

Discrimination in Microfinance: The Role of Credit Officers[⊗]

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ABSTRACT: This paper studies how high-powered incentives may affect credit officers' discriminatory practices in microfinance institutions. Using an agency model applied to a non-profit MFI, we argue that incentive contracts may help align the officer's behavior with the MFI's mission. However, since incentives are costly, and the MFI's budget is limited, even a benevolent institution faces a trade-off between fighting discrimination and raising outreach. Welfare maximization may not imply full eradication of discriminatory practices. A non-discriminating welfare-maximizing MFI may thus prefer paying smaller incentives, and letting its credit officer discriminate to some extent.

Keywords: Microfinance, Discrimination, Credit Officers, Incentives.

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1. Introduction

Microfinance is the name given to the industry that developed over the last thirty years or so in order to provide financial services (mainly credit and savings services) to people excluded from traditional banking. A naive observer of microfinance may view microfinance institutions (MFIs) as altruistic benevolent organizations. But microfinance is a very heterogeneous field, with a wide variety of actors, some of whom being mainly motivated by the social mission linked to the field while others consider microfinance as just another business, using specific features for specific market niches.

When considering this variety of situations, it may be interesting to consider that in microfinance like in any other type of institutions, some individuals tend to contribute only based on their expected return and to be affected by the same biases as other workers. They may in particular discriminate against subgroups of the clientele of microfinance.

Indeed, actual microfinance portfolios exhibit biases in favor of trade, biases in favor of women, or biases in favor of some other parts of potential populations. In some cases, this will be justified by “practice” saying that “petty trade pays faster”, that women “reimburse better”, and so on. Without discussing the fundamentals of such sayings, it may be interesting to stress that in some cases at least, it might come much more from a priori prejudices than from true practice, with the potential consequence of limiting the potential growth of MFIs and therefore maintaining “artificial gaps” between supply and potential demand (see de Janvry *et al.*, 2006).

Another type of discrimination may also sometimes exist in the form of purer discrimination against some categories based on ethnical, religious, or physical criteria. The case of disabled people is very illustrative of this trend. Indeed, even though officially MFI do not oppose the idea of providing microfinance to disabled people, in real life, very few do so. Different mechanisms explain it, but using Simanowitz’s (2001) typology of exclusion and referring to Mersland’s (2005) work on microcredit for self-employed disabled persons, Cramm and Finkenflügel (2008) point out that standard MFIs staff can indeed be a source of discrimination.

Among the staff that may discriminate, credit officers may play a key role, because the methodology of microfinance is extremely decentralized. It therefore gives credit officers, who visit clients on the field, in their home and working premises, the fundamental role in deciding which client will be accepted and which one will be rejected. In some

institutions, the decision is virtually limited to the credit officers. In other institutions, the decision power may be shared with either a branch manager or a credit committee usually composed by the branch manager and other credit officers who belong to the same branch, but even in this case, there is some information asymmetry between credit officers and the MFI because credit officers do play a major role in selecting the clients who will be financed. They therefore have ample scope to discriminate.

Nevertheless, whereas research on microfinance methodology often mentions the role of credit officers in the decentralized decision process, few papers really take credit officers as their main focus, let alone as a source of discrimination. Aubert *et al.* (2009) show that the efficiency of bonuses linked to repayment may depend on the profit or non-profit orientation of MFIs. This confirms the results by Besley and Ghatak (2005) showing that high-powered incentives may not be so important in sectors where motivation comes primarily out of the organization's mission rather than out of its ability to make (and share) profits. On the other hand, commercialization trends in microfinance tend to push MFIs to become everyday closer to normal companies, therefore questioning the type of incentives that they could adopt in order to make sure that their social mission of providing good financial services to as many excluded customers as possible is maintained can make sense at this stage of development of the industry. It may therefore be interesting to analyze how MFIs employees' goals and priorities can be aligned with the mission of those organizations.

This is precisely the aim of the present paper. Here we build a formal model to investigate how a purely welfare maximizing MFI may use incentive contracts to deter its credit officers from discriminating customers who belong to a discriminated group of society. The model suggests that incentive contracts may help align the officer's behavior with the MFI's goal. However, since incentive contracts are costly, and the MFI's budget is limited, the MFI faces a trade-off between fighting discrimination and raising outreach. Welfare maximization may accordingly not imply complete eradication of discriminatory practices. In equilibrium a non discriminating welfare maximizing MFI may be better off paying its credit officer a smaller incentive premium, and letting him/her discriminate at least to some extent.

