

Credit Officers and Loan Granting in Microfinance: Brazilian Evidence

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Abstract

In microcredit institutions, credit officers play a prominent role in loan granting decisions. Indeed, they collect field data, meet with the applicants, and provide personal recommendations to the credit committee that takes the final decisions (loan approval/denial, and loan size). This paper offers the first precise quantification of the degree of influence of the credit officers on the final decision making. Based on a detailed database from a Brazilian microcredit institution, we are able to scrutinize the process that drives the determination of loan size within the institution. The partiality of the credit officers is analyzed through the lens of gender bias, providing a measure of the extent of the agency problem at stake. The results show that there is indeed a gender gap in loan size generated by the MFI, and that this gap is almost exclusively attributable to the credit officers. In conclusion, this paper confirms that, despite monitoring, the credit officers remain by far the dominant decision-makers in microloan granting.

Keywords: Microcredit, Gender, Credit Officer, Loan Size, Allocation Process

JEL codes: O16, D82, J33, L31.

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“(...) the actions of loan officers have substantial and sometimes unexpected and unintended consequences for the actual direction and outcome of many credit programs.” (Dixon, Ritchie and Siwale, 2007, p. 8)

1 Introduction

Asymmetric information is the main problem faced by the lending industry (Stiglitz and Weiss, 1981). To tackle this problem, bankers typically combine two strategies: credit scoring and relationship lending. On the one hand, credit scoring is the process by which lending institutions assess the creditworthiness of potential borrowers from their personal and/or business characteristics (Hand and Henley, 2007; Lewis, 1994). On the other hand, relationship lending is a time-consuming process by which credit officers learn about their clients' creditworthiness (Berger and Udell, 1995; Boot, 2000) and offer them progressively increasing loans after timely repayments (Egli, 2004).

For reasons likely pertaining to low technology and relatively cheap human capital, credit scoring plays a less prominent role in the microcredit industry than in mainstream banking.¹ As a consequence, credit officers benefit from more leeway to allocate loans Armendáriz and Morduch (2010). This paper offers the first quantification of the influence of loan officers on microcredit granting. This is made possible thanks to access to an exceptionally detailed database from Vivacred, a Brazilian Microfinance Institution (MFI).

Microcredit officers are hard to monitor, notably because of the decentralization of the microlending methodology (Fuentes, 1996; Warning and Sadoulet, 1998; Churchill, 1999; Aubert, de Janvry and Sadoulet, 2009; Dixon, Ritchie and Siwale, 2007). Moreover, the demand for microloans still excess by far the supply (de Janvry, McIntosh and Sadoulet, 2010). Consequently, the credit officers could be tempted to follow their personal preferences, rather the MFI's optimum,² when selecting the borrowers.

On the other hand, most MFIs are socially-oriented, and often subsidized, institutions who need to stick to moral standards. Therefore, they need their staff to make decisions in line with their mission statement and sustainability

¹See Tra and Lensink (2007) for a comparative discussion on the lending practices of formal and informal credit markets.

²The MFI's optimum needs not be understood as solely referring to profit maximization. Other optimizations may also be considered here. For instance, Conning (1999); McIntosh and Wydick (2005); Ghosh and Van Tassel (2008); Armendáriz and Szafarz (2010) propose models built on social objective function.

concern. As a matter of facts, monitoring credit officers is a major and difficult task for the MFIs' managers.

From the researcher's viewpoint, disentangling objective creditworthiness assessment from the subjective - and hence possibly discriminatory - judgments requires observing the decision process that takes place within the MFI. More precisely, it is necessary to: 1) establish how the credit officers' recommendations are determined with respect to the applicant's characteristics, and 2) determine to which extent the credit committee critically examines these recommendations when making the final decision. Moreover, the decisions at stake concern not only loan approval, but also the credit conditions.

The current paper addresses this issue through the lens of disparate treatment. Indeed, previous work (Agier and Szafarz, 2010*a,b*) has demonstrated that in Vivacred, a Brazilian MFI, women entrepreneurs receive smaller loans than their male counterparts, all other things being equal. Building on these findings, we dissect here the decision mechanism that leads to such an outcome. Namely, we attribute to the credit officers and the credit committee their respective responsibilities in the existing gender gap in loan size. The results show that, beside the 65% gender gap attributable to the applicants themselves (women ask for smaller loans), the female loan downsizing is mainly caused by the credit officers (27%). Notably, instead of correcting the existing gender bias the credit committee tends to marginally reinforce it (7%).

