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Research Institute in Management Sciences

Solvay Brussels School of Economics and Management

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M. Labie, P-G. Méon, R. Mersland, and A. Szafarz

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CEB Working Paper N° 10/007
February, 2010

Université Libre de Bruxelles - Solvay Brussels School of Economics and Management
Centre Emile Bernheim
ULB CP145/01 50, avenue F.D. Roosevelt 1050 Brussels BELGIUM
e-mail: ceb@admin.ulb.ac.be Tel. : +32 (0)2/650.48.64 Fax : +32 (0)2/650.41.88

Discrimination by Microcredit Officers: Theory and Evidence on Disability in Uganda[⊗]

Marc Labie[a], Pierre-Guillaume Méon[b], Roy Mersland[c], and Ariane Szafarz[d]

This version: February 10th, 2010

Abstract: This paper studies the relationship between a microfinance institution (MFI) and its credit officers when the latter are biased against a subgroup of the clientele. Using survey data from Uganda, we provide evidence that credit officers are more biased against disabled borrowers than other employees. In line with the evidence, we then build an agency model of a non-profit MFI and a discriminatory credit officer. Since incentive schemes are costly, and the MFI's budget is limited, even a non discriminating welfare-maximizing MFI may prefer paying smaller incentivizing compensation, and letting its credit officer discriminate to some extent.

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1. Introduction

Claiming that microfinance institutions (MFIs) may discriminate against some of their customers may sound like an oxymoron. Indeed, many observers consider those suppliers of financial services to people excluded from traditional banking as altruistic and

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[⊗] The authors wish to acknowledge comments by Cécile Abramowicz, James Copestake, Simon Cornée, Bina Fernandez, Rients Galema, Andre Guettler, Niels Hermes, and participants to the Second International Research Workshop on Microfinance Management and Governance, Kristiansand and to the CERMi/Oxford Workshop "Microfinance's Contribution to Development Studies. What Interdisciplinary Approaches Add to Microfinance Understanding?", Brussels. All remaining errors and approximations must be blamed on one of the authors, on whose identity they will not agree.
[a] CERMi, Université de Mons (UMONS), Warocqué Business School, Email: marc.labie@umons.ac.be
[b] Université Libre de Bruxelles (ULB), Centre Emile Bernheim & DULBEA, Email: pgmeon@ulb.ac.be.
[c] University of Agder, Norway, and CERMi, Email : roy.mersland@uia.no
[d] Université Libre de Bruxelles (ULB), Centre Emile Bernheim & CERMi, Email: aszafarz@ulb.ac.be.

benevolent organizations. It is fair to recognize that their executive staff is often motivated by a genuine desire to be useful and do good. Microfinance is advocated by international institutions and sponsored by business people and leading foundations, which would put their reputations at risk if the institutions that they support were suspected of discriminating against customers based on race, gender or other characteristics. MFIs are therefore *prima facie* unlikely to consciously discriminate against some sub-group of their potential clientele.

However, organizations are complex, and the people working for MFIs are little different from others. Some individuals may be truly benevolent and sincerely support their institution's agenda. Others may contribute on the basis of their expected returns and be affected by the same biases as workers in other organizations. Some of them may therefore be prejudiced against parts of the population, and behave according to their prejudices. Evidence of discrimination on the loan market abounds. The evidence goes back at least to Black *et al.* (1978) who provided survey-based evidence that race mattered in mortgage loan allocation. A classic study using information collected by the Federal Reserve Bank of Boston is Munnell *et al*. (1991, 1996). It spurred a large literature by finding that non-white applicants were significantly more likely to be denied a mortgage loan than similar white applicants. In his survey of the literature, Ross (2005) shows that the finding that race impacts the probability of being denied a loan survives a series of refinements. Even more importantly for the microfinance industry, discrimination has also been found to affect the allocation of loans to small businesses. Using data from the 1988-1989 National Survey of Small Business Finance, Cavalluzzo and Cavaluzzo (1998) found that loan denial rates were significantly higher toward small businesses held by Hispanics and blacks than toward those owned by whites. With the same survey over the 1993-1998 period, Blanchflower *et al*. (2003) also report that black-owned small businesses are about twice as likely to be denied credit as white-owned businesses, holding other factors constant. Cavalluzo and Wolken (2005) extended the evidence to Hispanic and Asian in addition to black-owned businesses, and showed that the result was robust to controlling for personal wealth. Blanchard et *al.* (2008) confirm those results with additional control variables and under several econometric specifications. Admittedly, those pieces of evidence originate in the US, but there is ground to believe that discrimination in the allocation of loans also exists in developing countries, where populations are often ethnically heterogeneous. A piece of evidence from outside the US is provided by Storey (2004) who shows that, in Trinidad and Tobago, loan applications from African small-business owners are more likely to be denied than others.

Moreover, studies, notably in India and Latin America, have exhibited inequalities attributable to discrimination that remain even when controlling for a wide variety of parameters, including differences in productivity. As stated by Patrinos (2000), indigenous, ethnic, racial, and linguistic minorities worldwide tend to be in an inferior economic and social position with respect to the rest of the population. In some cases, discrimination is direct. Belonging to a given community generates social obligations and economic deprivation, as shown by Thorat (2002) with “caste discrimination”. In other cases, discrimination is more indirect: lower human capital endowment is associated with lower access to education leading some of the population to be pushed to poorly paid “dead-end jobs” (Knight, 1985).