To reach those conclusions, the rest of the paper is organized as follows. The next section reviews the literature and stylized facts on discrimination by credit officers and incentives. Section 2, sets up a formal model where a credit officer who is biased against a sub-group of the MFI's clientele is the agent of a welfare maximizing MFI that pays him/her an incentive contract. Section 3 concludes.

2. Credit officers' incentives and discrimination: a review of the literature

This section first surveys the literature on incentives in MFIs then discusses the potential for discrimination.

2.1. Incentives schemes in MFIs

The salary of credit officers is often largely determined by their results through incentives mechanisms. At first, as in the Finansol case mentioned previously, the incentives were often only related to a single criterion, i.e. “growth of loans portfolio”. However, over time, it appeared that by doing so MFIs were encouraging their credit officers to put more focus on allowing new credits than on portfolio quality. Therefore, if growth targets were met, sometimes it was at the cost of a major increase of loan arrears and losses. So, the policies were changed and now MFIs incentives usually combine portfolio growth indicators with portfolio quality ones, generating thus much more pressure for good screening. However, the way of designing incentives is far from easy and officers naturally adapt to whatever set of incentives, therefore generating sometimes new bias.

As an example, Pamecas (a major network of credit unions in Senegal experiencing one of the fastest growths in the region) had to redesign its incentives scheme. Its original scheme was made of the following two indicators: quality of portfolio (measured in terms of arrears) and total growth of portfolio (measured by the growth of the total amount of the credit officers portfolio). By defining “growth of portfolio” only in terms of total amount of the portfolio (without mentioning the issue of the number of loans distributed), they realized that they had created an incentive for credit officers to focus on customers requiring sound but larger loans, therefore favoring some involuntary mission drift by financing larger customers than those they wanted to target. So even though that had not been intended, the set of incentives created could potentially push the institution away from its poorer customers, generating an involuntary (for the institution) bias against “small clients”. In the long run, this may have caused a more systemic discrimination.

Over the last ten years, the use of staff incentives (and particularly for credit officers) has increased tremendously. The report published by McKim and Hughart (2005) and based on the responses of 147 MFIs to an in-depth international survey on staff incentive schemes

illustrates this trend. The conclusions drawn from this report are threefold. First, as credit officers do spend up to 75% of their time outside of the office, it is hard for managers to monitor them. Incentives are therefore more convenient than direct supervision. Second, staff incentive schemes (SIS) usually refer to systems that include not only financial but also non-financial rewards. Third, SIS have developed tremendously over the last few years. “The percentage of MFIs using staff incentive schemes has increased more than tenfold between 1990 and 2003, growing from 6% to 63%” (McKim and Hughart, 2005, p. 4). One explanation of this change may be the increasing trend toward the commercialization of microfinance that has happened over that period.

So clearly, the role of microfinance credit officers is better and better recognized and looking for relevant and efficient incentives seems on the agenda of the industry even though the focus has so far been much more on productivity than on making sure that incentives were motivating credit officers practices to match MFIs mission .

The topic has mainly been covered by the microfinance practitioners community (DID, 2003; Holtmann and Grammling, 2005). Some academic authors however have also contributed to the debate.

Dealing with rural financial markets, Fuentes (1996) and Warning and Sadoulet (1998) have shown that the incentives structure play quite an important role in systems that use village agents as intermediaries. In *The Economics of Microfinance*, Armendariz and Morduch (2005) consider incentives at the heart of management decisions taken by MFIs. They somehow follow Churchill (1999) who was among the first ones to stress that credit officers did matter to the success of microfinance particularly in individual lending. This is also corroborated by Schreiner (2000) who shows on Colombian data that the level of experience of the credit officer has a significant impact on the quality of his portfolio.

Dixon, Ritchie, and Siwale (2006) have studied the role of loan officers in a delinquency crisis in Zambia, showing that the intermediary position of the credit officers – working for the MFI but being close to their customers – might be difficult to handle in such a period and that the role of credit officers is also quite important in group lending.

In most methodologies, credit officers are in charge of screening potential customers. They also play the key role in the decision process of allowing the credit and are responsible for the follow up of the loans. So, the tasks of credit officers can be best described in four categories: generating new business (identifying new customers), analyzing the loans applications, monitoring and following-up the active loans and generating reports and statistics (Holtmann and Grammling, 2005, p. 53).

