

# Objective repayment performance in Bangladesh and its determinants:

## How to improve the allocation of loans by MFIs?\*

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### Summary:

The aim of this article is to produce a comprehensive analysis of the performance of microfinance institutions (MFIs) in terms of repayment. We use 1629 loan observations to analyze with a probit the determinants of the repayment performance of borrowers of the BRAC, the BRDB and the Grameen Bank. We test for endogeneity of the size and duration of the loan in the determination of repayment and use instrumental variables to correct for it. We then use a comparative analysis of the determinants of the repayment performance and of the loan size to give policy recommendations to improve the allocation of loan by MFIs.

*Keywords:* Microfinance, social ties, group homogeneity, social intermediation, Asia, Bangladesh.

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## Introduction.

Microfinance Institutions (MFIs) provide financial services (credit and saving) to the poor so as to reduce the credit rationing they face and help alleviate poverty. Should it be profit oriented or not, each MFI search the repayment performance as high repayment rates allow the MFI to lower the interest rate it charges to the borrower reducing thus the financial cost of credit and enabling more borrowers to have access to credit. Improving the repayment rate could also help reduce the dependence on subsidies and help the MFI reach a better sustainability level. It is also argued that high repayment rates reflect the adequacy of MFI's services to clients' needs and restrict the cross subvention<sup>1</sup> of the borrowers. Repayment performance also acts as an important positive signal when the MFI has to raise new funds. For all these reasons, higher repayment rates are largely associated with benefits both for the MFI and the borrower<sup>2</sup>.

The MFI will thus firstly tend to reach the first best level of a 100% on time repayment rate and, if such a level of repayment performance cannot be reached, it will try to allocate higher loans to borrowers with lower probability of default and reduce the delay in repayment. Understanding what the MFI should do to meet these objectives depends on the most common factors influencing repayment. Considering those factors, we can differentiate between those related to information asymmetries, those related to adverse shocks and those related to a low performance of institutions such as justice or education. When gaining information on the characteristics or on the behavior of the borrower is costly for the MFI, problems of adverse selection –allocation of loans to borrowers who did not have the ability to take advantage of his loan or with a low probability- and problems of moral hazard –the borrower has not produced the required level of effort to take advantage of his loan or has used his loan for unproductive purposes– are more likely to occur. Adverse selection and moral hazard will increase the proportion of borrowers who do not repay their loans on time next to those who experienced different adverse shocks (like illness or natural disasters). Borrowers might also have enough money to reimburse their loan but still default strategically. Cost of strategic default might indeed be low if they have low collateral requirement and if the legal system give little power to the MFI to enforce contracts. MFIs will try to restrict the

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<sup>1</sup> As borrowers have different probability of default and as it is difficult for the MFI to charge a different interest rate to each borrower relative to his probability of default, borrowers who are more prone to default will be subsidized by lower risk borrowers.

<sup>2</sup> If a good repayment performance is a prerequisite for financial sustainability, they are not a sufficient condition of financial health as high administrative costs or high borrower turnover could be the counterpart of those high repayment rates.

occurrence of those situations and design appropriate incentives to repay and sometime strengthen the economic ability of the borrower.

In this paper, we want to contribute to the improvement of the repayment performance of MFIs in examining the determinants of the repayment performance with a particular interest in “microfinance innovations”. This analysis will highlight in which direction the MFI should work so as to increase the repayment rate and as a consequence approach the first best. This paper also includes an analysis of the current adequacy of microcredit supply (in terms of loan size) based on the comparison of the determinants of the repayment performance to these of the loan size. As the on time repayment rate is often inferior to 100%, the MFI will have second best strategies to increase the repayment. This work uses an objective repayment variable, i.e. a repayment variable based on the declaration of the borrower (not the MFI's). It addresses the problem of endogeneity of principal and duration of the loan in the determination of the repayment performance.

The results indicate that microfinance innovations have a mixed explanatory power among the other influencing factors of the reimbursement.

The layout of this article is as follows: after a brief presentation of the conceptual framework (section 1), section 2 involve a brief empirical literature review and section 3 lays down the context of the case study. Section 4 presents the econometric methodology. The results of the regression model are discussed in section 5 and the article concludes with implications for policy recommendations and future research.

## 1. The conceptual framework.

### **1.1. How to get closer to the first best level of repayment performance?**

Credit rationing and collateral requirement are the traditional means used to cope with asymmetries in information on the credit market (Stiglitz & Weiss, 1981) but both of those means lead to the exclusion of the poor borrowers. To explain the success of microfinance in providing credit to the poor, a large literature uses the principal/agent theory to demonstrate that microfinance contracts which are lending o joint-liable groups allow the lender to bypass moral hazard (Stiglitz, 1990) and adverse selection (Gatack, 1999) due to asymmetries in information. It is also argued (Besley & Coates, 1995) that joint liable lending groups help enforce repayment as social interactions make it more costly to default. Regular repayment

schedules (Armendariz de Aghion & Morduch, 2000) or dynamic incentives<sup>3</sup> (Besley, 1995) are other appropriate incentive mechanisms used by MFIs to increase their repayment performance. Social intermediation, in other words, the provision of non-financial services next to credit and saving services (Edgcomb & Barton, 1998) also develops the economic ability of the borrower to repay. The previous mechanisms are considered to be financial innovations (Edgcomb & Barton, 1998) that make it financially sustainable for microfinance to lend to the poor. When the use of such mechanisms is insufficient for the MFI to reach a first best repayment rate and when borrowers are heterogeneous in their probability of default, the MFI should also allocate loans of different size to the borrowers so as to maximize the proportion of outstanding debts repaid on time.

## **1.2. The second best perspective: increasing the proportion of outstanding debts repaid on time.**

The purpose of this section is to understand why borrowers prefer bigger loans and why the MFI should allocate bigger loans to borrower with lower probability of default.

### *1.2.1. The context.*

We consider the credit relationship of microfinance institutions providing credit to joint liable credit group at a uniform interest rate. The MFI faces demand for credit of borrowers heterogeneous by their localisation, lending group, ability and preferences. The MFI maximizes the global net expected return of its borrower under a zero profit condition.

As borrowers face high credit rationing, there is a large set of highly productive projects and borrowers face an increasing medium productivity of capital. The expected profit for the borrower will thus be strictly increasing in the loan size for a given duration as shown in figure 1<sup>4</sup>.

The borrower acquires the information on the cash requirement, expected return and probability of success of the different projects he is able to manage before applying for a loan. This set of projects is possibly restricted by the local environment as the distance from marketable activities, the economic drive and the pre-existing concurrence of similar project in the area may induce variation in the set of profitable projects. The set of accessible projects

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<sup>3</sup> Dynamic incentives refer to the threat not to refinance a borrower who defaults on debt obligation. The incentive power of dynamic incentive is enhanced if the MFI allocate larger loans over time to good repayment borrowers.

<sup>4</sup> Figure 1 stands for a constant marginal productivity of capital. We could also allow for an increasing marginal productivity of capital which would strengthen the attractiveness of bigger loans for the borrowers.

may be further restricted by his lending group (Madajewicz, 1999) which may incite the borrower to undergo similar project in terms of size, activity and probability of success so as to better monitor his activities and limitate the variation in default probability among group members and consequent group cross subsidiation.

The borrowers have no own funds to invest.

### *1.2.2. The behaviour of the borrower: demand for credit and repayment.*

The demand for credit.

We consider a borrower who is given the chance to obtain a loan from a microfinance institution. The loan application of the borrower will correspond to the size and duration which maximizes his expected return<sup>5</sup>.

The optimal duration depends on the distribution with time of the returns of the project, on the scale of the project, on the preferences of the borrower for the present consumption and on the allocation of a new loan conditional to the total repayment of the previous loan. The duration will however be such that the sum of the return of the project and external returns is higher than each installement. This minimal duration of the loan increases when the returns to scale of the project are increasing and remains constant when they are constants.

For a given duration, each loan size will correspond to a single project as the borrower will undertake the project that has the higher expected return for each loan size.

As the net return is an increasing function of the size of the loan, the borrower will always prefer bigger loan and will ask for the maximum loan size he can ask for ( $L_{\max}$  in figure 1) given his set of accessible projects –defined by his characteristics, the characteristics of his environment and these of his lending group.

The repayment.

The borrower will default on his loan when the duration of this loan is inferior to the minimum duration. An increase in the duration along with unregular repayment schedules may also increase his probability of default.

For a given borrower and a duration of the loan, it is argued (Freimer & Gordon, 1965) that the repayment probability decreases with the size of the loan as shown in figure 2 where  $P_{\min}$  represent the probability of default due to external factors such as illness or acidental destruction of the borrower's productive assets. The increase in the default probability may be different among borrowers reflecting the difference in endowments and moral hazard or strategic default associated costs.

### *1.2.3. The MFI: improving the proportion of outstanding debts repaid on time.*

If the above mentioned incentive mechanisms and non financial services are imperfect, the MFI will choose a new target probability of default and will respond to the borrower demand for credit only if his default probability is inferior to the target. If there is observable heterogeneity in the repayment probability of borrowers for a given size of the loan, the MFI then allocate larger loans to the safer borrowers as shown in figure 3.

## 2. Literature review.

Following the discussion on the theoretical literature on microcredit we expect that joint liability, especially through peer selection, peer monitoring, and peer pressure should be associated with a better repayment performance. Group homogeneity and social ties are also expected to increase the repayment performance not per se but because they allow a better efficiency of group dynamics. Group homogeneity as a result of effective peer selection (group homogeneity in terms of risks, Ghatak, 1999) and as a mean to increase peer monitoring (group homogeneity in terms of interest, economic power..., Stiglitz, 1990) should go together with higher repayment rate. High level of social ties should have the same impact as they facilitate peer monitoring and increase the potential social sanction of peer pressure (Besley & Coates, 1995). Dynamic incentives and social intermediation, which are extra group microfinance financial innovations, are also expected to increase the repayment performance.

Addressing the question of the relative performance of group loans compared to individual loans and using data from Zimbabwe, Bratton (1986) states that group loans perform better than individual loans in years of good harvest and worse in drought years when peers are expected to default. Paxton (1996) analyzes with a mean and covariance structural model the determinants of successful group loan repayment of 140 credit groups in Burkina Faso. She raises one's attention on what she calls the domino effect<sup>6</sup> that can outweigh the positive effects of group lending. Zeller (1998) uses information on 146 credit groups in Madagascar and provides evidence in favor of group lending. Zeller shows indeed that the group generates insurance which leads to a better repayment performance.