Discrimination is thus a disappointing but acknowledged reality worldwide in various life circumstances, and in the attribution of loans in particular. Therefore, questioning its existence in microfinance not only makes sense, but is also particularly relevant as poverty and discrimination often overlap (Patrinos, 2000), and access to adequate financial services has proven instrumental for the poor. Microfinance portfolios are known to exhibit biases in favor of some customers like traders and urban customers. In some cases, this is justified by empirical observations that “petty trade pays faster”, and that serving urban customers “is more cost-efficient”. However, whether the biases actually originate from the claimed efficiency-differences or whether they may actually stem from a priori prejudices among the MFI staff is still mostly unexplored in the microfinance literature. A consequence is that the potential growth of MFIs is limited, and that “artificial gaps” between microfinance supply and demand are maintained. Those gaps may be hidden under efficiency claims but that does not prevent them from being based on customers’ ethnical, religious, or physical criteria. For example, de Janvry *et al.*, 2006 show that efficiency-enhancing lending innovation hurts the weaker segments of the population and increase social differentiation.

At this stage, we need to clarify what we call discrimination. An MFI’s employee 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[1]. The case of disabled people is very illustrative of this trend. Although officially MFIs tend to market a non-discrimination policy, very few disabled people access their services. Cramm and Finkenflügel (2008) and Mersland *et*

[1] A similar definition is proposed by Schreiner *et al.* (1996, p.849), “*Discrimination* is defined as providing smaller loans and/or providing loans with more stringent terms to borrowers who are identical with respect to creditworthiness but who differ with respect to characteristics unrelated to creditworthiness, such as race.”

al. (2009) point out that discrimination by MFI staff is a major reason why disabled people are hindered in access to microfinance.

Among the staff that may discriminate, credit officers play a key role, because they are the ones who actually make loan decisions. There is, moreover, evidence that they are a channel through which discrimination operates, at least in the US. For instance, Kim and Squires (2002) observe that African-Americans, and to some extent Hispanics, are significantly less likely to be denied a loan in banks where the share of African-American employees, respectively Hispanic employees, is larger. Ross and Yinger (2002) and Ross (2005) argue that loan officers provide more advice to applicants who belong to the same ethnic group. Because the methodology of microfinance is decentralized, it gives considerable leeway to credit officers when granting loans. Credit officers, visiting potential customers in their homes and working premises, decide who gets a loan and who will be rejected. Although most MFIs claim having credit committees, in many institutions the decision is virtually limited to the credit officers alone or in team with the branch manager. In cases where a supposedly more independent committee makes the decision, credit officers still have ample scope to discriminate, since decisions are taken based on the information that they provide.

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. Yet, if a benevolent MFI's employees display discriminatory behavior, then the institution would be better off recognizing that behavior and acting on it.

To some extent, MFIs have already recognized that their staff's priorities may not always be the same as their own. The use of incentives to align staff and MFI priorities has therefore become increasingly popular. The aim of this paper is precisely to discuss whether those incentives may help eliminate discrimination.

With that end in view, we first analyze the central role played by credit officers and scrutinize the mechanisms by which their prejudices may intervene in loan allocation. Then, we present empirical evidence from Uganda that credit officers tend to discriminate against disabled customers relatively more than non-credit officers, which motivates a specific focus on those agents. Thereafter, we build a formal model to investigate how a purely welfare maximizing MFI may use incentive contracts to deter its credit officers from discriminating against customers who belong to a marginalized group of society. The model suggests that incentive contracts may help align the credit officer's behavior with the MFI's goal.

However, since paying incentive contracts is 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.

The rest of the paper is organized as follows. The next section reviews the literature and stylized facts on discrimination by credit officers and reviews the literature on incentives in order to question the extent to which credit officers' discrimination could be countered with monetary incentives. Section 3 presents a survey from Uganda providing evidence that credit officers discriminate more than other employees. Section 4 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 5 concludes.

2. Credit officers and discrimination

In this section, we survey evidence of biases in the operation of MFIs, and then discuss how incentive schemes targeting credit officers may affect those biases.

2.1. Discrimination in MFIs

Discrimination must be clearly differentiated from selection. On the one hand, selection also puts aside some potential customers, but for due reasons. For instance, when Amin *et al.* (2003) find that MFIs do not reach the most vulnerable households they also indicate that the reason for this is that serving such households would be a greater credit risk for the MFI. Similarly, financing agricultural activities is not feasible to most MFIs because the customers' returns on such activities are often lower than those MFIs sustainable interest level. In such a situation, even though some could consider this choice to be discriminatory, it is only clientele selection based on economic criteria.

On the other hand, discrimination is the consequence of prejudice, implying the rejection of an individual due to some characteristic that is irrelevant to the decision being made, be it gender, geographical or ethnical origins, religion, and so on. This is the kind of discrimination that is Becker's (1957) focus.

In microfinance there has, to our knowledge, been no systematic research on the discriminations that credit officers may apply to their potential customers. In practice however, it seems quite reasonable to imagine that discrimination exists. 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 costly, as it often does not impede fairly good results in term of growth and returns. However, as competition in microfinance markets is increasing (McIntosh and Wydick, 2005) discrimination may ultimately be costly for MFIs. Likewise, from a development perspective, if microfinance has positive effects for those accessing services, anti-discrimination measures are needed.