For the screening part which we are mostly interested in here, if we take the example of a standard urban program providing classic working capital individual loans, criteria are quite minimal. Credit officers are generally supposed to visit the client, analyze his total cash flow cycle (taking business and family incomes and expenses into consideration), making sure that the margin generated by this micro-entrepreneur is big enough to cover the cost of the credit (typically the loan installments should not represent more than a third of the net margin available), that the client have the right kind of collateral (which can be much more flexible and diverse in microfinance than in traditional banking) and finally that frequent repayment will be possible (most “standard” MFIs do consider biweekly or monthly installments ; sometimes – when working with poorer customers – weekly ones). However, even if these criteria may seem quite minimal (and therefore seem to allow for a wide variety of customers), in real life, when looking at typical MFIs portfolio, a bias appears. Credits in favor of the certain activities and/or certain groups of persons tend to be more financed than others. It is therefore interesting to question to which extent this is a logical outcome deriving from the criteria of the screening (fast cash flow production mainly) or the result of a discrimination (conscious or not).

2.2. Discrimination by credit officers

Due to the decentralization of MFIs, there is space for agency conflicts where credit officers will tend to focus on some “easier” customers than the whole segment which could/should actually be served based on the mission and business model of a given MFI. A customer may be “easier” because of geographical considerations. Visiting remote villages or suburbs may for instance be less convenient than staying in the same urban area. Some customers may appear “easier” because they belong to the same social network as the credit officer. Finally, the credit officer may be reluctant to interact with some discriminated groups of the population, be it for reasons related to caste, gender, or ethnicity.

Of course, the cost of such discriminations is not easy to assess, as it is mainly made of opportunity costs and not always supported by the same stakeholders. In some cases, credit officers may “limit” their potential market, therefore making the MFI support the opportunity cost as it will not be able to register its full potential growth. In other cases, the customers are the ones who suffer from the screening biases as some do not have access to financial services they could have benefited from. Finally, and sometimes unexpectedly,

credit officers themselves may have to support part of the cost depending on how the incentives structure is established.

At that stage, we need to clarify what we call discrimination. A credit officer will be said to discriminate if he/she is inclined to select a client due to a given observable characteristic of this person even though this characteristic has no influence on the loan attribution criterion defined by the MFI.

Discrimination must be clearly differentiated from selection. Selection also puts aside some potential customers but for due reasons. For instance, for most microfinance institutions, financing agricultural activities is just not feasible due to their cost structure. In this case, the potential return of most agricultural activities is too low to be able to sustain the interest charged by the microfinance institution. This explains why in rural areas, microfinance institutions tend to select non-agricultural activities for giving a loan while rejecting at the same time purely agricultural ones. In such a situation, even though some observers could consider this choice to be discriminatory, it is only understandable selection.

Various behaviors may create discrimination. First, pure prejudice is the rejection of an individual just because he/she is of a certain gender, of such or such geographical or ethnical origins, of such or such religion, and so on. This is the kind of discrimination that is Becker's (1957) focus. However, mere laziness, standard in the principal-agent literature, may also result in discrimination without any distaste for the discriminated group. This would for instance be the case if the discriminated group clustered in a particular geographic area or a kind of profession that makes the officer's task more difficult. In this type of discrimination, the individual is restricting the categories of individuals that he/she tends to serve based on habits and conventions and not because of voluntary activism to exclude others.

In microfinance, to our knowledge, there has been no systematic research on the discriminations that credit officers may apply to their potential customers. Out of practice however, it seems quite reasonable to imagine that both types may coexist. Indeed, most microfinance markets are characterized by a supply of services which is much more limited than the potential demand it faces. Therefore, discrimination may not appear to be very costly as it is often possible to generate fairly good results in terms of growth and returns even allowing for discrimination. However, there are two good reasons to contradict such

statement. First, in the long run, on some specific markets competition is stronger¹ and discrimination may ultimately be quite costly for the MFIs. Second, from a development point of view, after 30 years of tremendous growth, it is disappointing that microfinance supply and demand still seem characterized by a real mismatch. Anti-discrimination measures may help reducing this mismatch by offering a better coverage of all potential segments.

3. A formal model of discrimination by a biased credit officer

In order to develop our formal framework, we have decided to work out on a theoretical case of discrimination against an identifiable class of customers when the MFI is socially-oriented (a “pro-poor MFI” following Aubert *et al.* (2009)). This should be seen as a typical example as our formalism aims at adapting well to any form of discrimination exerted by microfinance credit officers.