Analyzing the potential positive effects associated with group dynamics, some studies examine the impact of different levels of peer selection, peer monitoring and peer pressure.

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<sup>5</sup> We consider that the utility of the borrower is increasing with the return he gets from his project.

Wenner (1995) presents a methodology to test whether selection mechanism has an impact on the repayment performance of 25 Costa Rican credit groups and whether group members use local information for the screening of their peers. His study shows that lending groups use private information to select their peers and that this selection mechanism increases the group repayment performance<sup>7</sup>. On the same point, the above mentioned study of Zeller (1998) confirms the positive role of peer selection (internal rules of conducts) on repayment performance. Wydick (1999) uses data from 137 Guatemalteque credit groups to show how social cohesion affects group performance in terms of repayment rate, group insurance and moral hazard. He found that peer monitoring in urban groups and peer pressure in rural ones significantly affects group performance. Limiting the conclusions on the impact of group dynamics of the previous three articles, Diagne, Chimombo, Simtowe & Mataya (2000), working on data from Malawi, found that peer monitoring, peer pressure and joint liability had little or negative impact on repayment performance whereas peer selection was found to be limited.

Social ties and group homogeneity are supposed to improve the power of group dynamics. Nevertheless, the studies give mixed results. The study of Sharma & Zeller (1997), based on the analysis of repayment rates of 128 credit groups in Bangladesh, leads to a controversial negative impact of preexisting social ties as well as group homogeneity in terms of asset and enterprise diversity. The study of Zeller (1998) investigates the effects of intragroup pooling of risky assets or projects on repayment rates. While this analysis supports the positive role of social cohesion, it also concludes that risk diversification (up to a certain level) has a significant positive effect on repayment performance. This could be explained by a matching problem (Paxton, 1996). The matching problem arises when credit terms and conditions are no longer appropriate for each member as credit is repeated again. If initial group homogeneity and prior experience of group activities were associated to better repayment performance, as time goes the positive effect of group homogeneity on peer monitoring balance with the negative impact of a matching problem and the absence of risk diversification that limit the possibilities of intra-group insurance.

Parallel to group lending, MFIs usually use dynamic incentives and social intermediation. MFIs use dynamic incentives when they increase with time the amount they lend to a specific borrower and condition new loans to prior reimbursement discipline. Microfinance is

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<sup>6</sup> The domino effect occurs when at least one member of a credit group default due to the default of other members.

<sup>7</sup> Wenner challenges the positive effect of this feature as further analysis indicate that costs faced by the borrowers to get this information overcompensate the induced benefits in terms of repayment performance.

sometimes referred to as social intermediation (Edgcomb & Barton, 1998) as many MFI provide services or training that go beyond financial services. Contrary to group lending, those two main features of MFI have been little documented up to now. The most important factor that motivates lending groups to repay in the study of Diagne, Chimombo, Simtowe & Mataya (2000) is the relative value they associate to access to future credit. For Sharma & Zeller (1997), credit rationing up to a certain level, has significant positive effect on repayment performance. Moreover, we cannot assume that these dynamic incentives keep the same intensity as credit is repeated over time especially if borrowers observe that credit isn't systematically denied to defaulting or late borrowers. In a study devoted to the Grameen Bank and not exclusively focussed on a repayment rate analysis, Khandker, Khalily & Khan (1994) found that the longer the branch operates in an area, the higher the loan default rate. They explain this feature by the possible decreasing marginal profitability of new projects but as many MFI suffer today from a growth crisis, we have to be cautious on this point. Khandker, Khalily & Khan (1994) also found that membership training, which relates to social intermediation, has a positive influence on repayment.

The last set of variables to be documented in studies on the determinants of repayment rates are the characteristic of the area and of the borrower. Khandker, Khalily & Khan (1994) raise the question of whether default is random and influenced by erratic behavior or whether it is systematically influenced by area characteristics that determine local production conditions or branch-level efficiency. Their empirical test on Grameen overdue loans backs up the partial influence of area characteristics. Rural electrification, road width, primary educational infrastructure and commercial bank density are positively correlated with a low default rate as well as the predicted manager's pay and member training. We can infer from this study that the economic drive of the area positively influences the repayment rate. Paxton (1996) shows in the same way that access to other credit sources, market selling activities and urban location were linked to a better repayment performance. Questioning the impact of the characteristics of the borrower, Zeller (1998) showed that traditional priors against women, young borrowers or high family size could not be used as signals of repayment ability.

The above mentioned studies attribute a debatable role to the exploitation of group dynamics whereas the role of social intermediation and social ties is very little documented. It is thus important to produce further tests of the impact of these financial innovations on the repayment performance so as to understand better the common reasons for the success of microfinance. This article provides a test of the explanatory power of social ties and group



homogeneity as well as social intermediation and dynamic incentives. Impact of the main characteristics of the loan contract and of the borrower is also taken into account.

### 3. Data.

The data come from a quasi experimental survey ran in Bangladesh in 1991-1992 by the BIDS (Bangladesh Institute for Development Studies) and the World Bank. The survey covered 1798 households, coming from 87 villages from 29 different thanas (subdistricts)<sup>8</sup>. 1538 of these households were “eligible” to MFI, which means they were poor enough to benefit from microfinance services and 905 of these households actually took part in a microfinance program. For the purpose of our work, we concentrate our interest on households that had actually borrowed from one of the three MFIs. On the 2349 workable observations, 485 corresponded to BRAC loans, 430 to BRDB loans, 1081 to Grameen Bank loans and 353 to other credit providers (see Table 1 for the description of other credit providers).

The exploration of the data bears out little differences across the MFIs in terms of general characteristics of the loan (the interest rate is the same for all loans) or type of borrowers. Differences appear when we consider non financial services: health, education, marketing and professional training services. These services increase the value the borrower attributes to his relation with the MFI and can be referred to as social intermediation. The following section lays down the econometric model that will enable us to analyze the factors influencing the repayment performance.

### 4. The econometric framework.

Following the discussion on the theoretical literature, we describe the interaction between the borrower and the MFI with the following model:

*Stage one:* The borrower applies for a loan of a specific size and duration which correspond to the larger scale of his accessible projects defined by his/her characteristics, the characteristics of his environment and these of his/her lending group.

*Stage two:* Before allocating a loan to the borrower, the credit officer of the MFI computes the probability of default of this application given the information he has on the borrower, on his lending group, on the environment and on the predicted effectiveness of his repayment incentives for this borrower. When the computed probability is inferior to the acceptability

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<sup>8</sup> These 29 thanas were randomly chosen out of the 391 thanas of Bangladesh.

threshold, he allocates the loan the borrower applied for, otherwise, he allocates a smaller loan which correspond to the acceptability threshold.

*Stage three:* The borrower reimburses his loan on time or not given his/her environment, his/her characteristics/ability, the characteristics of his/her group and the characteristics of the loan contract.

The break down in three steps of the microcredit relationship sheds light on the possibility of endogeneity of the principal characteristics of the microcredit contract (loan size and duration) in the estimation of repayment. The determination of the loan size and duration in stage two and the determination of the repayment in stage three might indeed be based on shared omitted variables – variables observed by the MFI and the borrower but not available in our dataset (like the characteristics of the environment).

We constructed individual dummy variables for repayment. We thus used a probit model to estimate the probability for a borrower to repay his loan at the due date<sup>9</sup>. We used the method of Smith and Blundell (1986) to test for exogeneity in such a model. Endogeneity of the size and the duration of the loan couldn't be rejected and those variables are instrumented.

The previous discussion leads us to our estimation strategy:

- Step one : Estimation of the size and duration of the loan:

$$\begin{aligned}
 P_i &= \hat{P}_i + \varepsilon_i^p = \alpha^p + \sum_{j=1}^5 \beta_j^p X_{ij} + \sum_{j=1}^5 \rho_j^p Y_{ij} + \sum_j \sigma_j^p W_{ij} + \gamma^p IVp + \varepsilon_i^p \\
 D_i &= \hat{D}_i + \varepsilon_i^d = \alpha^d + \sum_{j=1}^5 \beta_j^d X_{ij} + \sum_{j=1}^5 \rho_j^d Y_{ij} + \sum_j \sigma_j^d W_{ij} + \gamma^d IVd + \varepsilon_i^d \quad (1)
 \end{aligned}$$

Where  $X_{.j}$  represents the variables of social ties, group homogeneity and size of the group. Social ties of the borrower with the rest of the community as a whole can increase the social cost of peer pressure and the identification of the borrower to their weekly meeting group gives argument in this sense. We tried therefore not to restrict social ties to social ties among the group<sup>10</sup> as in previous studies (Wydick 1999). We used the age of the group (i.e. the number of years during which the borrower took part to his present group) for inner group social ties and proxies such as living in the same house as the spouse for extended social ties. We postulate that the members of the group know each other better and develop social ties as the age of the lending group (AGEGP) increases. This is why we expect the ability of the

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<sup>9</sup> Estimations using larger definitions of repayment (repayment done before three, six or twelve months following the maturity date) have also been conducted and gave sensibly the same results. For such estimations, the sample had to be reduced to borrowers whose original date of reimbursement stands three to twelve months before the date of the survey. We chose the exposed definition of repayment so as to work with the largest sample.

members of the group to monitor and pressure each other to increase with the age of the group. The variable AGE<sub>GP</sub> should thus have a positive impact on the repayment performance. We used two variables for extra-group social ties. The first one, SCOHAB, takes the value of one if the borrower and his/her spouse live in the same house. We postulate that the social net of the borrower is bigger when he does not live in the same place as his/her spouse does. That is why we expect SCOHAB to have a negative impact on repayment. The second variable, RESE, gives the number of months the borrower lived out of the village in the previous year. The longer the borrower lives out of the village, the smaller his social ties with other villagers. RESE is then also expected to have a negative impact on repayment. Group homogeneity is based on shared characteristics (gender, age, education level) of the borrower and its group leader. We expect the variables of group homogeneity (SAMESEX, SAMEEDU, SAMEAGE) to have a positive impact on repayment performance.

Small groups are expected to show a better repayment performance as they can easily monitor each other. Because borrowers of large groups can benefit from larger intra-group insurance possibilities, large group may also have a positive impact on group performance. We use different dummies (NMBG1, NMBG2, NMBG4, NMBG5) for the size of the group to control for the possible non linear effect of the size of the group.