2.2. Fighting discrimination with incentives?

Due to the decentralized structure of MFIs, there is space for agency conflicts where credit officers will discretionarily choose some customers rather than serve the whole segment that corresponds to the mission and business model of the MFI. Some customers may indeed appear more appealing because they belong to the same social network as the credit officer. Similarly, the credit officer may be reluctant to interact with some discriminated groups of the population, for example the disabled people, or people belonging to a certain ethnical group. The costs of such discriminations are not easy to assess, as they are opportunity costs for both the MFI and the unserved potential customer.

Over the last ten years, incentive pay has become an important part of the salary of credit officers. The report by McKim and Hughart (2005), 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 spend up to 75% of their working time outside of the office, it is hard for managers to monitor them. Incentives are therefore more appropriate than direct supervision. Second, staff incentive schemes usually refer to systems that include not only financial but also non-financial rewards. Third, the use of staff incentives has developed rapidly over the last few years. McKim and Hughart (2005) report that the percentage of MFIs that resort to staff incentive schemes grew from 6% to 63% between 1990 and 2003, implying a more than tenfold increase.

Most contributions on microfinance staff incentives, like those of *Développement International Desjardins* (2003) and Holtmann and Grammling (2005), come from the microfinance practitioners' community. Few academic studies exist. Dealing with rural financial markets, Fuentes (1996) and Warning and Sadoulet (1998) have shown that incentives play a role in systems that use village agents as intermediaries. Armendariz and Morduch (2005) consider incentives to be at the heart of management decisions taken by

MFIs. Churchill (1999) was among the first 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, based on Colombian data, that the level of experience of the credit officer has a significant impact on the quality of the loan portfolio. Dixon *et al*. (2006) study the role of loan officers in a delinquency crisis in a Zambian MFI. They find that the intermediary position of the credit officers – working for the MFI but being close to their customers – is difficult to handle in times of crisis.

In most microfinance methodologies like solidarity groups, village banking and individual lending, credit officers play a major role in 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, criteria are relatively standardized. Take, for example, urban programs providing classic working capital individual loans. Credit officers are supposed to visit the client, analyze the total cash-flow cycle (taking business and family incomes and expenses into consideration), and make sure that the margin generated by this micro-entrepreneur is big enough to cover the cost of credit (typically, the loan installments should not represent more than a third of net margin), that the client have the right kind of collateral (which can be more flexible in microfinance than in traditional banking), and finally that frequent repayment will be possible (most "standard" MFIs do consider weekly, bi-weekly or monthly installments). However, while these criteria seem adequate and should allow for a wide variety of customers, real life observations show a bias in the typical MFI's portfolio. Certain activities and/or certain groups of borrowers tend to be more financed than others.

3. Credit officers' discrimination: evidence

In this section, we use a survey of MFIs' employees carried out in Uganda in 2008-2009. Those employees were questioned on their attitudes and beliefs about disabled customers. To argue that the disabled can be subject to "taste discrimination", we first demonstrate they are able to run viable businesses, and that their lower probability of getting a loan is therefore not attributable to their greater risk potential for the MFI. We then describe the survey, and finally provide an econometric analysis that supports the view that credit officers indeed taste discriminate, and that they do so more than other employees, thus deserving specific attention.

3.1. The disabled face taste-discrimination

Statistics show that 80 to 90% of people with disabilities in developing economies do not have a formal job. As a consequence, they turn to self-employment (UN, 2008). Of course, some disabled people are not able to work at all, but most of them are, and have to work in order to cater for their daily needs. Few have access to microfinance. Mersland *et al*. (2009) find that only around 0.5% of MFIs' customers in Uganda are disabled, compared to a disability incidence in the country ranging from 3.5% (Population and Housing Census, 2002) to 20% (Uganda Demographic and Health Survey, 2006), depending on the statistical method applied. According to the United Nations (UN, 2008), approximately 10% of the global population has disabilities, and 80% of these individuals live in developing countries. Besides, among those who live on less than one dollar a day, one in five has a disability.

The low incidence of disabled customers in MFIs cannot be simply explained by higher credit risk. Indeed, from a study in Uganda, Martinelli and Mersland (forthcoming) observe that disabled people run viable small businesses without, however, having access to external credit. More generally, researchers have repeatedly demonstrated that being disabled is associated with exclusion similar to race, sex, and tribal discrimination. As Neufeldt (1995) points out, it is widely recognized that disability is in a large measure a social construct with roots in societal attitudes. Accordingly, Johnson and Lambrino (1985) find that, correcting for possible efficiency differences, between one third and one half of wage differences between disabled and non-disabled people can be attributed to taste-discrimination. Likewise, Barnes (1994) puts forward substantial evidence of institutional discrimination in the UK. Barnes and Oliver (1995) argue that, even with the help of an anti-discrimination bill, disabled people in the UK will continue to face societal discriminatory actions and attitudes. In the US, evidence suggests that the recourse to law does not eliminate discriminatory actions against disabled people (Beegle and Stock, 2003). The existence of discrimination toward that group is thus well-documented.

