What Makes a Microfinance Company Focus on a Female Audience? An Evidence of a Global Sample

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Abstract

The microfinance segment is considered a mechanism capable of providing financial inclusion of the poorest, usually excluded from the mainstream financial system, thus allowing them to undertake autonomous activities which can generate income. Microfinance can be acknowledged as especially important for female audiences, as it can boost women's empowerment. In this sense, it is important to comprehend what are the characteristics of Microfinance Institutions (MFIs) that favors women's access to its services. This paper aims at identifying variables that may influence women's access to MFI loans. To that end, we have analyzed a sample made of 59 MFI's from around the world using a Beta Regression Model (BRM) for panel data. Results show that the proportion of women managers, the size of the institution and the solidarity-group lending are positively associated to the proportion of female borrowers, while the proportion of women who are at the council, as well as governance models and the average loan size show an opposite relation. The results obtained

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in this paper may be utilized to supply MFI's management controls that have an institutional liability of catering to women.

Keywords: Microfinance. Gender inequality. Management Control, Beta Regression Model.

1 Introduction

Access to finance is still a challenge when fighting poverty, which makes understanding the factors for this hardship crucial (Dawood et al., 2019). In this way, according to Banerjee et al. (2015), it is indispensable to create mechanisms that allow the access of more sustainable sources of income to the poorest. Financial inclusion, then, rises as a means of offering additional solutions to financial access (Chibba, 2009).

The relationship between financial inclusion and income access becomes evident in the work of Omar and Inaba (2020), who found a strong correlation between financial inclusion and per capita income (0.7269), as well as an inverse relationship between financial inclusion and poverty rates (-0.6249). Furthermore, other studies that investigate the relationship between financial inclusion, poverty, and income inequality have also identified positive effects ((Hussaini & Chibuzo, 2018; Schimied & Marr, 2016; Miled & Rejeb, 2015; Awojobi, 2014).

For instance, Dawood et al. (2019) have found that female-headed households are more likely to be in poverty conditions when compared to similarly structured male-headed households. The authors also argue that financial inclusion diminishes this probability. Therefore, based on their findings, they suggest that promoting the inclusion of female-headed families is relevant for the reduction of poverty.

Among the tools used to promote financial inclusion, they highlight microfinance. According to Zeller and Meyer (2002), it acts as an efficient mechanism for poverty reduction, especially due to opportunities that are created by microloans. This allows poor people to free themselves from financial restrictions, as well as acquire assets to start or even expand their businesses.

Microfinance also represents a mechanism for reducing gender inequality and empowering women (Saravanan & Dash, 2017). In addition, Duflo (2012) highlights how women play an essential role in achieving social goals, as evidence suggest that resources controlled by them are more efficiently directed to goods and services that improve their families' well-being. In this way, many institutions in this sector aim at promoting women's access to financial services, thus hoping to increase women's autonomy and importance in society (Muhammad, 2012).

However, only achieving social objectives is not enough for Microfinance Institutions (MFIs). The organizations that prove to be most effective are those that can expand all sides of the so-called "critical triangle of microfinance," which encompasses social outreach, financial sustainability, and the impact on beneficiaries' quality of life. Still, given how these objectives are arranged, some conflicts may take place (Zeller & Meyer, 2002).

One example of a conflict has become known in microfinance literature as "mission drift" or "mission abandonment". This happens when MFIs start pursuing commercial goals at the expense of their social "mission" to reduce poverty (Leite, Mendes & Sarmento, 2019). In this scenario, the pursuit of financial sustainability can lead to mission drift (Ben Soltane, 2012) and penalize the social objectives of these organizations, including women's access to credit.

In this context, there is a need to understand which elements are associated with the Proportion of Female Borrowers (PFB) in these institutions' loan portfolios. In this way, this study intends to answer the following question: Which variables associated to MFIs prioritize women's access to loans? To answer this query, this paper aims to identify variables associated with MFIs that prioritize women's access to their loans. Despite the existing

debates in the literature regarding the effects of greater female participation in the loan portfolios of MFIs and their implications for financial sustainability, we were unable to find a study that investigates the main characteristics of microfinance institutions that prioritize services for women.

Thus, the relevance of this research is linked to addressing this gap. Although microfinance activities are fundamentally designed with a social focus on including the poorest, especially women, the fulfillment of their needs does not occur uniformly across different institutions (Memon, Akram & Abbas, 2020). Furthermore, when the possibility of mission drift in favor of sustainability enters the equation, it can lead institutions to pursue different goals in serving the female population.

From an administrative perspective, the importance of this study is linked to the possibility of structuring the managerial control system of MFIs, so they are able to incorporate the variables identified as relevant for women's access to financial services. This would allow organizations to include control tools for some of these variables within their systems, thus guiding and adapting their operations in order to reach the largest possible number of women.

This way, this article is structured into five parts, including the current introduction. Section two presents the theoretical framework that will serve as basis for the research conducted. Section three is dedicated to the presentation of the methodology employed. Section four presents and discusses the findings, along with a brief analysis of the model's adequacy. Finally, the conclusion of this study is presented.

2 Theoritical Framework

2.2 Financial inclusion, microfinance and poverty reduction.

According to Banerjee et al. (2015), the fight against poverty is related to meeting the needs of the poorest part of the population through securing safe sources of income, with self-employment being highlighted as a means to achieve such a goal. Zeller and Meyer (2002) clarify how forms of financial inclusion, such as microfinance, are effective mechanisms to reduce poverty, primarily due to opportunities provided by microloans. This financial tool allows the poorest populations to either create or expand their businesses by acquiring assets.