$Y_{.j}$  describes the variables of social intermediation (such as access to health services) and dynamic incentives (proxied by credit rationing). The variables of social intermediation (FACL, FACT, FACH, FACM) and the variable of dynamic incentive (CRd) are expected to have a positive impact on the repayment.

$W_j$  stands for the exogenous control variables. Control variables gather characteristics of the borrower and his household and basic information on the loan (dummy for the MFI, size and duration of the loan, purpose of the loan, period of redemption date in the year and number of loans attributed by the MFI during the year of the loan).

$IV_p$  and  $IV_d$  represent the instruments respectively for principal and duration.

Because the determination of size and duration of the loan is simultaneous<sup>11</sup>, we run simultaneous regressions for those two variables.

- Step two: Smith and Blundell (1986) exogeneity test of principal and duration in the determination of the repayment performance:

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<sup>10</sup> Social ties inside the group are expected to facilitate the peer monitoring and the use of peer pressure.

<sup>11</sup> The MFI uses the same variable to allocate both the principal and the duration of the loan. This was confirmed by a Ramsey RESET test of omitted variable.

$$R_i = \alpha + \omega\widehat{P}_i + \nu\widehat{D}_i + \sum_{j=1}^5 \beta_{ij}X_{ij} + \sum_{j=1}^5 \rho_{ij}Y_{ij} + \sum_j \sigma_{ij}W_{ij} + \eta\varepsilon_i^p + \mu\varepsilon_i^d + \varepsilon_i \quad (2)$$

Where  $R_i$ , the latent variable of the model, is the capacity for an individual to generate cash in excess of the amount (principal plus interests) he has to repay before the initial date of paying back.

What we observe is the reimbursement  $R_i^*$  which takes the value of 1 if  $R_i > 0$  and 0 if  $R_i < 0$ .

Exogeneity is rejected if the coefficients of the errors ( $\eta, \mu$ ) of the instrumental regression of principal and duration are significant. This would indeed mean that the structure of the error term is the following:  $\varepsilon_i = \alpha\varepsilon_i^p + \beta\varepsilon_i^d + \mu$

The test of instrument confirms that we used appropriate instrumental variables<sup>12</sup>.

- Step three: Estimation of the repayment performance:

$$R_i = \alpha + \nu\widehat{D}_i + \omega\widehat{P}_i + \sum_{j=1}^5 \beta_{ij}X_{ij} + \sum_{j=1}^5 \rho_{ij}Y_{ij} + \sum_j \sigma_{ij}W_{ij} + \varepsilon_i \quad (3)$$

- Step four: Larger loans, for whom?

After a comment on the regression of the repayment probability, we compare its determinants to those of the size of the loan. If we assume that the loan size reflects the perception the MFI has of the capacities of the borrower, this allows us to analyze the adequacy of the loan allocation by the MFI.

Because, as previously exposed, the loan size is a result of both demand (stage one) and supply (stage two) factors, we cannot simply assume that the loan size reflects the abilities the MFI attributes to a specific borrower. We must indeed consider separately the two following cases:

1. If the demand of the borrower in terms of loan size is higher than the final loan size, the loan size reflects the perception of the MFI.
2. If the demand is equal to the attributed loan size, it could be that the MFI would have given more if the borrower had asked for if the MFI has a higher representation of the abilities of the borrower.

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<sup>12</sup> We use ELECTRICITY, i.e. private access to electricity (whole sample, BRDB, GB, RTG3) and the PGWBL, i.e. the number of weeks the borrower had to wait before receiving his loan (for the BRAC), as instrumental variable for loan size.

For the duration of the loan, we use COLS, i.e. signature or personal guaranty required as primary collateral (whole sample, BRAC, BRDB, RTG3) and PGWBL (GB) as instrumental variables.

Step four will thus be restricted to the borrowers who were credit rationed<sup>13</sup> (over 70% of the sample).

*Remarks:*

1. We ran the regression on both split-sample (one regression by MFI) and on the entire sample. This allows us to assess if the impact of a specific variable is driven by a specific MFI or not. The estimation on split sample and the application of the test of Smith and Blundell (1986) also proved the need of correction for endogeneity of principal and duration in the estimation of the repayment performance. We also present the regression for the repayment probability when a delay of three months (RTG3) is admitted for repayment. Correction for endogeneity of principal and duration has also been made for this regression.
2. What we observe here are only marginal impacts of microfinance innovation since each of the studied MFIs uses group lending, social intermediation and dynamic incentives in their credit relationships. This induces an underestimation of the effect of these financial innovations.

## 5. Results and discussion.

### **5.1. The repayment behavior of the borrower.**

The results of the probit estimation of the repayment are reported in Table 6 (repayment on time and with a grace of three months, whole sample) and Table 7 (repayment on time, split sample).

Social ties among the group, proxied by the age of the group (AGEGP), had a significant negative impact on repayment rate. We explain this contrasting feature in different ways. At first, we can refer to the matching problem (Paxton, 1996): as duration of membership increase, the credit need of the members of the group differs. A decreasing power of social penalties can also explain this feature as members know each other better and are more reluctant to control and sanction themselves. This seems to overcompensate the benefits of increasing experience in consumption smoothing and provision of insurance with membership duration. The age of the borrowing group was still significant when we allowed for arrears of three months for the repayment (estimation of RTG3).

The variable SCOHAB<sup>14</sup> which is a proxy for social ties out of the group had a significant negative effect as expected. If the spouse of the borrower lives elsewhere, the social network

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<sup>13</sup> As we do not have information on the loan size demand, credit rationment refer to the subjective appreciation of

of the borrower will be larger. Group homogeneity (SAMESEX, SAMEEDU, SAMEAGE) proved to have no significant impact on repayment performance in the whole sample as in the study of Wydick (1999)<sup>15</sup>. Group homogeneity in terms of sex showed a positive impact (regression of RTG3 and BRDB) whereas homogeneity in terms of education showed a negative effect (same regressions). Homogeneity in terms of age showed both a negative (BRDB) and a positive (GB) effect on the repayment performance.

Variables for social intermediation proved to have little or negative influence in the whole sample. Access to health services (FACH) had significant negative effect whereas professional training (FACT), marketing (FACM) and literature (FACL) services showed no effect. Negative impact of these non-financial services could be attributed to correlation with unobservable variables like the level of risk of the project of the borrower (for professional training) or idiosyncratic shocks (for the access to health). However, access to professional training has a positive significant effect in the estimation of RTG3. This questions the possibility for these services to increase the borrower's ability to succeed in their projects. The costs incurred by non-financial services cannot be justified by their positive effects on repayment performance. Important differences among the MFIs appeared in the impact of social intermediation (non-financial services) on repayment performance. Whereas, the BRAC experienced a positive influence of its marketing service and negative influence of its health services, the BRDB experienced a negative influence of both its professional and health services. Access to basic literacy had a negative impact on the repayment of the Grameen borrowers while access to health services proved to have a positive impact. The difference among the MFI on the impact of non-financial services give rise to a field for future research on non-financial services: what kind of service is offered to a specific borrower?, why?, is there a difference in the quality of the provision of these services among the different MFIs? and what are the costs and benefices induced by these services?

The split sample regression gives evidence of the positive impact of dynamic incentives on the repayment behavior of the borrowers as credit rationing (CRd) has a positive significant impact on the repayment performance.

Small groups (NMBG1) had better results in terms of reimbursement than medium groups which confirms the positive impact of peer monitoring but big groups (NMBG4) also proved to have a better performance probably due to a large use of intra-group insurance. When a

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the borrower who would or would not like to borrow more at the same interest rate.

<sup>14</sup> SCOHAB is a dummy which takes the value of one if the borrower and his/her spouse live in the same place.

<sup>15</sup> In the study of Wydick, SAMESEX is the only variable of social ties that affected repayment performance and it has a negative impact, only in urban groups.

grace period of 3 months is given for reimbursement, the relative performance of smaller group disappears. We can thus surmise that development of insurance services could give rise to a better exploitation of peer monitoring.

The characteristics of the contract showed significant impact on the repayment of the borrower. The instrumented size of the loan (PPRIN) presented a positive impact contrary to what was found before instrumentation and in the study of Sharma and Zeller, 1997. According to the theory of dynamic incentives, loan size increases with the duration in membership. The positive impact of loan size could thus be explained by a better ability of the borrowers to succeed in their projects with time. It is important to know whether the impact of the loan size is positive or negative because a negative impact of loan size could lead to embarrassing conclusions<sup>16</sup>. Duration (PDURATION) showed a negative impact in the whole sample but a positive one in two of the three split sample regressions. The repayment is significantly higher at the end of the year (ENDY) and during the harvest seasons (HARVEST). This is still the case when we allow a grace period of three months (RTG3). Borrowers that have to pay back their loan during the lean agricultural season seem to face permanent difficulties in paying back, maybe because of expensive coping strategies. That is why, if the cash management allows it, MFIs should avoid fixing the redemption date of the loan during the lean agricultural season<sup>17</sup>. Initial fees (FEE) had a positive effect. These fees are relatively low compared to the amount borrowed (cf. Table 3) but this formalization of the membership of the MFI seems to play a symbolic role for the borrower<sup>18</sup>. The number of weeks the borrower had to wait before receiving his loan (PGWBL) had no significant impact on repayment performance and we cannot postulate an appropriate screening of the MFI with this instrument. The estimation also reveals that personal (PURPP) and agricultural loans (PURPA) are better reimbursed than business ones. This must be related to the negative effect of employment (EO) and self-employment (SELFEO) in non agricultural activities. These activities are more risky but have an important role to play in the economic development of the area. This can justify the priority given by the Grameen Bank to self-employment and

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<sup>16</sup> Indeed, when big loans correspond to riskier projects with higher level of returns they are important for the economic development of the area and for the long term wealth of the borrower. This is a rather optimistic interpretation and we could also think that big loans do not meet the borrower needs and are not suited to the local economy. If borrowers cannot take advantage of big loans they will not be able to be independent of the MFI and to get out poverty. Lastly, we could think that incentives to strategic default increase with loan size. This discussion would temperate the interest for the MFI to attribute loans of big size.

<sup>17</sup> This is one of the propositions of the Guinean borrowers of the Crédit Rural de Guinée (Condé, Bouju & Gentil, 2001).

<sup>18</sup> This can be linked to the positive impact of rules of conduct in the study of Wenner (1997).

income generating activities even accounting for the lower performance of those projects in terms of reimbursement.