3.2. The survey

The data for this study were collected by the Association of Microfinance Institutions of Uganda (AMFIU) in a joint initiative with the National Union of Disabled Persons of Uganda (NUDIPU), whose aim is to increase disabled people's access to mainstream microfinance services. The Norwegian Association of the Disabled (NAD) supports AMFIU and NUDIPU in their efforts.[2] Part of the project is one-to-two hour training for staff working in MFI branches. Around 750 staff members in around 75 branches have been trained in issues related to microfinance and disability. In 24 of the branches the start-up of training, before any information was given, consisted in filling out the questionnaire of this survey. In addition to reporting personal data and their position in the branch, the respondents were asked to rate on a one-to-five scale their beliefs related to different questions about microfinance and disability. The original aim of the survey was to identify areas for joint AMFIU/NUDIPU efforts in order to increase mainstream microfinance outreach to disabled people. The survey does however also serve the research purpose in this paper.

A total of eight different MFIs are represented in the survey, from two smaller Savings and Credit Cooperatives (SACCOs) to the largest MFIs in Uganda. The 24 branches are located across the country in eight of Uganda's 80 districts. The dataset consists of 231 respondents and should be representative for staff working in branches of Ugandan MFIs.

3.3. Evidence of taste-discrimination among credit officers

We focus on two questions of the survey that directly address the issue of discrimination. In the first question, survey respondents were asked to rate on a one-to-five scale whether they agreed with the statement "*I believe that one of the reasons why we have few disabled customers is because we often unconsciously marginalize or discriminate them*". Second, respondents were asked to give their opinion about the statement "*I believe that in this branch we never discriminate people because of their disability*" on the same scale.

Since the variables are discrete but clearly ordered, we resort to an ordered logit model to determine the impact of being a credit officer on the response to those two questions.[3] We moreover use cluster-robust standard errors with clusters defined over branches to control for the fact that the answers of employees of the same branch may correlate. Finding a significant impact of being a credit officer will reveal a bias of credit officers with respect to other

[2] One of the authors has participated as a consultant for NAD in their efforts to increase outreach of microfinance to disabled people in Uganda.
[3] We also estimated the same relationships using ordered probit, which did not affect our qualitative results. Those results are available upon request.

employees working in the MFI branches. The sign of the estimated coefficients will signal whether credit officers tend to discriminate more or less than their co-workers.

Now, simply observing a difference between credit officers and other employees would tell us nothing about the origin of the bias. Discrimination may indeed be due either to a genuine distaste for the disabled or to the belief that the disabled are riskier customers. To disentangle those two explanations, we use a third question of the survey, where respondents were asked their opinion about the statement "*I believe that being disabled is associated with higher risk of loan default*". Whether a customer is risky or not is the key issue that a credit-officer must address. If he/she believes, rightly or not, that disabled customers are riskier clients, then he/she will discriminate against them even without having any aversion to them. This is the gist of the theory of statistical discrimination, which originates in Phelps (1972) and Arrow (1973).

Controlling for the response to that third question allows determination of whether the observed bias of credit officers is due to statistical discrimination or simply to a taste for discrimination *à la* Becker (1957). If pure taste-discrimination is at work, then controlling for the response to that question should not affect the estimated impact of being a credit officer. Conversely, if the bias of credit officers is based on statistical discrimination, namely if they differ from the rest of the population because they hold different beliefs, then the coefficient of being a credit officer should become insignificant. The bias of their beliefs would completely explain the bias in their responses.

Finally, the survey allows controlling for some of the individual characteristics of survey respondents. We thus include dummy variables controlling for whether the respondent has a disabled relative, for the respondent's gender, and for whether he/she has work experience equal to or longer than three years. We expect that respondents who have a disabled relative tend to discriminate less. One may also argue that people who are related to a disabled person are better informed about what the disabled can do. The answers to that question therefore provide some information about the true capacity of the disabled to run a business. We have no prior opinion on the impact of being a woman, but the role of women in microfinance has been emphasized (Armendariz and Morduch, 2005). Finally, experience may affect the respondent's beliefs about his or her potential customers.

The results are provided in tables 1 and 2. When interpreting those tables, one should bear in mind that they are based on two questions that were drafted differently. Namely, table 1 is based on reactions to a statement implying that the respondent "discriminates". Given the coding of responses, a positive coefficient indicates a greater agreement with the statement, which implies more discrimination. Conversely, table 2 is based on reactions to a statement implying that the respondent "never discriminates." Therefore, a positive coefficient implies less discrimination.

The picture that emerges from the two tables is quite consistent. In table 1, we observe in the baseline regression that being a credit officer is positively correlated with higher values of the response variable at the five or one-percent level of significance. The Wald Chi-squared statistic for the likelihood ratio test moreover confirms that adding the credit officer dummy improves the fit. Therefore, we conclude that credit officers admit to discriminate more than the rest of respondents. Regression (1.2) on the other hand signals no relationship between the belief that disabled customers cannot run a viable business and the tendency to admit discrimination. This regression is the only one whose explanatory power is rejected by the Wald Chi-squared statistics. Regression (1.3) shows that the impact of being a credit officer is robust to controlling for the respondent's belief about the capacity of the disabled to run a viable business, while that belief's impact remains insignificant.[4] Regressions (1.4) to (1.6) include additional controls, but leave the main result unchanged. Among additional control variables, only the dummy indicating whether the respondent has a disabled relative passes the ten-percent significance test. It moreover exhibits a negative coefficient. Accordingly, the relatives of disabled would therefore discriminate less than other respondents, which is what we expected.[5]

[4] Moreover, a simple bivariate logit regression of the belief in the capacity of the disabled to run a viable business on the credit officer dummy reveals no correlation between the two variables. The beliefs of credit officers are therefore statistically similar to those of other respondents.