The assumption is the following: in a given area, credit officers may decide to focus on favored customers (F) instead of discriminated customers (D) because analyzing F might be faster (due to the similarities of their activities and profiles) and also because F may be easier to find or to assess. Petty traders could be seen as an example of the “finding argument”, as in some countries, most of the petty trade is taking place in market places (easy to find) while handicraft might be more spread around in the city ; therefore traders may be seen as easier wanted customers. Disabled people may be seen as a good example of D customers because of the “harder to assess” argument. Indeed, disabled people may probably be sometimes rejected by credit officers because attending them is perceived more time consuming and because they are perceived as risky clients due to their vulnerability (Mersland, 2005). Besides, they are often considered less able to run a business than they probably really are as it is acknowledged by MFIs themselves (Cramm and Finkengflügel, 2008).

So, from a general point of view, F customers are assumed by credit officers to be the easiest to deal with in order to reach their goals while D customers are those that they will not naturally serve unless specific incentives schemes are put into place. What matters here is

¹ the most famous case is the city of La Paz in Bolivia where a stark competition has led to major decreases in the interests charged to the microfinance clients – roughly speaking from over 40% on an annual base to less than 25% some years later.

that the credit officer will be spontaneously reluctant to serve discriminated customers absent other incentives.

Let us consider a social MFI facing a loan attribution decision. All candidates are unbanked and can be either very poor ($\kappa = P$) or less poor ($\kappa = L$). Moreover, each applicant for a loan belongs either to the discriminated ($i = D$) or to the favored ($i = F$) group. Both poverty level and group membership are observable. Thus, any candidate is identifiable through its bidimensional vector of characteristics²:

$$(i, \kappa), i \in \{D, F\}, \kappa \in \{P, L\} \quad (1)$$

Due to its mission statement, the MIF is benevolent, and supposed to exhibit no preference for any group, be it discriminated or not. Its objective is to maximize its activity's impact on welfare. The MFI thus maximizes the expected social utility of its clients:

$$\text{Max} \sum_{j=1}^n E[U_j], \quad (2)$$

where n is the number of clients (to be determined through optimization) and $E[U_j]$ is the expected utility of client j .

For one client, the social utility brought by the MFI's action is Δu_p when client j is very poor ($j = P$) and Δu_L when client j is less poor ($j = L$). All loans are supposed to be identical (normalized to 1), however, if the marginal utility of income is decreasing, an identical loan will result in a larger increase in utility for a very poor than for a less poor:

$$\Delta u_p > \Delta u_L \quad (3)$$

The MFI therefore exhibits a preference for granting loans to poorer clients, because doing so will increase welfare more.

² Contrary to Aubert *et al.*(2008), we do not include clients' ability as a relevant characteristic as the MFI objective function here is purely social and sustainability is not discussed. Moreover, in our setting only the loans allocation process is considered, not the reimbursements and the associated credit risk.

To allocate loans, the MFI must rely on a credit officer, who actually meets potential clients, and decides to whom he/she grants a loan. Unlike the MFI, the credit officer is biased against the D group, and is therefore reluctant to offer a loan to members of that group.

The credit officer's selection process is sequential. For obvious time reasons, he/she only meets a limited number of potential clients every period, and allocates one loan each period.

For simplicity, we assume that those choices are always to be made between two candidates drawn randomly from the population described above.³ The population features the following proportions of the four categories: $\gamma_{DP}, \gamma_{FP}, \gamma_{DL}, \gamma_{FL}$, with $\gamma_{i\kappa} > 0 (i = D, F; \kappa = P, L)$ and

$$\sum_{i=D,F} \sum_{\kappa=P,L} \gamma_{i\kappa} = 1. \text{ The credit officer offers the loan on the basis of the candidates'}$$

bidimensional characteristics (κ, i) .

Since the credit officer is biased against the D group, he/she would never grant a loan to a D client unless both potential clients belong to that group. However, cognizant of the officer's bias, the MFI pays an incentive wage, that relates the officer's wage to his/her discriminatory practice. The credit officer's decision mechanism is modeled in probabilistic terms. When facing two candidates with respective characteristics (D, P) and (F, L) , the credit officer chooses the (F, L) candidate with probability $(1 - \lambda)$, $\lambda \in [0, 1]$. Under these circumstances, his/her decision is therefore only based on poverty level with probability λ . Variable λ is the officer's instrument and measures his/her propensity not to let prejudice interfere with the loan attribution.