The size of the loan portfolio (NBYT) showed significant negative impact<sup>19</sup> which could have different meanings. Firstly, in a financial perspective, as the MFIs grow they can finance projects with higher levels of risk because they can diversify their risks. Secondly, this could be explained by a fall in the manager's time allocated to each group as the loan portfolio increases. And lastly if as frequently reported, the MFIs do not systematically exclude bad or late borrowers, the experience of the MFI behavior will decrease the expected weight of the MFI's sanction in case of default. Considering that the number of borrowers steadily increased over the years, the negative impact of the size of the MFI portfolio could be linked to a better knowledge of the borrowers of the behavior of the MFI.

Individual and household characteristics like sex, household size, dependency ratio have no significant impact on repayment performance which confirms the finding of Zeller (1998) that traditional bias against female or high family size are not justified. Contrary to the traditional belief, female borrowing (SEX) even had a positive impact on BRAC and BRDB reimbursement performance and on RTG3 for the whole sample. This could justify the preference given to women by the MFIs. However, the repayment performance is influenced by age, wealth<sup>20</sup> (wealth is proxied by the value of productive assets, PASSET, the log of per capita consumption, LNPCXA, and the use of specific garbage disposition, GARBAGE) and ability (proxied by the education level, YEDLEVEL). This general finding holds in the split sample regressions and in the estimation of the repayment probability, given a grace period of three months.

The share of the variance explained by our variables remains small which could advocate for missing variables. These variables might be community-specific variables like local economic conditions, degree of monetarization, collective shocks<sup>21</sup> like exposure of the area to natural disasters (Zeller, 1998 ; Khandker, Khalily & Khan, 1994)... ; program-specific variables like functioning costs of the MFIs (Khandker, Khalily & Khan, 1994) or borrower-specific characteristics like idiosyncratic shocks (illness and injuries).

## **5.2. Is the fixation of loan size efficient?**

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<sup>19</sup> The negative impact of the size of the loan portfolio can be related to significant negative impact of the age of the branch in Khandker, Khalily & Khan (1994).

<sup>20</sup> The variables for wealth did not prove any significance in the regression of RTG3.

<sup>21</sup> Village fixed effects were not used because of too little loan observations per village.



Table 8 report the results of the simultaneous estimation of the size of the loan issued from the simultaneous regression of the principal and duration of the loan (step 4). We consider that MFIs give bigger loans for project they anticipate to be successful.

As duration in membership grows, MFIs tend to give larger loans to their more experienced borrowers and this corresponds to the use of dynamic incentives. However, as previously exposed, the age of the group has a negative impact on repayment performance. Groups made of borrowers of both sex received larger loans but the standard composition of groups is unisex. Group homogeneity in terms of age had a positive impact on loan size which could mean that MFIs consider group homogeneity as a specific factor influencing the repayment behavior.

Access to each of the non-financial services has a positive influence on the loan size, except for the BRDB. These services might indeed increase the borrowers' capabilities and thus increase their probability of success<sup>22</sup> even if they proved mixed effect on the repayment performance.

The size of the group had a non linear impact. Small groups and big ones received smaller loans compared to medium size groups. The MFI may take into account the overcompensation of lack of insurance possibilities in smaller groups (the long term repayment performance is indeed smaller) on positive effect of peer monitoring (repayment at the due date is higher). As they received smaller loans, biggest groups are maybe expected to be too heterogeneous to exploit group dynamic efficiently (this is confirmed by the regression of RTG3).

The MFIs seem to screen borrowers with the time they have to wait before they receive a loan as the longer they wait, the smaller the loan they receive. This screening did not prove its effectiveness as the number of weeks the borrower had to wait before receiving his loan did not prove to have any effect on the repayment (contrary to what was found before instrumentation). The MFI attributes significantly smaller loans to borrowers who have to pay initial fees but these borrowers had a better repayment performance. This could be due either to an effective incitative power of initial fees or to an ineffective use of initial fees.

The size of the loan portfolio had a significant positive influence on the principal of the loan offered by the MFI which could be due to a higher accepted level of risk by the MFI. As previously seen this variable has a negative impact on repayment performance.

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<sup>22</sup> The use of health, marketing, literature or professional training services might also be compulsory for big loans and the availability of these services could reflect the age of the branch which is positively correlated with the loan size.

Wealthy borrowers (wealth is proxied by log of per capita consumption, private access to electricity, use of toilets and the number of landed relatives) received bigger loans. Education level and age of the borrower had a positive effect on the loan size attributed by the MFI which makes sense but these two variables had a negative impact on the repayment. Other traditional factors like household size and the number of landed relatives are used in the MFI's determination of the size of the loan but with no effect on repayment performance. This leads us to think that the MFI should not take these variables into consideration when determining the loan size.

## 6. Conclusion.

The aim of this article was to test the explanatory power of models that attribute the performances of MFIs in terms of repayment rate to the use of group lending, social intermediation and dynamic incentives. Financial innovations showed mixed results in the determination of the repayment performance. The age of the group, a proxy for social ties inside the group, showed a significant negative impact on the reimbursement which raises the question of the necessity of specific incentives instruments for experienced borrowers. The social ties of the borrower out of his group have the expected positive impact as well as the proxy for dynamic incentives. In terms of sex, group homogeneity proved a positive impact on repayment performance<sup>23</sup> but we can not attribute the same positive impact to group homogeneity in terms of age or education level. Non-financial services did not show a positive impact in all the cases whereas MFIs tend to attribute bigger loans to borrowers who have access to these services. Negative impact of these non-financial services could be attributed to correlation with unobservable variables like the level of risk of the project of the borrower (for professional training) or idiosyncratic shocks (for the access to health).

The size of the group showed a non-linear effect revealing the conflict of the benefits of peer monitoring and these of insurance due to group. The development of insurance services could permit the exploitation of the full benefit of peer monitoring.

We also found that other loan characteristics like the purpose of the loan, the duration and the principal of the loan have to be taken as control variables for an effective analysis of determinants of the repayment performance.

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<sup>23</sup> We didn't address the question of the predicted positive impact on repayment of group homogeneity in terms of risk as a result of peer selection (Ghatak, 1999). Nevertheless, both the study of Zeller (1998) and the study of Sharma and Zeller (1997) give evidence from Madagascar and Bangladesh that show that this kind of homogeneity has a negative impact on repayment performance.

We draw one's attention to the endogeneity of the principal and duration of the loan in the determination of the repayment performance and we advise the use of instrumental variables for future analysis of repayment rate.

Our estimation could underestimate the effects of the financial innovations as we can only estimate marginal effects as we do not have a control group and as each of the three studied MFIs use such financial innovations.

Further researches on the effective explanatory power of social ties are needed as empirical studies do not manage to prove any impact of social ties on repayment performance. Group homogeneity is a prerequisite in many MFIs and further researches must be undertaken to understand what type, if any, of group homogeneity positively influences the borrowers' reimbursement. The mixed impact of non-financial services and the difference amongst MFIs in their provision give rise to further studies on the provision (condition of attribution, level of quality,...) and impact of these services. In the same line, further information on the formation before loan and time borrowers have to wait before they receive their loan could provide interesting comments. Seasonality seems to affect the borrower and his/her vulnerability. Further researches on this point and on possibilities to use the harvest cycle to increase the repayment performance are thus necessary.

The above analysis gives however rise to comments on ways to improve the repayment performance by a more adequate loan provision.

MFIs should find new incentives for more experienced lending groups of borrowers.

As engagement in non agricultural activities as well as participating to a professional training has a negative impact on repayment performance, MFIs should devote a specific attention to the training of borrowers engaged in non agricultural projects.

MFIs could take advantage in paying attention to the way they grow: devote the same attention to borrowers along time, pay attention to keep credible the threat of dropping out bad borrowers and avoid giving significantly bigger loans as they extend their borrowers portfolio.

MFIs should avoid fixing the redemption date of the loan during the lean agricultural season.

MFIs should limit the use traditional variables like the education level, sex or size of the family into consideration when determining the loan size as those variables might have an unexpected effect and go contrary to traditional expectations on age, sex or education.

## References.

- Armendariz de Aghion, B. & Morduch, J. 2000, "Microfinance beyond group lending.", *Economics of transition*, Vol. 8, No. 2, pp. 401-420.
- Besley, T. 1995, "Nonmarket institutions for credit and risk sharing in low-income countries," *Journal of Economic Perspectives*, Vol. 9, No. 3, pp. 115-27.
- Besley, T. & Coate, S. 1995, "Group lending, repayment incentives and social collateral.", *Journal of Development Economics*, Vol. 46, pp.1-18.
- Bratton, M. 1986, "Financing smallholder production: A comparison of individual and group credit schemes in Zimbabwe." *Public Administration and Development*, No. 6, pp.115-132.
- Condé, K., Bouju, S. & Gentil D. 2001, *Le Crédit Rural de Guinée vu par ses acteurs.*, Editions du GRET, .
- Diagne, A. Chimombo, W. Simtowe, F. & Mataya, C. 2000, *Design and sustainability issues of rural credit and saving programs for the poor in Malawi: An action-oriented research project.* IFPRI, Washington, D.C.
- Edgcomb, E. & Barton, L. 1998. : "Social intermediation and microfinance programs: A literature review.", *Microenterprise Best Practices*, USAID.
- Freimer, M & Gordon, M.J., 1965 "Why bankers ration credit.", *Quarterly Journal of Economics*, Vol. 79, pp. 397-416.
- Ghatak, M. 1999, "Group lending, local information and peer selection.", *Journal of Development Economics*, Vol. 60, pp.27-50.
- Goetz, AM. & Sen Gupta, R. 1996, "Who Takes The Credit? Gender, Power and Control over Loan Use in Rural Credit Programmes in Bangladesh", *World Development*, Vol. 24, No. 1, pp. 45-63.
- Henry, C. Sharma, M. Lapenu, C. & Zeller, M. 2000, *Assessing the Relative Poverty of Microfinance Clients: A CGAP Operational Tool.* CGAP, Washington, D.C.
- Khandker, S.R. Khalily, B. Khan, K. 1994, "Grameen Bank: performance and sustainability.", *World Bank Discussion Paper*, No.306.
- Madajewicz, M., 1999 "Capital for the poor: The effect of wealth on the optimal credit contract.", Columbia University, Draft, June.
- Morduch, J. 1998, "Does microfinance really help the poor? New evidence from flagship programs in Bangladesh.", Mimeo., Department of Economics, Harvard University.
- Paxton, J.A. 1996: *Determinants of successful group loan repayment: an application to Burkina Faso.*, Ph.D. Dissertation, The Ohio State University.
- Pitt, M.M. & Khandker, S. R. 1998, "The impact of group-based credit programs on the poor households in Bangladesh: does the gender of participants matter?", *Journal of Political Economy*, Vol.106, No. 5, pp.958-996.
- Pitt, M.M. 1999, "Reply to Jonathan Morduch's "Does microfinance really help the poor? New evidence from flagship programs in Bangladesh.", Mimeo, Department of Economics, Brown University.
- Pitt, M.M.& Khandker, S. R. 1996, "Household and intrahousehold impact of the Grameen Bank and similar targeted credit programs in Bangladesh.", *World Bank Discussion Papers*, No.320.
- Sharma, M. & Zeller, M. 1997, "Repayment performance in group-based credit programs in Bangladesh: An empirical analysis.", *World Development*, Vol. 25, No.10, pp. 1731-1742.
- Smith, R.J. & Blundell, R.W. 1986, "An exogeneity test for a simultaneous equation tobit model with an application to labor supply.", *Econometrica*, Vol. 54, No. 3, pp.679-685.
- Stiglitz, J.E. 1990, "Peer monitoring and credit markets.", *The World Bank Economic Review*, Vol. 4, No.3., pp. 351-366.