[5] This is important, because it lends credence to our interpretation of the dependent variable as measuring discrimination. One may indeed have worried about the truthfulness of respondents' declarations. The finding that those who have a disabled relative respond in a way that one would expect if responses were truthful alleviates that concern.

Table 1: Ordered logit regression results with the explained variable being the reaction to the statement: "*I believe that one of the reasons why we have few disabled customers is because we often unconsciously marginalize or discriminate them*"

	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)
Credit officer	0.696		0.691	0.666	0.646	0.713
	(2.30)**		(2.27)**	(2.03)**	(1.89)*	(1.87)*
Higher default		0.0441	0.0665	0.113	0.0864	0.0756
		(0.34)	(0.54)	(1.00)	(0.76)	(0.61)
Disabled relative				-0.587	-0.583	-0.597
				(2.05)**	(2.15)**	(-2.33)**
Woman					-0.314	-0.278
					(1.14)	(0.93)
Years of experience						0.0836
						(0.82)
Observations	189	213	188	184	180	166
Log-pseudolikelihood	-283.76	-327.43	-281.85	-273.43	-265.08	-242.43
Wald Chi^2	5.30	0.12	5.37	10.75	11.66	16.61
Pseudo R^2	0.0109	0.000481	0.0115	0.0181	0.0206	0.0229

Cluster-robust absolute z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 2: Ordered logit regression results with the explained variable being the reaction to the statement: "*I believe that in this branch we never discriminate people because of their disability*"

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)
Credit officer	-0.612		-0.62	-0.615	-0.655	-0.744
	(2.37)**		(2.51)**	(2.24)**	(2.38)**	(2.77)***
Higher default		-0.125	-0.13	-0.136	-0.142	-0.125
		(0.87)	(0.94)	(0.91)	(0.99)	(0.77)
Disabled relative				0.0895	0.183	-0.000409
				(0.25)	(0.5)	(0.00097)
Woman					-0.303	-0.316
					(0.97)	(0.82)
Years of experience						-0.14
						(0.1)
Observations	187	210	186	182	179	165
Log pseudolikelihood	-260.60	-293.98	-257.47	-251.90	-245.34	-218.60
Wald Chi^2	5.63	0.76	7.41	8.04	21.14	25.15
Pseudo R^2	0.00833	0.00395	0.0128	0.013	0.016	0.0199

Cluster-robust absolute z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 2 follows the same strategy as table 1. It first considers the pairwise correlation of the dependent variable with the two main independent variables, and then takes them together. Here, we observe that being a credit officer is always negatively correlated with the dependent variable at the five-percent level of confidence. Therefore, being a credit officer leads to disagree more with the statement "*we never discriminate*". Table 2 therefore confirms a positive association between being a credit officer and acknowledging discrimination. It also confirms that responses about discrimination are independent from beliefs about the riskiness of disabled customers. Including additional control variables does not alter those results. The only difference with previous results is that we find no significant impact of having a disabled relative. This may be understood by the fact that the previous question directly concerned the respondent himself or herself, whereas the second question relates to the branch.

Overall, our findings underline a strong correlation between acknowledging discrimination and being a credit officer. Moreover, that tendency is not due to biased beliefs, which means that the acknowledged bias is consistent with a broader taste for discrimination. We interpret those results as signalling that the preferences of credit officers are biased with respect to other survey respondents. In the next section, we investigate the consequences of such a bias for welfare-maximising MFI.

4. A model of discrimination by a biased credit officer

In this section, we first set up a simple agency model consistent with the previous section's finding that credit officers exhibit a taste for discrimination that is at odds with the socially-oriented goal of their employer. We then show that to fulfill its goal, the MFI may have to tolerate some discrimination.

4.1. The model

Let us consider a socially-oriented MFI, i.e. a "pro-poor MFI" following Aubert *et al.* (2009), facing credit officers' taste-discrimination against an identifiable class of customers.[6] More precisely, the discrimination mechanism is the following: in a given area, credit officers may decide to focus on favored customers (*F*) instead of discriminated customers (*D*). The previous section suggests that disabled people are a good example of *D* customers. Indeed, they are sometimes rejected by credit officers who consider them less able to run a business than they really are, as is acknowledged by MFIs themselves (Cramm and Finkengflügel, 2008, Mersland et al., 2009), and credit officers confess more than other employees that they discriminate. So, *F* customers are preferred by credit officers, while *D* customers are those whom they will not naturally serve unless specific incentives schemes are put into place. What matters here is that in the absence of incentives credit officers are spontaneously reluctant to serve discriminated customers.

[6] This should be seen as a stereotypical example as our formalism adapts well to any form of discrimination exerted by microfinance credit officers.

The social MFI is 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 characteristics[7]:

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

Due to its mission statement, the MFI is benevolent, and supposed to exhibit no preference for any group. Its objective is to maximize its impact on welfare. The MFI thus maximizes the expected social utility of its clients:

$$Max \sum_{j=1}^{n} E\left[U_j\right], \tag{2}$$

where n is the number of clients, to be determined endogenously, and $E\left[U_j\right]$ is the expected utility of client j.