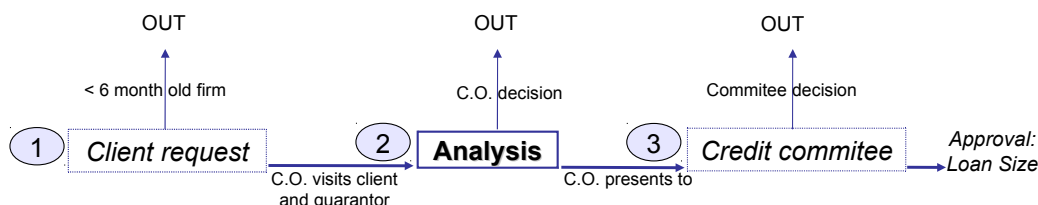
Deriving those estimates is made possible by using partial least square (PLS) regression, and observing the complete three-step process starting with the application (requested amount), then followed by the credit officer's recommendation, and ending with the credit committee's decision. Indeed, our database allows to trace any loan application that reaches the MFI. On top of these pieces of information, it includes all personal and business characteristics of the loan applicants. By taking into consideration all screening variables collected by the MFI, our results suffer as few as possible from the missing variable problem that often plagues studies on creditworthiness assessment (Ross and Yinger, 2002).

The paper is organized as follows. Section 2 describes the database. Section 3 identifies each MFI actor's responsibility in female loan downsizing. Section 4 concludes.

2 The Loan Granting Process in Vivacred

Our unique database comes from Vivacred, a non-profit microcredit institution operating in Rio de Janeiro *favelas*, over the period 1997-2007 (11 years). It includes all pieces of information gathered by the six branches of Vivacred. The study is based on exhaustive data concerning 34,000 applications and 32,000 actual loans.³

The credit officers play an important role in clientele selection. Indeed, they are in charge of collecting all relevant information on the loan applicants, and making proposals to the credit committee based on their own evaluation. The full decision process in Vivacred is summarized by figure 1.



The granting process starts with the applicant entering a loan request (step 1). The application files are entrusted with credit officers on a geographic basis in order to reduce the MFI operational costs. The designated credit officer meets with the applicant and guarantor, if any, and collects the relevant data,⁴ and makes a recommendation to the credit committee (step 2). This step is particularly demanding since the credit officer needs to examine in details the applicant’s business balance sheet and the household’s budget. Lastly, the full application file - including the credit officer’s recommendation - is examined by the credit committee⁵ that has the final word on the loan approval/denial and the loan size (step 3).

The credit officer has a face-to-face contact with each applicant, while this is not the case for the credit committee. The credit officers also spend more

³The contracts with incomplete specifications, the loans to Vivacred’s employees, and the few group loans were removed.

⁴The information on each applicant includes: private and professional location, birth date, birth state, marital status, gender, dependent(s), profession, bank references, partner’s ID, current account, family consumption, family external income, full credit history (as a borrower, a borrower’s partner, or a guarantor), the business characteristics and financial statements, and all credit conditions (loan size, duration, full credit history) if a loan is granted (Agier and Szafarz, 2010b).

⁵Actually, the so-called “credit committee” refers to a single person who is either the branch manager or a senior credit officer, depending on the requested amount.

time on each individual file. For these reasons, it is likely that subjectivity affects the officer’s recommendation more than it affects the committee’s decision.

Our dataset contains not only the actual loan contracts, but also all the applications presented to the committee, whether approved or denied. We are therefore able to trace the entire decision-making process that can be decomposed in three steps: 1) the amount requested by the loan applicant, 2) the credit officer’s recommendation, and 3) the final loan size fixed by the credit committee.

Table 1 presents the overall and gender-disaggregated descriptive statistics. They concern the requested amount, the officer’s proposed amount, and the final loan size, both in absolute terms and in proportion to the requested amount. In each case, a t-test for equal means between genders is performed.

Table 1: Global and gender-disaggregated descriptive statistics

	Global	Std.	Mean		t-test ^b
	Mean	Dev.	Male	Female	
Loan approval (Yes = 1, No = 0)	0.945	0.228	0.944	0.946	-0.0021
Requested Amount (BRL ^a)	1,380	1,242	1,518	1,237	281***
Proposed Amount (BRL ^a)	1,046	1,016	1,168	921	248***
Loan size (BRL ^a)	1,015	997	1,137	891	245***
LS/RA (%)	78.6	24.2	79.3	78.0	1.26***
Observations	33,530		16,899	16,631	

^aAll financial values are in monthly BRL (Real), the Brazilian currency. Over the period under consideration, the BRL fluctuated between 0.270 and 0.588 USD.