- Stiglitz, J.E. & Weiss, A. 1981, "Credit rationing in markets with imperfect information.", *American Economic Review*, Vol. 17, No. 3, pp. 393-410.
- Wenner, M. 1995, "Group credit: a means to improve information transfer and loan repayment performance.", *Journal of Development Studies*, Vol. 32, pp. 263-281.
- Wydick, B. 1999, "Can social cohesion be harnessed to repair market failures? Evidence from group lending in Guatemala.", *The Economic Journal*, No.109, pp.463-475.
- Zeller, M. 1998, "Determinant of repayment performance in credit groups: The role of program design, intragroup risk pooling, and social cohesion.", *Economic Development and Cultural Change*, Vol. 46, No.3, pp.599-621.

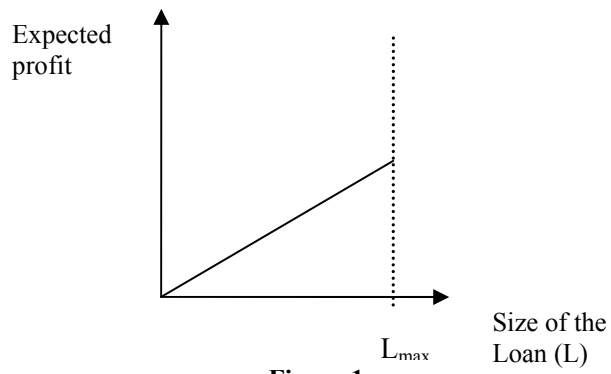


Figure 1.

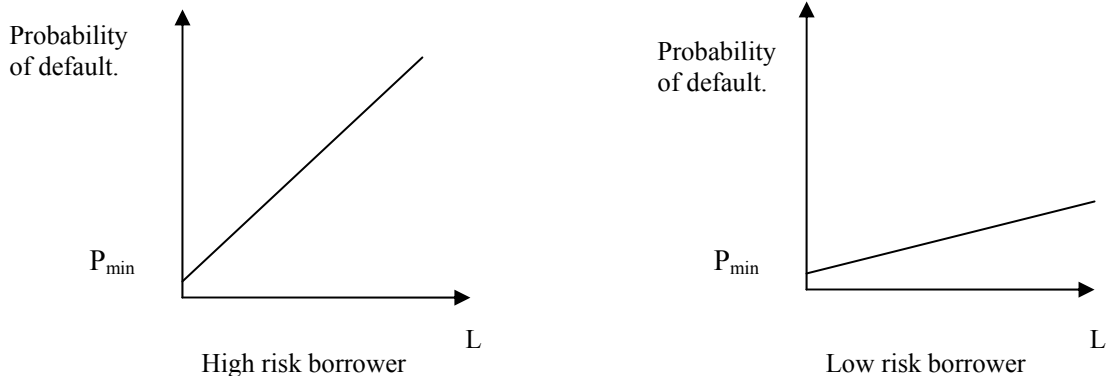


Figure 2.

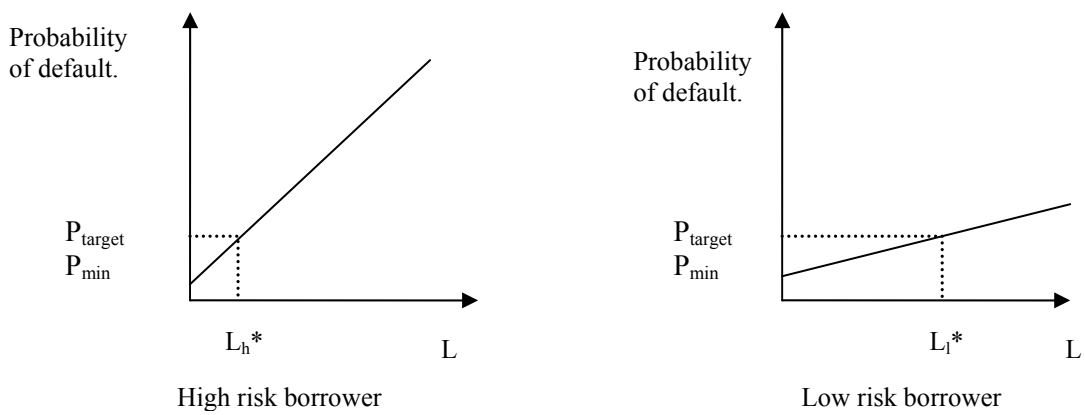


Figure 3: Optimal size of the loan.

**Table 1.**  
***Other source of credit of borrowers.***

<b>Other credit providers :</b>	
Government	2,8%
Krishi Bank	10,1%
Commercial Bank	10,4%
Cooperative	2,2%
Other NGO	7,3%
Relatives	32,9%
Friends and neighbor	21,4%
Shopkeeper	3,6%
Landlord	5,1%
Other	4,2%

**Table 2.**  
***Different measures of the repayment rate.***

<b>Repayment rates</b>	<b>Whole MFI</b>	<b>BRAC</b>	<b>BRDB</b>	<b>GB</b>	<b>Other credit source</b>
ROT	0,518 (1638)	0,416 (364)	0,495 (321)	0,562 (971)	0,167 (126)
RTG3	0,792 (1537)	0,717 (311)	0,653 (291)	0,865 (935)	0,405 (74)
RTG6	0,871 (1434)	0,807 (290)	0,776 (259)	0,920 (885)	0,470 (68)
RTG12	0,954 (1337)	0,917 (264)	0,899 (238)	0,981 (835)	0,579 (57)

*(The number of loan observations available for the calculation of the different repayment rate is given in parentheses.)*

ROT : Dummy = 1 if the borrower repaid his loan on time.

RTG3 : Dummy = 1 if the borrower repaid his loan with arrears of less than three months.

RTG3 : Dummy = 1 if the borrower repaid his loan with arrears of less than six months.

RTG3 : Dummy = 1 if the borrower repaid his loan with arrears of less than twelve months.

**Table 3.**  
*Descriptive statistics of the microcredit contract.*

	Whole MFI	BRAC	BRDB	GB
<b>General characteristics of the loan.</b>				
Loan size (Taka) <sup>24</sup>	2939.605 (1432.80)	2519.773 (1400.59)	2467.752 (1404.24)	3316.096 (1349.08)
Duration (days) <sup>25</sup>	400.888 (187.38)	477.582 (304.05)	391.338 (101.50)	370.326 (125.69)
Interest rate <sup>26</sup>	16.136 (0.72)	16.049 (0.44)	16.009 (0.19)	16.225 (0.92)
<b>Associated costs...</b>				
Required primary collateral:				
None	63,65%	57,53%	64,04%	66,23%
Signature or personal guarantee	31,40%	35,46%	24,59%	32,28%
Credit group	4,91%	7,01%	11,14%	1,48%
Initial fees :				
Dummy variable	0.705 (0.45)	0.8 (0.40)	0.967 (0.17)	0.559 (0.49)
Amount	6.774 (6.33)	8.328 (6.19)	12.058 (6.36)	3.975 (4.56)
% of loan size	0.003 (0.003)	0.004 (0.004)	0.005 (0.004)	0.001 (0.002)
Number of week before loan	9.548 (11.10)	18.846 (14.32)	14.5 (10.07)	3.337 (2.73)
Weeks of training before loan	2.743 (3.14)	2.711 (3.46)	0.627 (1.33)	3.605 (3.10)
<b>...and associated services.</b>				
Access given to 1	0.252 (0.43)	0.253 (0.43)	0.420 (0.49)	0.184 (0.38)
2	0.259 (0.43)	0.317 (0.46)	0.051 (0.22)	0.315 (0.46)
3 non-financial services	0.472 (0.49)	0.420 (0.49)	0.513 (0.50)	0.479 (0.49)
Access given to basic literacy	0.677 (0.46)	0.567 (0.49)	0.481 (0.50)	0.805 (0.39)
Access given to professional training	0.280 (0.44)	0.327 (0.46)	0.727 (0.44)	0.080 (0.27)
Access given to health	0.695 (0.46)	0.663 (0.47)	0.327 (0.46)	0.856 (0.35)
Access given to marketing	0.279 (0.44)	0.068 (0.25)	0.202 (0.40)	0.404 (0.49)
Access given to other services	0.254 (0.43)	0.523 (0.49)	0.325 (0.46)	0.105 (0.30)
<b>Other characteristics.</b>				
Credit Rationing (dummy)	0.712 (0.45)	0.647 (0.47)	0.783 (0.41)	0.713 (0.45)
Program saving	657.121 (927.90)	565.414 (415.05)	573.809 (467.78)	731.406 (1189.24)
Purpose of the loan:				
Agricultural	0.058 (0.23)	0.105 (0.30)	0.039 (0.19)	0.045 (0.20)
Personal	0.086 (0.28)	0.049 (0.21)	0.195 (0.39)	0.060 (0.23)
Related to dwelling expenses	0.011 (0.10)	0.039 (0.19)	0 (0)	0.002 (0.05)
Business	0.843 (0.36)	0.806 (0.39)	0.765 (0.42)	0.891 (0.31)
Seasonality (harvest)	0.211 (0.40)	0.214 (0.41)	0.220 (0.41)	0.206 (0.40)
Seasonality (end of the year)	0.232 (0.42)	0.276 (0.44)	0.146 (0.35)	0.246 (0.43)
Number of borrower of the year	169.529 (64.84)	122.760 (41.57)	148.502 (64.05)	198.876 (57.81)
Number of observations (available for the general characteristics of the loan/ available for the calculation of repayment rate)	1996/1963	485/481	430/429	1081/1073

(Standard errors are given in parentheses).