The credit officer's expected utility therefore decreases with λ . We assume the following risk-neutral expected utility function:

$$E[V] = E[\omega] - \frac{1}{2} d \lambda^2 \quad (d \geq 0) \tag{4}$$

As d increases, the officer's expected disutility of choosing a poor D client in lieu of a less poor F client increases. Parameter d gauges the aversion for the discriminated group relative

³ Although we have fixed this number to two for the sake of simplicity, the argument can be easily generalized to larger numbers.

to the utility of consumption. It thus measures the intensity of the credit officer's discriminatory bias. An unbiased person is characterized by $d = 0$, but there is no upper limit on that parameter.

The distribution of outcomes of the loan attribution is summarized in table 1. The characteristics of the two candidates are displayed, respectively, in the first row and the first column of table 1. Each cell of that table gives the characteristics of the loan beneficiary, and, whenever relevant, their probabilities.

Table 1: outcomes of the loan attribution process

Client 1 Client 2	(D, P)	(D, L)	(F, P)	(F, L)
(D, P)	(D, P)	(D, P)	(F, P)	(D, P) with prob. λ (F, P) with prob. $(1-\lambda)$
(D, L)	(D, P)	(D, L)	(F, P)	(F, L)
(F, P)	(F, P)	(F, P)	(F, P)	(F, P)
(F, L)	(D, P) with prob. λ (F, P) with prob. $(1-\lambda)$	(F, L)	(F, P)	(F, L)

Depending on the loan beneficiary, the contribution to the MFI objective will differ. Table 2 displays the MFI social benefit in each possible configuration of loan attribution.

Table 2: Social welfare associated to the outcomes of the loan attribution process

Client 1 \ Client 2	(D, P)	(D, L)	(F, P)	(F, L)
(D, P)	Δu_p	Δu_p	Δu_p	Δu_p with prob. λ Δu_L with prob. $(1-\lambda)$
(D, L)	Δu_p	Δu_L	Δu_p	Δu_L
(F, P)	Δu_p	Δu_p	Δu_p	Δu_p
(F, L)	Δu_p with prob. λ Δu_L with prob. $(1-\lambda)$	Δu_L	Δu_p	Δu_L

Whenever the poverty levels of the two candidates are identical, the officer systematically chooses an F client, if any. The decision becomes less obvious when the poorest candidate belongs to the D group. The officer's distaste for that group could be large enough for him/her to give the loan to a less poor favored candidate rather than very poor discriminated candidate. In such situation, the credit officer's prejudice is detrimental to the MFI mission and can result in mission drift (see Gosh and Van Tassel, 2008; Armendariz and Szafarz, 2009).

The MFI pays a wage that is inversely related to the officer's discriminatory intensity $(1 - \lambda)$. Specifically, a standard linear contract with fixed component C and premium s is assumed:

$$\omega = C + s\lambda, \quad s \geq 0, \quad C > 0 \quad (5)$$

The MFI however faces a budget constraint. Its fixed budget B is to be allocated to both loans (all of unit size) and the credit officer's wage ω :

$$B = \omega + n \quad (6)$$

This constraint reflects the role of credit officers in microfinance, which is fundamental, as microfinance is labor intensive. Labor cost typically amounts to 50 to 70% of total administrative costs supported by MFIs (Holtmann and Grammling, 2005).

The officer's wage is determined by the MFI. The budget constraint therefore implies that the MFI faces a trade-off. Increasing the officer's incentive will increase his/her propensity to serve poorer clients, but also raise his/her wage, therefore reducing the number of loans that can be distributed. The MFI finds itself in a position to trade-off between serving the poorest of the poor, and serving more loans.

The social utility of one loan attribution (to client j) is thus the random variable defined by:

$$U_j = \begin{cases} \Delta u_L & \text{with probability: } \Omega(\lambda) = \gamma_{DL}^2 + \gamma_{FL}^2 + 2\gamma_{DL}\gamma_{FL} + 2(1-\lambda)\gamma_{FL}\gamma_{DP} \\ \Delta u_P & \text{with probability: } 1-\Omega(\lambda) \end{cases} \quad (7)$$

where probability $\Omega(\lambda)$ is a linear function of λ :

$$\begin{aligned} \Omega(\lambda) &= (\gamma_{DL}^2 + \gamma_{FL}^2 + 2\gamma_{DL}\gamma_{FL} + 2\gamma_{FL}\gamma_{DP}) - 2\lambda\gamma_{FL}\gamma_{DP} \\ &= a - b\lambda \end{aligned} \quad (8)$$

with:

$$\begin{cases} a = \gamma_{DL}^2 + \gamma_{FL}^2 + 2\gamma_{DL}\gamma_{FL} + 2\gamma_{FL}\gamma_{DP} \\ b = 2\gamma_{FL}\gamma_{DP} \end{cases} \quad (9)$$