^bt-test for equal means between genders; *** p<0.01, ** p<0.05, * p<0.1

Vivacred claims no special focus on female population. Its clientele is gender-balanced with about 50% women. Men and women face similar approval rates (94.5%), but women receive smaller loans, in absolute terms (BRL 891 versus BRL 1,137) as well as proportionately to the requested amount (78% versus 79.3%). This gender gap shows off at all step of the loan granting process. Indeed, women request smaller loans than men (BRL 1,237 against BRL 1,518). Then, the credit officers perpetuate the gap gender in their recommendations (BRL 921 against BRL 1,168). Lastly, the final decision made by the credit committee goes in the same direction (BRL 891 against 1,137).

Unconditional means thus indicate that the credit officers and the credit committee do not compensate for the initial gender gap. Different objective factors could explain this phenomenon. For instance, men and women differ in within-household’s situations and in business sizes.

In the next section, we will therefore draw regressions controlling for all characteristics pertaining to the borrowers, their businesses and the loan specifications. In that way, we will solely keep the component of the gender gap unexplained by the objective characteristics. This will enable us to focus on the subjective appreciations made first by the credit officers, and subsequently by the credit committee. As our unique database allows to observe the three steps of the granting process, we are able to determine each actor’s responsibility in the gender gap.

3 Who is responsible for the gender gap?

The typical agency problem embedded in microcredit granting is examined by [Aubert, de Janvry and Sadoulet \(2009\)](#). In the same line, [Labie et al. \(2010\)](#) show that credit officers are more reluctant to serve disabled applicants than other staff members.

[Agier and Szafarz \(2010b\)](#) show that a gender gap in loan size is present beyond all the objective characteristics available to the MFI. Moreover, two thirds of the gender gap is attributed to the difference in requests between male and female applicants. The remaining third originates from the MFI, underlining the discriminatory aspect of the gender gap. This paper further exploits the same database and disentangles the responsibilities of the credit officers and the credit committee for this gender gap.

Unlike mortgage loan applications that are typically approved or denied as such, productive loans can be easily sized by the lender. Therefore, observing both the loan size and the requested amount allows to detect credit rationing.

Table 1 shows that the gender gap is present in the behaviors of the applicants, the credit officers, and the credit committee. In order to disentangle the three channels, we use a two-tear Partial-Least-Squares (PLS) estimation method intended to mimic the sequential process that governs the loan size determination. First, applicant i announces a requested amount RA_i , then the credit officer proposes to grant a loan of size P_i (possibly zero) to the credit committee that fixes the final loan size, LS_i .

In line with the actual process of loan granting, the PLS estimation rests upon a recursive specification. In the first step, we regress the requested amount on the gender dummy and the control variables,⁶ and determine the residual requested amount, denoted by RRA_i , that represents the “pure”

⁶See [Agier and Szafarz \(2010b\)](#) for more details on the control variables that are used.

request effect excluding the impacts of gender and controls:

$$RA_i = a_F F_i + \mathbf{a}'_Z \mathbf{Z}_i + RRA_i \quad (1)$$

In the second step, the loan size proposed by the credit officer is regressed on the gender dummy, the controls, and the residual requested amount:

$$PA_i = d_F F_i + \mathbf{d}'_Z \mathbf{Z}_i + d_R RRA_i + RPA_i \quad (2)$$

In that way, we fully incorporate the request effect, and avoid distorting the impact of the gender dummy variable.

In the last step, the actual loan size resulting from the credit committee's decision is explained by the gender dummy, the controls, the residual requested amount (due to the client), and the residual proposed amount (due to the credit officer):

$$LS_i = e_F F_i + \mathbf{e}'_Z \mathbf{Z}_i + e_R RRA_i + e_P RPA_i + \epsilon_i \quad (3)$$