<sup>24</sup> 43% (27% for the Grameen Bank, 56% for the BRAC and 67% for the BRDB) of the loans correspond to loan size of 1000 to 2000 taka.

<sup>25</sup> 72% of the loans have a duration of 350 to 370 days .

<sup>26</sup> The interest rate is the same for the three MFI : 16%, 20% after 1991 for the BRAC and the Grameen Bank due to an increase in bank employee payment.



**Table 4.**  
*The loan contract of other credit providers.*

	<b>Other credit providers</b>	
<b>General characteristics of the loan.</b>		
Loan size (Taka)	5753.853	(17961.54)
Duration (days)	356.142	(350.45)
Interest rate (%)	36.254	(53.64)
<b>Associated costs...</b>		
Required primary collateral:		
None	51,56%	
Signature or personal guarantee	17,85%	
Credit group	1,70%	
Initial fees (dummy)	0.150	(0.35)
Amount	14.900	(74.22)
% of loan size	0.004	(0.02)
<b>Other characteristics</b>		
Credit Rationing (dummy)	0.308	(0.46)
Purpose of the loan :		
Agricultural	0.382	(0.48)
Personal	0.331	(0.47)
Related to dwelling expenses	0.050	(0.22)
Business	0.235	(0.42)
Seasonality (harvest)	0.104	(0.30)
Seasonality (end of the year)	0.118	(0.32)
Number of observations	353/203	

*(Standard errors are given in parentheses).*

**Table 5.**  
*Descriptive statistics of the borrower and his group.*

	<b>Whole MFI</b>	<b>BRAC</b>	<b>BRDB</b>	<b>GB</b>
<b>Characteristics of the borrower.</b>				
Sex (dummy : 1 if male, 2 if female)	1.660 (0.47)	1.7216 (0.44)	1.380 (0.48)	1.744 (0.43)
Household head or spouse	0.890 (0.31)	0.863 (0.34)	0.923 (0.26)	0.889 (0.31)
Education level	1.635 (2.72)	1.397 (2.67)	2.446 (3.44)	1.419 (2.33)
Age of the borrower (in months)	389.593 (122.89)	398.847 (134.33)	396.958 (123.26)	382.506 (116.89)
Marital status (dummy : 1 if married)	0.881 (0.32)	0.826 (0.37)	0.906 (0.29)	0.896 (0.30)
Self Employment in agriculture	0.711 (0.45)	0.630 (0.48)	0.741 (0.43)	0.736 (0.44)
Self Employment in othe activities	0.640 (0.47)	0.552 (0.49)	0.611 (0.48)	0.691 (0.46)
Employement in agriculture	0.136 (0.34)	0.092 (0.290)	.2139535 .4105721	0.124 (0.33)
Employement in other activities	0.107 (0.30)	0.109 (0.31)	0.169 (0.37)	0.081 (0.27)
Spouse lives in the same house	0.865 (0.34)	0.826 (0.37)	0.902 (0.29)	0.868 (0.33)
Number of month lived elsewhere	0.083 (0.60)	0.136 (0.87)	0.141 (0.76)	0.037 (0.30)
<b>Characteristics of his/her household</b>				
Value of productive assets (taka)	39057.34 (63303.87)	38612.37 (66703.68)	38042.23 (55566.03)	39660.76 (64662.34)
Transfers received	0.051 (0.22)	0.045 (0.20)	0.076 (0.266)	0.043 (0.20)
Household size	5.464 (1.99)	5.523 (2.22)	5.344 (1.83)	5.486 (1.95)
Average age of the household	22.265 (7.23)	22.581 (7.90)	21.630 (7.56)	22.375 (6.76)
Number of landed relatives	3.665 (4.22)	2.828 (3.68)	3.255 (3.39)	4.204 (4.65)
Log of per capita consumption	4.278 (0.34)	4.307 (0.39)	4.281 (0.33)	4.264 (0.32)
Use of garbage equipment	0.881 (0.32)	0.820 (0.38)	0.865 (0.34)	0.914 (0.27)
Private access to electricity	0.062 (0.24)	0.092 (0.29)	0.093 (0.29)	0.036 (0.18)
<b>Characteristics of the group</b>				
Age of the group (years)	3.991 (2.00)	3.866 (1.88)	3.080 (1.99)	4.413 (1.93)
Group size (person)	30.937 (15.28)	49.087 (16.15)	21.329 (8.54)	26.545 (8.92)
Group size 1 :<=10	0.0854 (0.27)	0.006 (0.07)	0.143 (0.351)	0.098 (0.29)
Group size 2 :>10 & <=15	0.045 (0.20)	0.008 (0.09)	0.081 (0.27)	0.048 (0.21)
Group size 3 :>15 & <=30	0.571 (0.49)	0.169 (0.37)	0.654 (0.47)	0.719 (0.44)
Group size 4 :>30 & <=50	0.177 (0.38)	0.391 (0.48)	0.106 (0.30)	0.109 (0.31)
Group size 5 :>50 & <=81	0.119 (0.32)	0.424 (0.49)	0.013 (0.11)	0.024 (0.15)
same sex	0.932 (0.25)	0.925 (0.26)	0.832 (0.37)	0.975 (0.15)
same education level	0.578 (0.49)	0.595 (0.49)	0.367 (0.48)	0.654 (0.47)
same age	0.394 (0.48)	0.371 (0.48)	0.295 (0.45)	0.444 (0.49)

*(Standard errors are given in parentheses).*

**Table 6.**  
*Determinants of the repayment performance, whole sample.*

		Predicted impact on repayment	ROT IV		ROT without IV			RTG3 IV		RTG3 without IV		
			Coef.	P>z	Coef.	P>z		Coef.	P>z	Coef. Std.	P>z	
<b>Social Ties</b>	<i>agegp</i>	+	-0,142**	0.007	-0,007	0.735	<i>agegp</i>	-0,100**	0.039	0,011	0.672	
	<i>scohab</i>	-	-0,313**	0.004	-0,225**	0.036	<i>scohab</i>	-0,104	0.403	-0,038	0.757	
	<i>rese</i>	-	-0,066	0.336	-0,067	0.297	<i>rese</i>	-0,094	0.208	-0,087	0.233	
<b>Group Homogeneity</b>	<i>samesex</i>	+	0,327	0.223	-0,025	0.871	<i>samesex</i>	0,726**	0.004	0,460**	0.007	
	<i>sameedu</i>	+	-0,033	0.686	-0,062	0.425	<i>sameedu</i>	-0,189**	0.048	-0,203**	0.030	
	<i>sameage</i>	+	0,078	0.332	0,130*	0.083	<i>sameage</i>	0,029	0.752	0,076	0.398	
<b>Social Intermediation</b>	<i>facl</i>	+	0,076	0.479	0,144	0.111	<i>facl</i>	0,249**	0.027	0,284**	0.006	
	<i>fact</i>	+	-0,233	0.124	-0,091	0.398	<i>fact</i>	-0,285*	0.061	-0,178	0.147	
	<i>fach</i>	+	-0,173*	0.099	0,045	0.638	<i>fach</i>	-0,161	0.175	0,019	0.865	
	<i>facm</i>	+	0,171	0.148	0,331**	0.001	<i>facm</i>	-0,093	0.492	0,023	0.855	
<b>Dynamic Incentives</b>	<i>CRd</i>	+	-0,182**	0.042	-0,078	0.347	<i>CRd</i>	-0,247**	0.017	-0,151	0.126	
<b>Group Size</b>	<i>nmbg1</i>		1,112***	0.000	0,389**	0.009	<i>nmbg1</i>	0,193	0.416	-0,390**	0.022	
	<i>nmbg2</i>		-0,306	0.109	-0,181	0.339	<i>nmbg2</i>	-0,028	0.895	0,091	0.672	
	<i>nmbg4</i>		0,571***	0.000	0,082	0.479	<i>nmbg4</i>	0,449**	0.005	0,045	0.737	
	<i>nmbg5</i>		-0,153	0.414	0,374**	0.033	<i>nmbg5</i>	-0,114	0.598	0,384*	0.060	
<b>Characteristics of the loan</b>	<i>BRAC</i>		-0,247	0.181	-0,801***	0.000	<i>BRAC</i>	-0,615**	0.003	-1,169***	0.000	
	<i>BRDB</i>		-0,217	0.190	-0,411**	0.010	<i>BRDB</i>	-0,636**	0.001	-0,844***	0.000	
	<i>Pprin</i>		0,001**	0.007	0,000***	0.000	<i>Pprinrg3</i>	0,001**	0.012	0,000***	0.000	
	<i>Pduration</i>		-0,007***	0.000	0,002***	0.000	<i>Pdurationrg3</i>	-0,006***	0.000	0,001**	0.006	
	<i>fee</i>		1,086***	0.000	0,549***	0.000	<i>fee</i>	0,447**	0.005	0,026	0.834	
	<i>pgsaving</i>		0,000**	0.028	0,000	0.440	<i>pgsaving</i>	0,000	0.244	0,000***	0.000	
	<i>pgwbl</i>		0,005	0.477	-0,013**	0.002	<i>pgwbl</i>	0,011*	0.079	-0,003	0.466	
	<i>purpa</i>		0,427**	0.006	0,159	0.280	<i>pgwt</i>	-0,015	0.321	-0,017	0.237	
	<i>purpp</i>		0,654***	0.000	0,074	0.566	<i>purpa</i>	0,041	0.811	-0,205	0.214	
	<i>harvest</i>		0,296**	0.001	0,157*	0.074	<i>purpp</i>	0,457**	0.013	-0,023	0.880	
	<i>endy</i>		0,319**	0.001	0,304**	0.001	<i>harvest</i>	0,301**	0.004	0,168	0.107	
<b>Characteristics of the individual</b>	<i>NBYt</i>		-0,012***	0.000	-0,003***	0.000	<i>endy</i>	0,122	0.255	0,114	0.273	
	<i>sex</i>		-0,162	0.113	-0,082	0.416	<i>NBYt</i>	-0,012***	0.000	-0,004***	0.000	
	<i>yedlevel</i>		-0,037*	0.070	-0,014	0.373	<i>sex</i>	-0,287**	0.013	-0,208*	0.071	
	<i>ageb</i>		-0,002***	0.000	0,000	0.101	<i>yedlevel</i>	-0,046**	0.027	-0,029*	0.098	
	<i>selfEagr</i>		0,038	0.672	0,095	0.291	<i>ageb</i>	-0,002***	0.000	-0,001**	0.014	
	<i>selfEo</i>		-0,303**	0.001	-0,008	0.922	<i>selfEagr</i>	0,257**	0.014	0,316**	0.003	
	<i>Eagr</i>		0,054	0.693	-0,121	0.305	<i>selfEo</i>	-0,127	0.210	0,143	0.120	
	<i>Eo</i>		-0,473**	0.003	0,039	0.739	<i>Eagr</i>	-0,001	0.996	-0,145	0.287	
	<b>Characteristics of the household</b>	<i>Passet</i>		0,000**	0.001	0,000**	0.001	<i>Eo</i>	-0,311*	0.062	0,133	0.339
		<i>transferr</i>		0,355*	0.052	0,227	0.187	<i>Passet</i>	0,000	0.693	0,000	0.771
		<i>hhszize</i>		-0,017	0.514	0,019	0.357	<i>transferr</i>	0,185	0.389	0,063	0.764
<i>Rownl</i>			0,005	0.663	0,034**	0.001	<i>hhszize</i>	0,014	0.621	0,043*	0.069	
<i>lnpcxa</i>			-0,349**	0.027	-0,071	0.540	<i>Rownl</i>	-0,009	0.486	0,017	0.143	
<i>garbage</i>			0,511***	0.000	0,336**	0.004	<i>lnpcxa</i>	-0,113	0.504	0,135	0.337	
<i>_cons</i>			3,363***	0.000	0,210	0.758	<i>garbage</i>	0,233*	0.094	0,079	0.554	
						<i>cons</i>	3,162***	0.000	0,472	0.559		
	<i>Log likelihood</i>		-923,02		-908,47	<i>Log likelihood</i>	-644.7		-639.52			
	<i>PseudoR2</i>		16.48%		17.8%	<i>Pseudo R2</i>	15.53%		16.20%			
	<i>N</i>		1597		1597	<i>N</i>	1507		1507			