All loans are supposed to be identical (normalized to 1). We assume that those loans allow customers to seize a riskless investment opportunity that yields the same return r. However, with decreasing marginal utility of income, the same return results in a larger increase in utility for a very poor than for a less poor customer. For one client, the 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$(j = L)$: $\Delta u_P > \Delta u_L$.The MFI therefore exhibits a preference for granting loans to poorer clients, because doing so will increase welfare more. In other words, the MFI aims at serving the poorest of the poor.

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. That hypothesis is in line with the results of previous section. It is moreover consistent with the

[7] Contrary to Aubert *et al*. (2008), we do not include the 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.

finding reported by Cavalluzzo and Cavalluzzo (1998) that the higher denial rate of minorities-owned small businesses is attributable to prejudicial discrimination *à la* Becker. The credit officer's selection process is sequential. Due to obvious time constraints, he/she only meets a limited number of potential clients every period, and allocates one loan in each period. For simplicity, we assume that those choices are always to be made between two candidates drawn randomly from the population described above.[8] The population features the following proportions of the four categories: $\gamma_{DP}, \gamma_{FP}, \gamma_{DL}, \gamma_{FL}$, with $\gamma_{i\kappa} > 0 \left(i = D, F; \kappa = P, L\right)$ and $\sum_{i=D,F} \sum_{\kappa=P,L} \gamma_{i\kappa} = 1$. The credit officer offers the loan on the basis of the candidates' bidimensional characteristics $\left(\kappa, i\right)$.

Since the credit officer is biased against the *D* group, he/she would never spontaneously 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 reaction to that incentive is modeled in probabilistic terms. When facing two candidates with respective characteristics $\left(D, P\right)$ and $\left(F, L\right)$, the manager hires the $\left(F, L\right)$ candidate with probability $(1 - \lambda)$, $\lambda \in [0, 1]$. Under these circumstances, his/her decision is therefore based on poverty level only 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:

$$E\left[V\right] = E\left[\omega\right] - \frac{1}{2} d\, \lambda^2 \quad \left(d \geq 0\right) \tag{3}$$

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 to the discriminated group relative 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.

[8] Although we have set this number at two for the sake of simplicity, the argument can easily be generalized to larger numbers.

The distribution of outcomes of the loan attribution is summarized in table 3. The characteristics of the two candidates are displayed, respectively, in the first row and the first column of table 3. Each cell of that table gives the characteristics of the loan beneficiary, and, whenever relevant, their probabilities.

Table 3: Outcomes of the loan attribution

Client 2 \ Client 1	(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 4 displays the MFI social benefit in each possible configuration of loan attribution.

Table 4: Welfare gains associated to the outcomes of the loan attribution

Client 2 \ Client 1	(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 a very poor candidate. In such a situation, the credit officer's prejudice is detrimental to the MFI mission and can result in mission drift.[9]

Following Agarwal and Wang (2009), we assume that the credit officer receives incentive compensation. Unlike them, however, we assume that the MFI pays a wage that is not proportional to the number of loans but that is inversely related to the officer's discriminatory intensity $(1 - \lambda)$.

The rationale for relating incentives directly to discrimination is twofold. Firstly, most socially-oriented MFIs would consider prejudice reduction as a subsidiary part of their mission. For instance, MFIs are able to focus on women even in male-dominated societies (Morduch, 1999). Secondly, in our model, the MFI maximizes a utility function that depends on the poverty level of its clients, which is unobservable to the institution. Contrarily, group membership (disability, gender, or race) is easily observable to the MFI, and discriminated groups are typically poorer than the rest of the population. Therefore, even if the chosen incentive scheme is not primarily intended to fight discrimination, discrimination-based incentives may constitute a good instrument to fulfill the MFI's mission.

Specifically, a standard linear contract with fixed component C and premium s is assumed:

$$\omega = C + s\lambda, \quad s \geq 0, \quad C > 0 \tag{4}$$

This wage contract nests the standard contract, where the officer's wage is independent from the distribution of loans across groups, when s is set to zero.

The MFI also 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:

$$B = \omega + n.c\,, \tag{5}$$

[9] The term « mission drift » usually designates the situation where the financial sustainability constraint makes the MFI move away from its poverty alleviation objective (see Gosh and Van Tassel, 2008; Armendariz and Szafarz, forthcoming). In our model, the mission drift would rather be due to discrimination from the credit officer.

where c is the constant marginal cost and benefit associated to a loan, on top of the credit officer's wage. Actually, c can be positive or negative depending on the technology adopted by the socially-oriented MFI. In financial terms, c is the net present value of a standardized loan brought by the credit officer, but excluding his/her own retribution. The value of c, therefore, includes (negatively) the present value of the interest differential (the loan rate minus the financing rate), as well as (positively) the operational and monitoring costs, and the expected default loss. For the sake of simplicity, we do not split c into its components and do not differentiate between types of clients, as the costs and benefits unrelated to the credit officer's wage are not our main focus.[10]

The assumption of a fixed budget is consistent with the fact reported by Hermes and Lensink (2007) and Cull *et al.* (2009) that most institutions serving the poorest earn profits that are too small to attract profit-oriented investors. Subsidized NGOs therefore represent the bulk of MFIs. This constraint reflects the cost of credit officers to MFIs, 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). As Cull *et al.* (2009) observe, the unit cost of a loan granted by an NGO is bound to be larger than the cost of a loan originating in a commercial institution, because the former typically serves poorer customers and grants smaller loans.