Thus, for one loan, the expected social utility is:

$$\forall j: E[U_j] = \Delta u_L \Omega(\lambda) + \Delta u_P [1 - \Omega(\lambda)] \quad (10)$$

or equivalently:

$$\forall j: E[U_j] = a\Delta u_L + (1-a)\Delta u_P - b(\Delta u_L - \Delta u_P)\lambda \quad (11)$$

For n loans attributed along the same lines in independent processes, the expected utility writes:

$$\sum_{j=1}^n E[U_j] = n[a\Delta u_L + (1-a)\Delta u_P - b(\Delta u_L - \Delta u_P)\lambda] \quad (12)$$

The MFI objective function is thus:

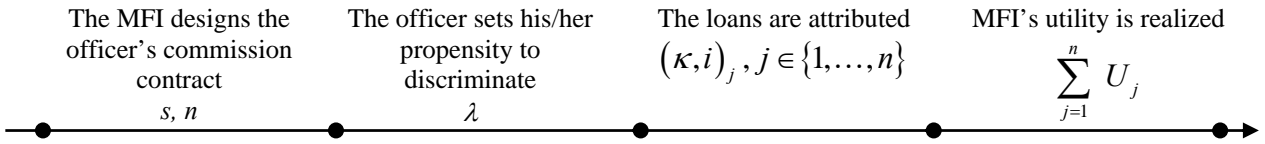
$$\text{Max}_{n,s} \sum_{j=1}^n E[U_j] = n[a\Delta u_L + (1-a)\Delta u_P - b(\Delta u_L - \Delta u_P)\lambda] \quad (13)$$

subject to the budget constraint:

$$B = C + s\lambda + n \quad (14)$$

To close the model, we specify the timing of the game. The MFI first chooses the parameters of the premium s , under the participation constraint, which states that the officer's expected utility must exceed that provided by his/her outside option. The Credit officer then determines the value of λ . The loans attribution subsequently takes place. Once the loans have been attributed, the MFI's utility is observed and the officer's commission paid. Finally, MFI total utility is determined. This timing is summarized by the timeline in figure 1.

Figure 1: the timing of the game



The model is solved by backward induction. First, we describe the last player's, i.e. the credit officer's, reaction function. Then, we derive his/her optimal contract, which determines the outcome of the game.

The utility maximizing credit officer chooses probability λ , which represents his/her propensity not to let prejudice interfere with the hiring decision:

$$E[V] = E[\omega] - \frac{1}{2}d\lambda^2$$

$$E[V] = C + s\lambda - \frac{1}{2}d\lambda^2 \quad (15)$$

The officer's maximization problem becomes:

$$\text{Max}_{\lambda \in [0,1]} \left\{ C + s\lambda - \frac{1}{2}d\lambda^2 \right\} \quad (16)$$

The first order condition accordingly reads:

$$s - d \lambda = 0 \quad (17)$$

which yields:

$$\lambda = \frac{s}{d}. \quad (18)$$

λ is increasing in s , the MFI's incentive instrument. Being a probability, λ must be positive and smaller than or equal to one. This restriction is to be added to the specification and may therefore lead to corner solutions for some parameters configurations. One has thus:

$$\lambda^* = \begin{cases} \frac{s}{d} & \text{if } s \leq d \\ 1 & \text{if } s > d \end{cases} \quad (19)$$

Being the Stackelberg leader, the MFI designs the performance-based contract by anticipating its effects on the officer's behavior. He/she therefore maximizes expected profit, taking the officer's reaction as a constraint. Namely:

$$\text{Max}_{n,s} \sum_{j=1}^n E[U_j] = n [a \Delta u_L + (1-a) \Delta u_P - b (\Delta u_L - \Delta u_P) \lambda] \quad (20)$$

$$\text{s.t. } B = C + s \lambda + n$$

The constraint can be rewritten as:

$$n(s) = B - C - s \lambda \quad (21)$$

Such that the optimization problem becomes:

$$\text{Max}_s E[U(s)] = (B - C - s \lambda) [a \Delta u_L + (1-a) \Delta u_P + b (\Delta u_P - \Delta u_L) \lambda] \quad (22)$$

