in the incidence of females going out for work in the last five years as additional instruments for MFI coverage in equation (3). For robustness check, competition among moneylenders (percentage of households owning no more than 10 decimal of land) is included in both equations.

Results for 3SLS estimation of the system are reported in Table 4.[11] It is evident that the results do not meaningfully change from those estimated by OLS. Column 2a reports results for equation (3) without the interaction terms. The coefficients of MFI coverage and percentage of land irrigated with electricity enter positively and significantly. The interaction terms are included in column 3a. This is our preferred specification as it corrects for endogeneity and incorporates interaction effects of MFI coverage with other relevant factors. As in OLS estimation, use of moneylender loan enters negatively and significantly, and its interaction with MFI coverage positively and significantly. This reconfirms our previous result that moneylenders charge higher interest rates if loans are used in productive purposes in the villages where higher percentage of households borrow from MFIs.

There is one important change in the results. Percentage of land under irrigation using electricity and its interaction with MFI coverage become insignificant. The reason is probably that the MFI borrowers are usually tenants and marginal landowners who are not able to take advantage of modern irrigation facilities because of diseconomies of scale. In column 4a, competition among moneylenders is included as a robustness check. Results do not differ from those in column 3a. We find that competition drives down and higher distance from bazaar increases moneylender interest rates.

---

[11] The results do not meaningfully change if changes in the incidence of females going out for work are not used as additional instruments.

Table 4. System estimation (Equation (3): *InterML* is the dependent variable; Equation (4): *MFI_cover* is the dependent variable)

Explanatory variables	(2a) Equation (3)	(2b) Equation (4)	(3a) Equation (3)	(3b) Equation (4)	(4a) Equation (3)	(4b) Equation (4)
MFI_cover	1.212** (0.595)		1.872* (0.982)		1.689* (0.959)	
InterML		-0.002 (0.147)		0.241*** (0.082)		0.255*** (0.070)
MFIno		3.407** (1.497)		2.032 (1.340)		1.760 (1.357)
UseML	-24.058 (20.425)		-106.198** (45.559)		-117.422*** (42.489)	
UseMFL	-9.851 (12.915)		-29.519 (23.094)		-29.230 (22.180)	
MFI_cover* UseML			2.775** (1.293)		3.059** (1.201)	
MFI_cover* UseMFL			0.491 (0.681)		0.686 (0.691)	
Shop	0.063 (0.116)	-0.027 (0.042)	0.104 (0.113)	-0.024 (0.041)	0.083 (0.107)	-0.020 (0.041)
DisBank	0.283 (2.052)	-0.265 (0.718)	-0.111 (1.881)	-0.155 (0.712)	-0.496 (1.780)	.0069458 .7019841
DisBazaar	7.275** (3.685)	-0.534 (1.595)	7.990** (3.551)	-1.946 (1.363)	10.937*** (3.383)	-3.032*** (1.402)
DisBus	0.424 (1.718)	0.749 (0.561)	-0.139 (1.696)	0.444 (0.550)	0.449 (1.615)	0.262 (0.544)
DisRoad	-1.826 (4.241)	-1.762 (1.549)	0.730 (4.131)	-0.919 (1.415)	0.788 (3.907)	-1.055 (1.375)
Electr	25.892 (55.261)	5.804 (19.742)	48.335 (51.401)	-6.588 (19.416)	21.604 (49.040)	-0.739 (19.185)
ElectIri	0.431** (0.194)	0.129 (0.100)	0.517 (0.425)	0.013 (0.077)	0.431 (0.415)	-0.034 (0.076)
MFI_cover* ElectIri			-0.007 (0.012)		-0.0003 (0.012)	
Crop1	-0.700 (0.672)	0.171 (0.244)	-0.870 (0.627)	0.350 (0.238)	-0.695 (0.597)	0.309 (0.234)
Crop2	-0.672 (0.518)	-0.146 (0.205)	-0.583 (0.475)	0.077 (0.189)	-0.629 (0.449)	0.116 (0.185)
Crop3	-0.589 (0.624)	-0.128 (0.227)	-0.504 (0.592)	0.089 (0.215)	-0.534 (0.559)	0.101 (0.211)
MaleWage	0.126 (1.127)		0.272 (0.866)		0.267 (0.789)	
FemWage	1.176 (1.288)		0.271 (1.007)		0.457 (0.938)	
PovCon		-10.263 (7.982)		-5.285 (5.405)		-4.384 (4.813)
PovSli		2.548 (6.033)		1.181 (4.636)		1.524 (4.490)
PovSam		-17.873*** (6.014)		-12.495** (4.863)		-10.392** (4.658)
Landcon_10					-330.837*** (91.209)	88.202** (32.415)
Sample size	89	89	89	89	89	89

Figures in the parentheses are standard errors. All regressions include a constant. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

The coefficient of MFI coverage is uniformly larger than that in comparable OLS regressions ranging from 1.2 to 1.9, and its significance level ranges from 5 to 10% level. In equation (4), moneylender interest rates predict MFI coverage (columns 3b and 4b). Results are also robust to different combinations of variables in the two equations (not reported).