The officer's wage is determined by the MFI. The budget constraint implies that the MFI faces a trade-off. Increasing the officer's incentive will augment 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 the need 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:

$$U_j = \begin{cases} \Delta u_L \text{ with probability}: \Omega(\lambda) = \gamma_{DL}^2 + \gamma_{FL}^2 + 2\gamma_{DL}\gamma_{FL} + 2(1-\lambda)\gamma_{FL}\gamma_{DP} \\ \Delta u_P \text{ with probability}: 1-\Omega(\lambda) \end{cases} \tag{6}$$

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

[10] The present model rests on the hypothesis that the MFI pays the credit officer an incentive wage. However, its main conclusion would remain qualitatively unchanged in any setting where combating discrimination is costly and the MFI cares for that cost, be it because its resources are limited or because it maximizes profit.

$$\Omega(\lambda) = \left(\gamma_{DL}^2 + \gamma_{FL}^2 + 2\gamma_{DL}\gamma_{FL} + 2\gamma_{FL}\gamma_{DP}\right) - 2\lambda\gamma_{FL}\gamma_{DP}$$
$$= a - b\lambda$$

with:

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

Thus, for one loan, the expected utility is:

$$\forall j : E\left[U_j\right] = a\Delta u_L + (1-a)\Delta u_P - b\left(\Delta u_L - \Delta u_P\right)\lambda \qquad (7)$$

For n loans attributed along the same lines in independent processes, the social expected utility to be maximized by the MFI reads:

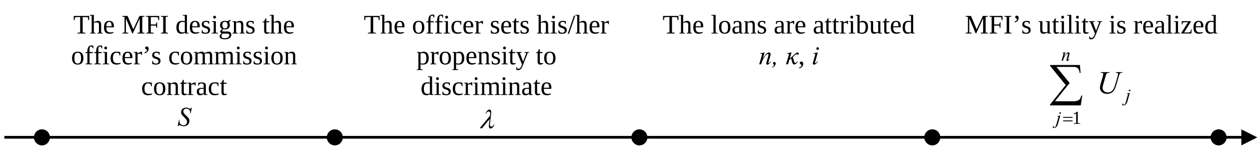
$$\sum_{j=1}^{n} E\left[U_j\right] = n\left[a\Delta u_L + (1-a)\Delta u_P - b\left(\Delta u_L - \Delta u_P\right)\lambda\right] \qquad (8)$$

The MFI faces the following budget constraint:

$$B = C + s\lambda + nc \qquad (9)$$

To close the model, we specify the timing of the game. The MFI first chooses the parameters of 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: Timing of the game



4.2. Equilibrium discrimination

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 the contract offered by the MFI, 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. Plugging the wage-scheme (4) in his/her utility function, the officer's maximization problem becomes:

$$\underset{\lambda\in[0,1]}{Max}\left\{C+s\lambda-\frac{1}{2}d\,\lambda^{2}\right\} \tag{10}$$

and the first order condition accordingly yields:

$$\lambda=\frac{s}{d}. \tag{11}$$

Note that λ is increasing in the MFI's incentive instrument, s. Being a probability, λ must take values between 0 and 1.[11] This restriction may in turn lead to corner solutions for some parameters configurations. One has thus:

$$\lambda^{*}=\begin{cases}\dfrac{s}{d} & \text{if} \quad s\leq d\\ 1 & \text{if} \quad s>d\end{cases} \tag{12}$$

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

[11] This might lead to the erroneous impression that discrimination fully disappears when the probability that the credit officer selects a poor client from the discriminated group over a less poor client from the favored group is equal to one. This is not the case, because the MFI 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.

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

s.t. $B = C + s\lambda + nc$

Let $Q = B - C$ be the net budget, $A = a\Delta u_L + (1-a)\Delta u_P$ be the part of welfare that is independent from the officer's behavior, and $\delta = \Delta u_P - \Delta u_L$ be the extra utility of granting a loan to a very poor instead of a less poor. The MFI's problem can be rewritten as:

$$\underset{s}{\text{Max}}\ E\left[U(s)\right] = \left(\frac{Q - s\lambda}{c}\right)\left(A + b\,\delta\,\lambda\right) \quad (14)$$

Given the credit officer's optimal reaction function (12), the optimal value for s is either an interior point, $\tilde{s}$, or the corner value, d. To compute $\tilde{s}$, we rewrite the MFI's objective function for $\lambda = \frac{s}{d}$:

$$\sum_{j=1}^{n} E\left[U_j\right] = \frac{1}{cd^2}\left(-b\,\delta d\ s^3 - A\,s^2 + Q\,b\,\delta\ s + dQA\right) \quad (15)$$