This estimation procedure allows to evaluate the impact of the requested and proposed amounts independently from the control variables. The remaining gender gap, if any, is then attributable to the credit committee. Indeed, eq.1 yields:

$$PA_i = \tilde{d}_F F_i + \tilde{\mathbf{d}}'_Z \mathbf{Z}_i + d_R RRA_i + RPA_i \quad (4)$$

where

$$\tilde{d}_F = d_F + d_R a_F \quad (5)$$

$$\tilde{\mathbf{d}}'_Z = \mathbf{d}'_Z + d_R \mathbf{a}'_Z \quad (6)$$

Similarly, thanks to eq.1 and eq.4 the final loan size writes:

$$LS_i = \tilde{e}_F F_i + \tilde{\mathbf{e}}'_Z \mathbf{Z}_i + \tilde{e}_R RRA_i + e_P RPA_i + \epsilon_i \quad (7)$$

where:

$$\tilde{e}_F = e_F + e_P (d_F + d_R a_F) + e_R a_F \quad (8)$$

$$\tilde{\mathbf{e}}'_Z = \mathbf{e}'_Z + e_P (\mathbf{d}'_Z + d_R \mathbf{a}'_Z) + e_R \mathbf{a}'_Z \quad (9)$$

$$\tilde{e}_R = e_R + e_P d_R \quad (10)$$

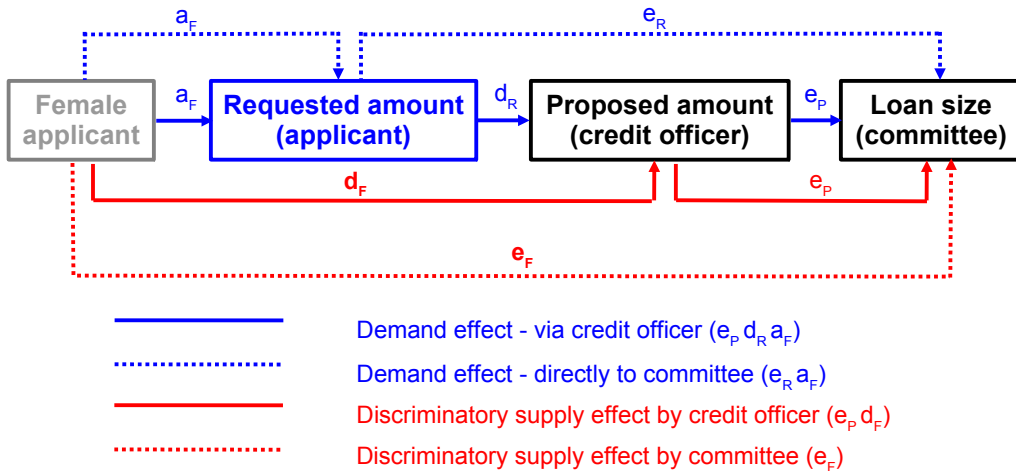
Coefficient \tilde{e}_F is split into four components, each one representing a specific channel through which gender impacts the loan size. The committee makes

its decision by considering the client’s characteristics (including gender and requested amount), and the officer’s recommendation. Its decision can thus be gender-related either directly, or through the officer’s recommendation. In the former case, female loans may be lower either because female requests are lower ($e_R a_F$), or because the committee is gender-biased (e_F). In the latter case, the gender gap arising at the committee level is a pure consequence of the officer’s proposal.

In turn, a gender gap emanating from the credit officer can be attributable to either the applicant’s request ($e_P d_R a_F$), or to gender-discrimination ($e_P d_F$). Consequently, the credit committee is potentially contaminated by any of those two sources of female loan downsizing through the officer’s proposal.

Figure 2 represents the four possible channels for a gender gap in loan size. The blue lines represent actions that fall under the female applicants’ responsibility (lower requested amounts), while the red lines represent actions that are endured by the female applicants (differences attributable to the MFI).

Figure 2: Decomposing the responsibility for female loan downsizing (PLS regressions)



In the first place, this methodology allows to estimate that 67% of the gender gap in loan size comes from the applicant’s side (“request effect”).⁷ Secondly, it allows to disentangle the responsibilities within the MFI for the remaining 33% gender gap.

Actually, Figure 2 shows that the request effect on the final loan size is twofold: direct and channeled by the credit officer. Likewise, the MFI share

⁷In particular, this result emphasizes the need for considering a continuous variable (loan size) rather than a dummy variable (loan denial).

of responsibility can be decomposed into the impacts of two actors: the credit officer and the committee.

Table 2 reports the two-tear PLS regression results. Column (1) displays the estimated impact of the gender dummy, F , on the requested amount, RA , (eq.1). In column (2) the amount proposed by the credit officer to the credit committee (PA) is explained by the gender dummy, the residual requested amount (RRA), and controls (eq.4). Lastly, column (3) explains the final loan size (LS) by the gender dummy, the residual requested amount, the residual proposed amount (RPA), and controls (eq.7).