**Table 7.**  
*Determinants of the repayment performance, split sample.*

	<b>BRAC IV</b>	<b>Coef.</b>	<b>P&gt;z</b>	<b>BRDB IV</b>	<b>Coef.</b>	<b>P&gt;z</b>	<b>GB IV</b>	<b>Coef.</b>	<b>P&gt;z</b>
<b>Social ties</b>	<i>agegp</i>	-0,139**	0.022	<i>agegp</i>	-0,498***	0.000	<i>agegp</i>	-0,162**	0.015
	<i>scohab</i>	-0,436*	0.083	<i>scohab</i>	0,021	0.950	<i>scohab</i>	0,043	0.793
	<i>rese</i>	-0,019	0.894	<i>rese</i>	-0,033	0.798	<i>rese</i>	0,130	0.579
<b>Group Homogeneity</b>	<i>samesex</i>	0,272	0.459	<i>samesex</i>	0,899**	0.005	<i>samesex</i>	-0,884	0.122
	<i>sameedu</i>	-0,010	0.956	<i>sameedu</i>	-1,050***	0.000	<i>sameedu</i>	0,056	0.646
	<i>sameage</i>	-0,148	0.440	<i>sameage</i>	-0,457*	0.054	<i>sameage</i>	0,403***	0.000
<b>Social Intermediation</b>	<i>facl</i>	0,211	0.345	<i>facl</i>	0,314	0.272	<i>facl</i>	-0,484**	0.010
	<i>fact</i>	-0,151	0.642	<i>fact</i>	-0,780**	0.005	<i>fact</i>	-0,148	0.537
	<i>fach</i>	0,394*	0.058	<i>fach</i>	-1,370***	0.000	<i>fach</i>	0,473**	0.010
	<i>facm</i>	-1,307**	0.003	<i>facm</i>	-0,243	0.456	<i>facm</i>	-0,011	0.953
<b>Dynamic Incentives</b>	<i>CRd</i>	0,260	0.211	<i>CRd</i>	1,111***	0.004	<i>CRd</i>	0,307**	0.020
<b>Group Size</b>	<i>nmbg2</i>	0,776	0.416	<i>nmbg1</i>	-2,653***	0.000	<i>nmbg1</i>	1,677**	0.002
	<i>nmbg4</i>	0,140	0.640	<i>nmbg2</i>	0,844*	0.095	<i>nmbg2</i>	-0,373	0.227
	<i>nmbg5</i>	0,511*	0.080	<i>nmbg4</i>	-1,807**	0.003	<i>nmbg4</i>	-0,967**	0.009
<b>Characteristics of the loan</b>	<i>Pprin1</i>	0,000	0.101	<i>Pprin2</i>	0,003***	0.000	<i>nmbg5</i>	0,745	0.388
	<i>Pduration1</i>	0,005***	0.000	<i>Pduration2</i>	-0,002*	0.088	<i>Pprin3</i>	0,001*	0.083
	<i>fee</i>	0,196	0.485	<i>fee</i>	2,643**	0.021	<i>Pduration3</i>	0,030***	0.000
	<i>pgsaving</i>	0,000	0.881	<i>pgsaving</i>	-0,001**	0.002	<i>fee</i>	0,851**	0.003
	<i>pgwt</i>	0,013	0.647	<i>pgwbl</i>	0,012	0.376	<i>pgsaving</i>	0,000***	0.000
	<i>purpa</i>	-0,483	0.101	<i>pgwt</i>	-0,112	0.215	<i>pgwbl</i>	0,063**	0.003
	<i>purpp</i>	-0,462	0.280	<i>purpa</i>	-1,343*	0.057	<i>pgwt</i>	0,027	0.147
	<i>harvest</i>	0,166	0.427	<i>purpp</i>	0,666**	0.016	<i>purpa</i>	1,053***	0.000
	<i>endy</i>	0,427**	0.029	<i>harvest</i>	1,933***	0.000	<i>purpp</i>	0,958***	0.000
	<i>NBYt</i>	-0,013***	0.000	<i>endy</i>	-0,140	0.667	<i>harvest</i>	-0,088	0.509
	<b>Characteristics of the individual</b>	<i>sex</i>	-0,432*	0.086	<i>NBYt</i>	-0,013***	0.000	<i>endy</i>	-0,444**
<i>yedlevel</i>		-0,067	0.163	<i>sex</i>	-1,829***	0.000	<i>NBYt</i>	-0,010**	0.003
<i>ageb</i>		-0,001	0.162	<i>yedlevel</i>	-0,031	0.338	<i>sex</i>	0,101	0.528
<i>selfEagr</i>		0,081	0.720	<i>ageb</i>	-0,003**	0.003	<i>yedlevel</i>	-0,011	0.696
<i>selfEo</i>		0,102	0.608	<i>selfEagr</i>	-0,891**	0.005	<i>ageb</i>	0,002**	0.004
<i>Eagr</i>		-0,184	0.632	<i>selfEo</i>	-0,291	0.242	<i>selfEagr</i>	0,239*	0.065
<i>Eo</i>		-0,158	0.594	<i>Eagr</i>	1,228**	0.003	<i>selfEo</i>	0,284**	0.036
<b>Characteristics of the household</b>	<i>Passet</i>	0,000*	0.083	<i>Eo</i>	-1,207**	0.002	<i>Eagr</i>	-0,078	0.666
	<i>transferr</i>	0,056	0.886	<i>Passet</i>	0,000*	0.056	<i>Eo</i>	-1,064***	0.000
	<i>hhszize</i>	-0,066	0.165	<i>transferr</i>	0,315	0.453	<i>Passet</i>	0,000**	0.009
	<i>Rownl</i>	0,050*	0.084	<i>hhszize</i>	0,086	0.237	<i>transferr</i>	0,512*	0.081
	<i>lnpcxa</i>	-0,167	0.544	<i>Rownl</i>	0,016	0.628	<i>hhszize</i>	-0,039	0.179
	<i>garbage</i>	-0,197	0.476	<i>lnpcxa</i>	0,542	0.146	<i>Rownl</i>	0,052**	0.001
	<i>electricity</i>	-0,686*	0.052	<i>garbage</i>	0,951**	0.006	<i>lnpcxa</i>	-0,202	0.264
	<i>_cons</i>	-1,315	0.387	<i>_cons</i>	-9,959**	0.001	<i>garbage</i>	-0,313	0.132
						<i>cons</i>	-9,620***	0.000	
	<i>Log likelihood</i>	-181,86		<i>Log likelihood</i>	-153,65		<i>Log likelihood</i>	-472,02	
	<i>Pseudo R2</i>	20.64%		<i>Pseudo R2</i>	28.95%		<i>Pseudo R2</i>	26.97%	
	<i>N</i>	336		<i>N</i>	312		<i>N</i>	945	