Deriving the above expression with respect to s leads to the following first order condition:

$$-3bd\,\delta s^2 - 2As + Q\,b\,\delta = 0\,. \quad (16)$$

Since $\Delta = A^2 + 3Q b^2\,\delta^2 d > 0$, this degree-two equation has two real roots, but only one is non-negative (because $\Delta > A^2$), and therefore admissible given that it represents a premium:

$$\tilde{s} = \frac{A + \sqrt{\Delta}}{3bd\delta} \quad (17)$$

Due to the sign of the first derivative (positive before $\tilde{s}$, negative after $\tilde{s}$), the MFI objective function reaches its global maximum in $s^* = \tilde{s}$ provided that $\tilde{s} \le d$. Alternatively, if $\tilde{s} > d$ then, due to (12), the credit officer adopts the non-discriminatory behavior, $\lambda^* = 1$, and the MFI has no incentive to provide a premium larger than d. In that case, the MFI optimal premium is $s^* = d$. In summary, we have:

$$s^* = \min\{d, \tilde{s}\} \tag{18}$$

The corresponding optimal value for λ is given by:

$$\lambda^* = \begin{cases} \dfrac{\tilde{s}}{d} & \text{if} \quad s^* = \tilde{s} \\ 1 & \text{if} \quad s^* = d \end{cases} \tag{19}$$

Expression (19) displays our key result: the probability that the officer does not let his/her prejudice interfere with his/her decision can remain lower than one in equilibrium. In that situation, despite being a pure welfare-maximizer, blind to group membership, the MFI tolerates a discriminatory behavior in equilibrium. The rationale for that result is that fighting discrimination is costly, not only financially (higher wage premium required by the credit officer), but also, and more to the point, in terms of outreach (less loans). Each extra dollar devoted to paying incentives reduces the number of loans that can be granted. The MFI must then trade-off two evils: discrimination and poverty. If the officer's taste for discrimination is large enough, the social cost, in terms of foregone loans, of eradicating discriminatory behaviors would be too large. The MFI would then have to tolerate some discrimination because the marginal benefit of devoting a dollar to combating discrimination would be lower than the benefit of granting an extra loan.

Consequently, observing an MFI's distribution of loans biased against one group does not imply that this MFI is intrinsically biased against that group. Because the MFI has to rely on biased credit officers, this may be the best that it can do. To sum up, an incentive wage helps to reduce discrimination but fully eliminating discrimination could come at the cost of too many loans.

From a management and policy perspective, this result suggests that additional solutions must be found to combat discrimination[12], because wage incentives may be

[12] In our setting, the MFI is hurt by discrimination only because it interferes negatively with its mission. Fighting discrimination is not the MFI final goal. A more drastic version of our model could include a kind of "human-rights objective" to the MFI's mission and then add a so-called "bottom line".

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.

5. Concluding remarks

So far microfinance practices have been studied in terms of methodology efficiency and market segments. Those factors largely explain why some clients are served by MFIs while others remain unserved. However, other reasons might be at work, like discrimination. This paper presents evidence that credit officers taste discriminate against disabled people more than other MFI employees do, and discusses 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 incentives are costly and its budget is limited, the MFI may better fulfill its objective by not offering incentives that would eradicate discrimination. In a nutshell, a non-discriminatory institution may tolerate some discrimination because eliminating it would be too costly.

Before drawing policy-oriented conclusions from those results, several comments are in order. Firstly, designing adequate incentives is delicate. The first incentive schemes used by MFIs were based on a single criterion, typically the growth of loan portfolios. Over time, it appeared that growth targets were often met at the expense of credit quality. Consequently, MFIs today increasingly tend to combine criteria. Even so, the adjustment of credit officers to whatever set of incentives can still generate new biases. As an example, Pamecas, a major network of credit unions in Senegal, set up a scheme mixing two indicators: quality of portfolio (measured in terms of arrears) and growth of portfolio (measured in terms of total amount). By not including the number of loans, Pamecas created an incentive for credit officers to focus on customers requiring sound but larger loans, therefore favoring a mission drift and making it necessary for Pamecas to modify their incentive schemes.

Secondly, governance issues are more complex in socially-oriented organizations than in profit-oriented firms (Labie, 2001, Hartarska, 2005, Mersland and Strøm, 2009). On the one hand, the discrimination issue is likely to be more important in welfare-maximizing institutions because those organizations lack the profit-seeking mindset necessary to build adequate incentives, a point already raised by Aubert *et al.* (2009). On the other hand, corporate cultures in socially-oriented organizations and donors are less likely to tolerate discrimination from the charitable institutions they finance than shareholders and customers from typical firms. Lastly, paying incentives to credit officers in order for them to service a discriminated group, like the disabled, may reinforce long-term discrimination. In practice, the use of incentives is therefore no quick fix to the discrimination problem.

Thirdly, additional anti-discrimination measures might paradoxically make the MFI deviate from its mission. It has been argued, for instance by Coate and Loury (1993), that such measures may in fact hurt the very population that that they aim to help, by reinforcing stereotypes. An alternative route would be to hire credit officers biased in favor of discriminated subpopulations, as illustrated by d'Espallier *et al*. (2009) who show that female credit officers increase the odds of serving female clients. Identifying officers with a bias in favor of disabled customers may however prove difficult.

For all of these reasons, we believe that the subject of microcredit discrimination deserves more attention than it has received so far, and hope that this first contribution will open the way to future investigations aiming at gauging the amplitude of on-field discriminatory practices and at exploring the applicability of tools aligned with the MFIs' social mission.

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