However, these results are based on village level data that lack information in the individual borrower level. Moneylenders may charge different interest rates to different borrowers in the same village based on individual borrower characteristics and loan size. It is worth mentioning that there may be possible multi-level sample selection bias in the household data (Iqbal 1988). For example, X number of total households are surveyed out of which $X_1 < X$ are found to be borrowers, and only $X_2 < X_1$ borrow from moneylenders. If the analysis is restricted to the X_2 borrowers only, the results suffer from two sources of selection bias. If borrowing households are not randomly selected from the overall sample, which may not be unlikely, OLS regression does not distinguish between the behavioural function relating the interest rate to its determinants and the sample selection function relating the probability of borrowing to its determinants. Heckman (1979) correction can be employed to account for this, but there is another level of sample selection bias. If moneylender clients are not randomly selected from the sample of borrowers, which may not again be unlikely, a similar statistical problem occurs. Village level data can avoid this econometric difficulty but at a cost. Nonetheless, it would be more informative to investigate using household data with duly addressing the econometric issues.

19

CONCLUDING REMARKS

This paper explores the impact of MFI programme expansion on moneylender interest rates in rural Bangladesh. It is found that moneylender interest rates go up with the percentage of households borrowing from MFIs. Productive investment of loan lowers moneylender interest rates. But MFI programme expansion increases moneylender interest rates in the villages in which more loans are invested in productive economic activities. As loans are used for productive purposes, the likelihood of repayment increases, so that moneylenders are able to charge lower interest rates. But if overall demand for fund goes up as indicated by higher percentages borrowing from MFIs, and if MFI loan is inadequate or seasonal working capital is unavailable from MFIs, and repayment schedule is tight, borrowers will resort to moneylenders for additional fund to sustain their projects. Increased demand for fund will increase moneylender interest rates. It is also found that competition among moneylenders lowers, and distance from place of commercial activities increases moneylender interest rates. Results are robust to correction for endogeneity.

The results are important for policymakers. Borrowers can make more productive investments if MFIs meet their demand for loan by allowing more flexibility in loan disbursement and repayment schedule. Borrower projects will also be more profitable if MFIs expand their programme of loan-only to loan-plus.[12] In that case, moral hazard problem faced by moneylenders will be greatly reduced. Active presence of the moneylenders is not necessarily harmful and can even be beneficial if increasing competition between formal and informal lenders increases borrowers' access to funds at competitive interest rates.

---

[12] BRAC follows loan-plus approach, where loans are accompanied by various forms of assistance for the borrowers such as skill development training, provision of higher quality inputs and technical assistance as well as marketing for finished products.

REFERENCES

Aleem I (1990). Imperfect information, screening, and the costs of informal lending: a study of a rural credit market in Pakistan, *World Bank Econ Rev* 4(3):329-49.

Amin S, Rai AS, Giorgio T (2003). Does microcredit reach the poor and vulnerable? Evidence from northern Bangladesh. *J Dev Econ* 70(1):59-82.

Bell C (1990). Interactions between institutional and informal credit agencies in rural India, *World Bank Econ Rev* 4(3):297-327.

Bose P (1998). Formal-informal sector interaction in rural credit markets. *J Dev Econ* 56(2):265-80.

de Aghion BA and Morduch J (2005). The economics of microfinance. Massachusetts: MIT Press.

Floro MS and Ray D (1997). Vertical links between formal and informal financial institutions. *Rev Dev Econ* 1(1):34-56.

Gauri V and Fruttero A (2003). Location decisions and nongovernmental organization motivation. Washington DC: World Bank. (World Bank Policy Research Working Paper 3176)

Ghatak S (1983). On interregional variations in rural interest rates. *J Dev Areas* 18(1):21-34.

Heckman JJ (1979). Sample selection bias as a specification error. *Econometrica* 47(1):153-61.

Hoff K and Stiglitz JE (1993). Imperfect information and rural credit markets: puzzles and policy perspectives, *In:* Hoff K, Braverman A, Stiglitz JE (Editors). The economics of rural organization: theory, practice, and policy. New York: Oxford University Press. 33-52.

Hoff K and Stiglitz JE (1998). Moneylenders and bankers: price-increasing subsidies in a monopolistically competitive market. *J Dev Econ* 55(2):485-518.

Husain AMM (Editor) (1998). Poverty alleviation and empowerment: the second impact assessment study of BRAC's rural development programme. Bangladesh, Dhaka: BRAC.