For clarity sake we define:

$$B' = B - C \text{ (Net budget)} \quad (23)$$

$$A = a\Delta u_L + (1-a)\Delta u_p \text{ (Part of welfare that is independent from the officer's behavior)} \quad (24)$$

$$\delta = \Delta u_p - \Delta u_L \text{ (Extra utility of granting a loan to a very poor instead of a less poor)} \quad (25)$$

We thus get:

$$\text{Max}_s E[U(s)] = (B' - s\lambda)(A + b\delta\lambda)$$

We now solve the MFI's problem given the credit officer's optimal reaction function (19).

According to this reaction, the optimal value for s is either an interior point \tilde{S} or the corner

value d . For computing \tilde{s} , we rewrite the MFI objective function for $\lambda = \frac{s}{d}$:

$$\sum_{j=1}^n E[U_j] = \left(B' - \frac{s^2}{d}\right) \left(A + b\delta\frac{s}{d}\right) = -b\delta\frac{s^3}{d^2} - A\frac{s^2}{d} + B'b\delta\frac{s}{d} + B'A \quad (26)$$

This function is a polynomial of degree three in s . Its derivative is thus a polynomial of degree two taking a positive sign outside its real roots, if any, and negative between these roots:

$$\frac{d\{E[U(s)]\}}{ds} = -3b\delta\frac{s^2}{d^2} - 2A\frac{s}{d} + B'b\delta\frac{1}{d}. \quad (27)$$

The first-order condition is:

$$-\frac{3b\delta}{d}s^2 - 2As + B'b\delta = 0. \quad (28)$$

Since $\Delta = A^2 + \frac{3B'b^2\delta^2}{d} > 0$, the first derivative possesses indeed two real roots. Only one root, denoted \tilde{s} , is non-negative and therefore admissible given that it represents a premium level:

$$\tilde{s} = \frac{d}{3b\delta} \left(A + \sqrt{A^2 + \frac{3B'b^2\delta^2}{d}} \right) = \frac{Ad}{3b\delta} + \sqrt{\left(\frac{Ad}{3b\delta}\right)^2 + \frac{B'}{3}} \quad (29)$$

Due to the sign of the first derivative (27) (positive before \tilde{s} , negative after \tilde{s}), the MFI objective function reaches its global maximum in $s^* = \tilde{s}$ provided that $\tilde{s} \leq d$. Alternatively, if $\tilde{s} > d$ then, due to (19), the credit officer adopts the non-discriminatory behavior, $\lambda^* = 1$, and the MFI has no interest to provide a premium larger than d . In that case, the MFI optimal premium is $s^* = d$. In summary, we have:

$$s^* = \begin{cases} \tilde{s} & \text{if } 0 \leq \tilde{s} < d \\ d & \text{otherwise} \end{cases} \quad (30)$$

or equivalently :

$$s^* = \min \{d, \tilde{s}\} = d \cdot \min \left\{ 1, \frac{A}{3b\delta} + \sqrt{\left(\frac{A}{3b\delta}\right)^2 + \frac{B'}{3}} \right\} \quad (31)$$

The corresponding optimal value of λ given by:

$$\lambda^* = \begin{cases} \frac{\tilde{s}}{d} & \text{if } s^* = \tilde{s} \\ 1 & \text{if } s^* = d \end{cases} \quad (32)$$

Finally, the number of clients the MFI is able to serve at the optimum is:

$$n^* = B - C - s^* \lambda^* = B - C - d \min \left\{ 1, \left(\frac{A}{3b\delta} + \sqrt{\left(\frac{A}{3b\delta}\right)^2 + \frac{B'}{3}} \right)^2 \right\} \quad (33)$$

implying that, in all cases:

$$n^* \geq B - C - d \quad (34)$$

The corner case $n^* = B - C - d$ concerns the case where the credit officer's taste for discrimination d is small and/or the MFI net budget $B - C$ is large. In that case, the MFI will find it optimal to choose the minimal premium level that allows for a non-discriminatory

solution: $s^* = d$. Indeed, according to (19), in that case the credit officer's optimal reaction is $\lambda^* = 1$.