Table 2: Two-tears PLS estimates (control variables are used, but their coefficients are not reported)

	(1)	(2)	(3)
	RA	PA	LS
Female Borrower (F)	-107.2*** (11.24) (a)	-95.87*** (5.132) (b)	-93.99*** (3.566) (d)
Residual Requested Amount (RRA)		0.626*** (0.00248) (c)	0.573*** (0.00173) (e)
Residual Proposed Amount (RPA)			0.889*** (0.00378) (f)
Observations	33,530	33,530	33,530
R ²	0.336	0.793	0.897

Monetary variables in deflated BRL, Standard errors in parentheses, *** p<0.01

(a) to (f): Estimators for respectively a_F (eq.1), \tilde{d}_F and d_R (eq.4), \tilde{e}_F , \tilde{e}_R and e_P (eq.7)

Controls: Borrower’s characteristics: married, have at least one dependent, age (years), household’s external income. Borrower’s history within Vivacred: number of former loans as a client, as a guarantor, with delay as a client. Loan’s characteristics: number of installments, whether a guarantor is involved, investment purpose (investment vs treasury), whether the loan is made to repay another loan. Business characteristics: business profit, trade (sector), official business, number of employees.

The control variables (not reported in the table) are the ones typically used to assess creditworthiness. They include the borrower’s personal information (age, marital status, external income, presence of dependents, guarantor’s involvement and gender if involved), the business characteristics (past profits, sector, whether the business is official, number of employees), the credit characteristics (number of installments and loan purpose), as well as the client’s credit history with Vivacred (delays in previous loans, number of former loans as a client and as a guarantor). Year dummies are introduced in order to account for external economic factors.

Women get an average loan of BRL 94 less than men. Table 2 allows to

decompose this difference.⁸ On the one hand, smaller female requests are both channeled by the credit officer (BRL 59.66) to the credit committee, and come directly to the committee (BRL 1.77). On the other hand, the gender gap originating from the MFI side comes from both the credit officer (BRL 25.57) and the credit committee (BRL 6.99).

This decomposition is presented in table 3. The results are respectively given for all applicants (first column), for the newcomers (second column), and the known clients⁹(third column). In the full sample, the responsibility for female loan downsizing is attributable to the credit officer (27.3%) and the credit committee (7.4%), but also, and principally, to the women themselves (65.3%) who request significantly smaller loans.

Table 3: Responsibilities for female loan downsizing

	Applicant's category		
	All	New	Known
Client's responsibility (smaller requested amount):			
Total	65.3%	46.5%	74.1%
- channeled by credit officer	63.5%	44.9%	72.0%
- direct effect on committee	1.8%	1.6%	2.1%
MFI's responsibility:			
Total	34.7%	53.5%	25.9%
- by credit officer	27.3%	43.5%	18.1%
- by committee	7.4%	10.0%	7.8%

Understandably, the MFI's global share of responsibility is lower for known applicants (25.9%) than for newcomers (53.5%). More interestingly, this difference is almost entirely captured by the credit officer's change in attitude. Indeed, the credit's officers share of responsibility in the gender gap drops from 43.5% for newcomers to 18.1% for known applicants. This confirms that relationship is mainly experienced by the credit officers who is in charge of the field work, and hence establishes the personal contact with the clients. The credit committee is less sensitive to existing relationship, and tends to stick to its prior (but light) bias against female borrowers.

⁸Indeed, from regression (1) and (2), the estimates are, respectively, 107.2 for a_F , -95.87 for \tilde{d}_F , and 0.626. for d_R . From equation 5, it follows that the estimate for d_F is -28.76 . Then, from regression (3), we obtain the following coefficients: 0.889 for e_p , 0.573 for \tilde{e}_R , and -93.99 for \tilde{e}_F . Consequently, from equation 10, the e_R estimate is 0.0165, and from equation 8, since the e_F estimate is -6.99 , we compute the following estimated products: $e_P d_F \simeq -25.57$, $e_P d_R a_F \simeq -59.66$, and $e_R a_F \simeq -1.77$.

⁹The known clients are the ones who have already reimbursed at least one former loan.

As robustness checks, we draw again the regressions on two types of subsamples. Firstly, we segment the full sample by credit officer. It appears that the gender-gap in propositions emanates from an identifiable subgroup of 11 credit officers over 40.¹⁰ The bias intensity is thus heterogeneously distributed among credit officers (Méon and Szafarz, 2010). Moreover, the regressions restricted to the applications treated by a gender-biased credit officer exhibit a stronger impact of the credit officer's proposition (42%). Consequently, gender-biased credit officers seem overall more influential than fair ones.