Iqbal F (1988). The determinants of moneylender interest rates: evidence from rural India. *J Dev Stud* 24(3):364-78.

Jain S (1999). Symbiosis vs. crowding-out: the interaction of formal and informal credit markets in developing countries. *J Dev Econ* 59(2):419-44.

Jain S and Mansuri G (2003). A little at a time: the use of regularly scheduled repayments in microfinance programs. *J Dev Econ* 72(1):253-79.

Kochar A (1997). An empirical investigation of rationing constraints in rural credit markets in India. *J Dev Econ* 53(2):339-71.

Litosseliti L (2003). Using focus groups in research. New York: Continuum. (Continuum research methods series)

Matin I and Halder SR (2004). Combining methodologies for better targeting of the extreme poor: Lessons from BRAC's CFPR/TUP Programme. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada. (CFPR Working paper series no. 2)

McKernan S-M, Pitt MM, Moskowitz D (2005). Use of the formal and informal financial sectors: does gender matter? Empirical evidence from rural Bangladesh. Washington DC: World Bank. (World Bank Policy Research Working Paper 3491)

Meyer RL (2002). The demand for flexible microfinance products: lessons from Bangladesh. *J Int Dev* 14(3):351–68.

Morduch J (1999). The microfinance promise. *J Econ Literature* 37(4):1569-1614.

Rahman A (1992). The informal financial sector in Bangladesh: an appraisal of its role in development. *Dev Change.* 23(1):147-68.

Rahman A (1999). Micro-credit initiatives for equitable and sustainable development: who pays? *World Dev* 27(1):67-82.

Rahman A and Razzaque A (2000). On reaching the hardcore poor: some evidence on social exclusion in NGO programmes. *Bangladesh Dev Stud* 26(1):1-35.

Rahman H and Ali TO (2006). Stories of targeting: process documentation of selecting the ultra poor for CFPR/TUP programme. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada. (CFPR Working paper series no. 1)

Rahman HM and Manprasert S (2006). Landlessness and its impact on economic development: a case study on Bangladesh. *J Soc Sci* 2(2):54-60.

Ravallion M and Quentin W (2000). Banking on the poor? Branch location and nonfarm rural development in Bangladesh. *Rev Dev Econ* 4(2):121-39.

Sinha S and Matin I (1998). Informal credit transactions of microcredit borrowers in rural Bangladesh. *IDS Bulletin* 29(4):66-80.

Stewart DW and Shamdasani PN (1990). Focus groups: theory and practice. New York:Sage Publications. (Applied Social Research Methods Series, Vol 20)

Stock JH, Jonathan HW, Yogo M (2002). A survey of weak instruments and weak identification in generalized method of moments. *J Business and Econ Stat* 20(4): 518-29.

Taslim MA and Ahmed FU (1992). An analysis of land leasing in Bangladesh. *Econ Dev and Cultural Change* 40(3):615-28.

Todd H (1996). Women at the center: Grameen Bank after one decade. Dhaka: University Press Limited.

White H (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48:817-38.

World Bank (2003). Development policy review. Washington DC: World Bank. (Technical report No. 26154-BD)

Zaman H (1997). Micro-credit programmes: who participates and what does it matter? *In:* Wood GD and Sharif IA (Editors). Who needs credit? Poverty and finance in Bangladesh. Dhaka: University Press Limited.

Zeller M, Sharma M, Ahmed AU, Rashid R (1999). Group-based financial institutions for the rural poor in Bangladesh: An institutional and household-level analysis. Washington DC: IFPRI. (Research Report No 120)

APPENDIX

List of variables

Variable name	Notation
Average moneylender interest rate (log)	*InterML*
Percentage of households borrowing from MFI (log)	*MFI_cover*
Number of MFIs delivering loan in the village	*MFIno*
Main use of moneylenders loan (1 = investment, 0 = otherwise)	*UseML*
Main use of MFI loan (1 = investment, 0 = consumption)	*UseMFL*
Number of shops in the village	*Shop*
Distance from the nearest Bank	*DisBank*
Distance from the nearest Bazaar	*DisBazaar*
Distance from the nearest Bus stop	*DisBus*
Distance from the nearest all weather (*pucca*) road	*DisRoad*
Percentage of houses with electricity connection	*Electr*
Percentage of land irrigated with electricity	*ElectIri*
Percentage of land with one crop	*Crop1*
Percentage of land with two crops	*Crop2*
Percentage of land with three crops	*Crop3*
Average daily male wage rate (in Taka)	*MaleWage*
Average daily female wage rate (in Taka)	*FemWage*
In last 5 years incidence of poverty in the village has	
Increased considerably	*PovCon*
Increased slightly	*PovSli*
Remained the same	*PovSam*
Percentage of households owning no more than 10 decimal of land	*Landcon_10*

23