**Table 8.**  
**Determinants of the principal.**

<b>P_Whole</b>	<b>Coef.</b>	<b>P&gt;z</b>	<b>P_BRAC</b>	<b>Coef.</b>	<b>P&gt;z</b>	<b>P_BRDB</b>	<b>Coef.</b>	<b>P&gt;z</b>	<b>P_GB</b>	<b>Coef.</b>	<b>P&gt;z</b>
<i>agegp</i>	138,478***	0.000	<i>agegp</i>	104,572**	0.006	<i>agegp</i>	115,465***	0.000	<i>agegp</i>	192,582***	0.000
<i>scohab</i>	54,421	0.544	<i>scohab</i>	141,490	0.448	<i>scohab</i>	44,194	0.823	<i>scohab</i>	184,437*	0.094
<i>rese</i>	-51,466	0.262	<i>rese</i>	-130,710*	0.064	<i>rese</i>	-45,993	0.472	<i>rese</i>	565,518***	0.000
<i>samesex</i>	-530,354***	0.000	<i>samesex</i>	338,872	0.215	<i>samesex</i>	-188,969	0.270	<i>samesex</i>	-848,886**	0.005
<i>sameedu</i>	1,504	0.982	<i>sameedu</i>	217,884	0.105	<i>sameedu</i>	-79,614	0.532	<i>sameedu</i>	-58,204	0.480
<i>sameage</i>	133,976**	0.033	<i>sameage</i>	322,789**	0.017	<i>sameage</i>	220,110*	0.072	<i>sameage</i>	45,358	0.544
<i>facl</i>	322,294***	0.000	<i>facl</i>	296,896**	0.050	<i>facl</i>	-289,684**	0.044	<i>facl</i>	192,197*	0.086
<i>fact</i>	280,346**	0.001	<i>fact</i>	245,371	0.217	<i>fact</i>	84,460	0.547	<i>fact</i>	371,468**	0.008
<i>fach</i>	267,912**	0.001	<i>fach</i>	-77,748	0.595	<i>fach</i>	266,155	0.129	<i>fach</i>	249,680**	0.039
<i>facm</i>	-3,084	0.971	<i>facm</i>	-49,978	0.863	<i>facm</i>	-13,420	0.945	<i>facm</i>	79,611	0.488
<i>nmbg1</i>	-336,837**	0.021	<i>nmbg1</i>	(dropped)		<i>nmbg1</i>	779,177**	0.004	<i>nmbg1</i>	-1570,988***	0.000
<i>nmbg2</i>	41,780	0.825	<i>nmbg2</i>	1,167	0.999	<i>nmbg2</i>	247,819	0.381	<i>nmbg2</i>	-327,575	0.221
<i>nmbg4</i>	-208,729**	0.023	<i>nmbg4</i>	-535,269**	0.014	<i>nmbg4</i>	620,172**	0.001	<i>nmbg4</i>	-638,440***	0.000
<i>nmbg5</i>	68,246	0.636	<i>nmbg5</i>	-206,623	0.330	<i>nmbg5</i>	(dropped)		<i>nmbg5</i>	-620,094	0.218
<i>BRAC</i>	185,875	0.190	<i>fee</i>	-575,446**	0.002	<i>fee</i>	-191,466	0.542	<i>fee</i>	-717,815***	0.000
<i>BRDB</i>	-3,677	0.978	<i>pgsaving</i>	0,970***	0.000	<i>pgsaving</i>	0,466***	0.000	<i>pgsaving</i>	0,031	0.475
<i>fee</i>	-385,252***	0.000	<i>pgwbl</i>	-12,627**	0.019	<i>pgwbl</i>	-0,132	0.985	<i>purpa</i>	-188,969	0.280
<i>pgsaving</i>	0,173***	0.000	<i>purpa</i>	428,437**	0.036	<i>purpa</i>	748,516**	0.012	<i>purpp</i>	-382,120**	0.007
<i>pgwbl</i>	-14,541***	0.000	<i>purpp</i>	-513,346*	0.097	<i>purpp</i>	-160,779	0.286	<i>harvest</i>	-282,064**	0.003
<i>purpa</i>	276,862**	0.030	<i>harvest</i>	-165,729	0.275	<i>harvest</i>	-134,669	0.328	<i>endy</i>	22,361	0.797
<i>purpp</i>	-412,710***	0.000	<i>endy</i>	197,002	0.182	<i>endy</i>	371,187**	0.015	<i>NBYt</i>	10,886***	0.000
<i>harvest</i>	-151,842**	0.044	<i>NBYt</i>	9,747***	0.000	<i>NBYt</i>	1,867**	0.044	<i>sex</i>	-285,485**	0.011
<i>endy</i>	104,613	0.152	<i>sex</i>	107,187	0.606	<i>sex</i>	304,394**	0.045	<i>yedlevel</i>	24,410	0.163
<i>NBYt</i>	7,327***	0.000	<i>yedlevel</i>	67,519**	0.016	<i>yedlevel</i>	0,384	0.985	<i>ageb</i>	0,897**	0.010
<i>sex</i>	-7,981	0.926	<i>ageb</i>	0,808	0.105	<i>ageb</i>	0,548	0.241	<i>selfEagr</i>	113,233	0.229
<i>yedlevel</i>	26,696**	0.031	<i>selfEagr</i>	86,766	0.563	<i>selfEagr</i>	219,504	0.121	<i>selfEo</i>	168,554*	0.058
<i>ageb</i>	0,931***	0.000	<i>selfEo</i>	-86,394	0.542	<i>selfEo</i>	213,551*	0.089	<i>Eagr</i>	234,064	0.123
<i>selfEagr</i>	137,960*	0.063	<i>Eagr</i>	166,659	0.533	<i>Eagr</i>	-379,217**	0.018	<i>Eo</i>	213,957	0.166
<i>selfEo</i>	170,264**	0.011	<i>Eo</i>	51,046	0.800	<i>Eo</i>	361,705**	0.021	<i>Passet</i>	0,000	0.843
<i>Eagr</i>	-52,286	0.623	<i>Passet</i>	-0,002	0.155	<i>Passet</i>	0,001	0.315	<i>transferr</i>	148,655	0.389
<i>Eo</i>	365,468***	0.000	<i>transferr</i>	25,786	0.945	<i>transferr</i>	-105,794	0.644	<i>hhszize</i>	6,735	0.746
<i>Passet</i>	0,000	0.794	<i>hhszize</i>	31,845	0.377	<i>hhszize</i>	8,575	0.814	<i>Rownl</i>	35,490***	0.000
<i>transferr</i>	-84,152	0.548	<i>Rownl</i>	12,434	0.559	<i>Rownl</i>	-15,011	0.432	<i>lnpcxa</i>	97,823	0.467
<i>hhszize</i>	31,934*	0.059	<i>lnpcxa</i>	385,220**	0.037	<i>lnpcxa</i>	-23,103	0.913	<i>garbage</i>	615,521***	0.000
<i>Rownl</i>	27,815***	0.000	<i>garbage</i>	-397,439**	0.021	<i>garbage</i>	-138,645	0.427	<i>electricity</i>	514,401**	0.015
<i>lnpcxa</i>	177,359*	0.079	<i>electricity</i>	106,107	0.587	<i>electricity</i>	289,461	0.169	<i>_cons</i>	-1097,072	0.168
<i>garbage</i>	-3,803	0.968	<i>_cons</i>	-1347,346	0.241	<i>_cons</i>	1585,843	0.161			
<i>electricity</i>	373,848**	0.003									
<i>cons</i>	-329,935	0.568									
<i>Pseudo R2</i>	36.49%		<i>Pseudo R2</i>	40.87%		<i>Pseudo R2</i>	38.64%		<i>Pseudo R2</i>	48.65%	
<i>N</i>	1387		<i>N</i>	307		<i>N</i>	330		<i>N</i>	750	

**Table 9.**  
*Dictionary of the variables used in the regression.*

Variables	Description
<b>ageb</b>	Age of the borrower.
<b>agegp</b>	Age of the lending group in years.
<b>BRAC</b>	Dummy: 1 if the loan program is the BRAC.
<b>BRDB</b>	Dummy: 1 if the loan program is the BRDB.
<b>CRd</b>	Dummy: 1 if the borrower feels credit rationed (would like to borrow more at the same interest rate).
<b>duration</b>	Duration of the loan.
<b>Eagr</b>	Dummy: 1 if the borrower received income from employment in agricultural activities.
<b>electricity</b>	Dummy: 1 if the household has private access to electricity.
<b>endy</b>	Dummy: 1 if the loan had to be finished paid back during the end of the year.
<b>Eo</b>	Dummy: 1 if the borrower received income from employment in other activities.
<b>fach</b>	Dummy: 1 if the borrower had access to health services.
<b>facl</b>	Dummy: 1 if the borrower had access to basic literacy services.
<b>facm</b>	Dummy: 1 if the borrower had access to marketing services.
<b>fact</b>	Dummy: 1 if the borrower had access to professional training.
<b>fee</b>	Dummy: 1 if the borrower had to pay initial fees.
<b>garbage</b>	Dummy: 1 if the household use specific garbage disposition.
<b>harvest</b>	Dummy: 1 if the loan had to be finished paid back during the month of harvest.
<b>hhsiz</b>	Number of members in the household.
<b>lnpcxa</b>	Log of per capita consumption.
<b>NBYt</b>	Number of borrowers of the MFI of the borrower at the year the borrower received his/her loan <sup>27</sup> .
<b>nmbg1</b>	Dummy: 1 if the size of the borrower's lending group is inferior or equal to 10 persons.
<b>nmbg2</b>	Dummy: 1 if >10 & <=15
<b>nmbg4</b>	Dummy: 1 if >30 & <=50
<b>nmbg5</b>	Dummy: 1 if >50
<b>Passet</b>	Value of productive assets.
<b>pgsaving</b>	Value of program savings.
<b>pgwbl</b>	Number of weeks the borrower had to wait before he received his loan.
<b>pgwt</b>	Number of training weeks before the borrower received his loan.
<b>Prin<sup>28</sup></b>	Principal of the loan.
<b>purpa</b>	Dummy: 1 if the purpose of the loan is agricultural.
<b>purpp</b>	Dummy: 1 if the purpose of the loan is personal.
<b>purpw</b>	Dummy: 1 if the purpose of the loan is related to dwelling expenses.
<b>rese</b>	Number of months the borrower lived elsewhere.
<b>Rownl</b>	Number of landed relatives.
<b>sameage</b>	Dummy: 1 if the borrower and the group leader have the same age (more or less 5 years).
<b>sameedu</b>	Dummy: 1 if the borrower and the group leader have the same education level (more or less two years).
<b>samesex</b>	Dummy: 1 if the borrower and the group leader have the same sex.
<b>scohab</b>	Dummy: 1 if the spouse of the borrower lives in the same place.
<b>selfEagr</b>	Dummy: 1 if the borrower received income from agricultural self-employment.
<b>selfEo</b>	Dummy: 1 if the borrower received income from other activities self-employment.
<b>sex</b>	Dummy: 1 if male, 0 if female.
<b>transferr</b>	Dummy: 1 if the household of the borrower received transfers.
<b>yedlevel</b>	Education level in years.

<sup>27</sup> The growth of the loan portfolio in the sample was similar to the effective growth of the portfolio of the MFI. The annual growth rate of the loan portfolio for the Grameen Bank was of 32.73% between 1986 and 1991 in our sample compared to 37.8% according to calculation based on information in Khandker, Khalily and Khan, 1995.

<sup>28</sup> Respectively Prin (predicted principal with instrumental variables for the whole sample), Pprin1 (id for the BRAC), Pprin2 (id for the BRDB), Pprin3 (id for the Grameen Bank), Pprinrg3 (id for the whole sample but when rtg3 is the dependant variable).