Secondly, we segment the full sample by year.¹¹ The regressions show that the share of responsibility of the credit officers decreases with time, evolving from 38% in 1997 to 7% in 2007. This is probably a sign that the MFI has progressively implemented monitoring tools that yielded efficiency gains.

In sum, the responsibility for the female loan downsizing that originates from the MFI side is mainly attributable to the credit officers. However, the credit committee tends to marginally contribute to the bias. Therefore, each step of the process is detrimental to the female borrowers. Firstly, they enter smaller requests. Secondly, this initial gender gap is reinforced by the credit officer who fails to properly account for the objective characteristics that he/she has collected during the screening process. Lastly, the credit committee also fails to play its monitoring role fairly since it does not counterbalance the credit officer's misjudgment.¹²

4 Conclusion

The peculiarities of its lending methodology exposes the microfinance sector to an acute principal-agent problem. In practice, this problem translates into an unchallenged dominance of the credit officers in the loan granting decision-making. Most MFI try to align their credit officers' objectives to their mission through wage incentives.¹³ However, even when incentives are

¹⁰Notably, the officer's gender does not explain the gender-bias observed in propositions.

¹¹Our sample stretches over an eleven-year period.

¹²On top of that, Agier and Szafarz (2010a) show that, all other things equal, women exhibit higher creditworthiness than men. This finding provides strong evidences of economic inconsistency of the observed gender gap, likely due to stereotyping against women entrepreneurs.

¹³According to McKim and Hughart (2005), the share of MFIs that use staff incentive schemes grew from 6% in 1990 to 63% in 2003. de Janvry, McIntosh and Sadoulet (2010) and Labie et al. (2010) discuss the merits of incentive-based wage schemes for non-profit MFIs.

enforced (as is the case in Vivacred), monitoring remains an indispensable complement, especially given the still huge excess demand for microloans.

This paper has shown that monitoring is working poorly, at least for correcting the credit officers' gender-biased recommendations. As a consequence, other measures are needed to increase to make credit officers' refrain from expressing their economically unjustified preferences and/or stereotypes. Given the importance of subsidies in microfinance, the donors could constitute a valuable channel of influence. Regulations and/or codes of good conduct could also help disciplining the credit officers, provided that such rules are accompanied by appropriate enforcement mechanisms.

Nevertheless, the main difficulty in assessing the actual biases in loan granting stems from data availability. Indeed, detailed databases such as the one used in this paper remains rarely disclosed, so that the internal functioning of MFIs keeps looking like a "black box" to the researchers, and likely to the managers of the MFIs themselves.

In that respect, it is fair underlying that Vivacred is a well-managed - and exceptionally transparent - MFI that benefits from a well-organized recording system. Therefore, we conjecture that the evidence put forward in this paper underevaluates the agency problem prevailing in the microfinance industry. Of course, more data are required to check the relevance of this conjecture.

An important limitation of this paper comes from its focus restricted to gender biases. Indeed, many other judgemental biases may lead to credit officers' recommendations diverging from the MFI's mission.

Monitoring obviously increases operational costs, which are knowingly high in the industry. Therefore, given the practical problems plaguing monitoring devices, one could advocate for second best solutions. For instance, monitoring could be replaced, at least to some extent, by a well-designed hiring policy. More precisely, the credit officers would be selected among those who exhibit *ex ante* characteristics that increase their likeliness to have objectives naturally aligned with the MFI's mission. However, the very nature of such characteristics remains unclear.¹⁴

Moreover, the availability of credit officers with narrowly-defined profiles is not warranted. Still, when hiring credit officers MFIs could at least pay attention to the candidates' propensity of making biased recommendations. The resulting confidence in its credit officers' probity could indeed reveal fruitful to the MFI in terms of monitoring cost reduction.

¹⁴For instance, our study has shown that female credit officers behave similarly to their male colleagues regarding the gender gap in loan size. However, [Guérin, Mersland and D'Espallier \(2010\)](#) show that female credit officers increase the odds of serving women

In conclusion, our contribution confirms that the governance of socially-oriented firms raises specific issues (Labie, 2001; Hartarska, 2005; Mersland and Strom, 2010). By scrutinizing the influence of microcredit officers in the decision-making, we have stressed the need for innovative disciplining devices that are designed to efficiently combat detrimental mission drift.

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