The striking result of the model is that in equilibrium the probability that the credit officer discriminates can remain positive despite the MFI being a pure welfare maximizer, blind to group membership. The issue here is that fighting discrimination is costly not only in financial terms, but more to the point in terms of the MFI outreach. Namely, if the MFI wishes to maximize welfare, it may have to tolerate some discrimination, because eradicating discrimination would necessitate paying a wage so high that more welfare would be lost by reducing the number of loans than by granting more loans to discriminated very poor instead of favored less poor.

A corollary is that observing that the distribution of loans is biased against one group does not imply that the MFI is intrinsically biased against that group. If the MFI has to rely on local credit officers who are biased, then it may be the best that it can do. It may indeed even pay an incentive wage to reduce discrimination. However, fully eliminating discrimination would come at the cost of too many non granted loans.

From a management and policy point of view, this result suggests that other solutions must be found to combat discrimination, because wage incentives may be insufficient. Since our result is obtained on the premise that the MFI maximizes social welfare, a benevolent social planner would adopt exactly the same behavior.

4. Concluding remarks

So far microfinance practices have usually been studied at the customer's or at the institution's level. As part of this trend, loans disbursements are usually studied in terms of methodology efficiency and market segments attended or not. Of course, those factors explain very largely why some clients are served by MFIs while others remain unserved. However, other reasons might be at stake. One of those is the bias and discrimination that may exist within the microfinance field itself. One source of discrimination may come from the way credit officers assume their jobs. This paper discussed how a benevolent MFI may mitigate that source of discrimination by offering high-powered incentives. Using a formal agency

model, it argues that well-designed incentive schemes might be part of the solution. However, because such incentives are costly, and the MFI's budget is limited, the MFI may better serve its objective by not offering incentives that would eradicate discrimination. In a nutshell, a non-discriminatory institution may tolerate discrimination because eliminating it would be too costly.

As for our model, some comments can be done. First, the only strong assumption is the fact that the size of the loans is the same for all clients. This is an issue that was already identified in Fuentes (1996) and should be relaxed in further work.

Second, the way we model discrimination might lead to the erroneous impression that when the probability that the credit officer selects a poor client from the discriminated group over a less poor client from the favored group, discrimination disappear totally from the MFI clients selection. This is unfortunately not the case, because the MFI wants to select as many very poor clients as possible but is blind to discrimination taking place within poverty classes. Indeed, when facing two candidates for a loan presenting the same level of wealth, the credit officer systematically chooses the favored candidate, if any. Pushing the argument to the extreme, if the population were made of very poor only, then no candidate from the discriminated group confronting a favored candidate would ever receive a loan. This is a straight consequence of the MFI objective function specification.

However, the question of whether the MFI should complement its welfare optimization with a kind of equity, or proportionality, requirement is tougher than it looks at first sight. Actually, such additional "anti-discrimination constraint" might paradoxically make the MFI deviate from its mission. For instance, a strict proportionality rule could hamper women empowerment through microfinance, or any type of affirmative action. But, by using this argument in the opposite direction, the MFI could in fact view biased credit officers as an opportunity for favoring certain subpopulations known to be preferred by the latter. Indeed, by deliberately opting for female credit officers, for instance, the MFI could increase the odds to have female clients. In that case, if the optimal policy leads to the probability that the credit officer selects a poor client from the discriminated group over a less poor client from the favored group being equal to one. Then the MFI will not only benefit from costless women empowerment (at equal level of poverty, a woman will be preferred), but also avoid any welfare-loss (a poor man will be preferred to a wealthier woman) and, therefore, face no mission drift.

Governance issues are as important in socially-oriented organizations as they are in profit-oriented firms (Lapie, 2001). Specifically in the case of MFIs, the empirical results by

Mersland and Strøm (2007) testify that board characteristics, ownership type, market structure and regulation are crucial for explaining profitability and mission fulfillment. The discrimination issue is likely to be even more important in welfare-maximizing institutions than in standard capitalistic firms, precisely because profit-seeking is not there to build adequate incentives, a point already raised by Aubert *et al.* (2009). Moreover, donors are less likely to tolerate discrimination from charitable institutions they finance than shareholders and customers from typical capitalistic firms. For these reasons, we believe that this subject deserves more attention than it has received so far, and hope that our first theoretical attempt will open the way to empirical investigations aiming at gauging the amplitude of the on-field discriminatory practices and the feasibility of implementing incentive schemes aligned with the MFIs' social mission.

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