At this point, it is important to clarify that financial inclusion is understood as the provision of affordable financial services for disadvantaged groups, such as the low-income population in general (Hussaini & Chibuzo, 2018). According to Zeller and Meyer (2002), financial inclusion impacts household income in three ways. The first is through investments that allow for production expansion and an increase in income. Another way is through the optimization of risk allocation in clients' asset portfolios. Finally, it helps smooth consumption patterns in the face of unexpected events. For Schmied and Marr (2016), the link between poverty and access to financial services lies in the challenges the poorest face when accessing these services, especially credit.

Therefore, many studies that investigated the relationship between financial inclusion, poverty and income inequality in developing countries were able to identify some kind of positive effect (Omar & Inaba, 2020; Hussaini & Chibuzo, 2018; Schmied & Marr, 2016; Miled & Rejeb, 2015; Awojobi, 2014). Table 1 below shows a summary of studies on financial inclusion and poverty reduction.

Table 1

Studies on financial inclusion and poverty reduction

Author	Scope	Goal	Outcome
Awojobi (2014)	Nigeria	Investigate how MFIs have contributed to reducing poverty in Nigeria.	It was found that 65% of the interviewees, clients of microfinance institutions (MFIs), have agreed that access to credit positively impacted their incomes. Also, 82.5% believe these services improve a family's well-being.
Miled e Rejeb (2015)	Developing countries	Examine the relationship between microfinance and the reduction of poverty on a macro level.	It was demonstrated that countries whose MFIs have a higher gross loan portfolio tend to have lower poverty rates and higher levels of per capita consumption.
Schmied e Marr (2016)	Peru	To assess the impact of microloans and microfinance on poverty.	It identified how social inclusion has a relieving effect on different measures of poverty, emphasizing the importance of avoiding exclusion from access to financial services.
Hussaini e Chibuzo (2018)	Nigeria	Investigate the effects of social inclusion on poverty reduction	It found evidence that supports the positive relationship between financial inclusion and poverty reduction, given how the results of the tested hypotheses point at this conclusion.
Dawood et. al. (2019)	Indonesia	Provide evidence of the impact of financial inclusion on poverty at a household level.	It showed how the gender of a head of the family affects their likelihood of being in complete poverty. Also, financial inclusion has the potential of reducing the risk of poverty.
Omar e Inaba (2020)	Developing countries	Investigate the impact of financial inclusion on poverty reduction and income inequality.	It identified significant evidence of how economies with a greater financial inclusion have significantly lower poverty and income inequality rates in developing countries.

Source: The author, 2024.

However, according to Freitas (2013), there are challenges that formal financial organizations face in order to meet the specific needs of poorer populations, due to high fixed costs and the presence of information asymmetries. In light of this situation, microfinance can help the poorest to start businesses, expand their ventures, and even save resources more efficiently (Leite, 2017).

According to Quayes (2012), MFIs have operational and institutional structures that diverges from traditional institutions. As most MFIs do not rely solely on deposits as their main source of funds, they can offer small loans through innovative arrangements such as: unsecured credit, group lending, progressive financing structures, immediate repayment deals, among others.

In this way, in face of the mission these institutions have to reduce poverty and provide access to income, it is imperative to debate their role among the most vulnerable groups. Among them, Arnold and Gammage (2019) highlight women, particularly regarding issues related to education and cultural traditions involving gender. Thus, understanding the role of financial inclusion for women is paramount to reducing poverty.

2.3 The importance of female financial inclusion

A study by Dawood et al. (2019) indicated that female-headed families had a higher probability of being in poverty compared to male-headed families. This result suggests that

financially including families led by women would be relevant for mitigating poverty in a population.

In addition to that, there is also the role women play in achieving social goals, as the resources they control are directed toward goods and services that improve their families' well-being. From this perspective, microloans can play a dual function, both empowering women and helping them achieve social goals (Duflo, 2012).

In this context, Swamy (2014) noted that the participation of poor women in financial inclusion programs had a strong impact on the growth of household income and the well-being of Indian families. Furthermore, Banerjee et al. (2015) found that interventions that increase women's income have repercussions for their empowerment.

Women, as Arnold and Gammage (2019) argue, face more barriers when accessing financial services. The explanation for this phenomenon involves social issues women face, such as mobility limitations and greater family responsibilities. As Leite and Civitarese (2019) state, the problems that affect male entrepreneurship, like the lack of credit history and collateral, are felt disproportionately by women, amplifying the difficulties in accessing these services.

According to Duflo (2012), microfinance institutions (MFIs) that prioritize women's access to credit argue that women are more likely to be excluded from formal credit sources. Therefore, as Abdullah and Quayes (2016) note, most MFIs primarily target women. Thus, to ensure that the group with the greatest restrictions on access to financial services continues to receive support from these organizations, it is essential that their focus remains on social objectives rather than shifting predominantly toward financial purposes.

2.4 Microfinance and mission drift

Generally speaking, Microfinance Institutions (MFIs) face the so-called "critical triangle of microfinance", which illustrates three dimensions these organizations must pursue. In this sense, MFIs must balance social performance, financial sustainability, and impact on their clients' quality of life (Zeller & Meyer, 2002). As D'Espallier, Hudon, and Szafarz (2013) clarify, the literature has assessed social performance through a myriad of indicators, including women's access to services.

In this context, the truly effective organizations are the ones that can expand all these dimensions. However, given how these goals are configured , some form of trade-off between them may occur (Zeller & Meyer, 2002). According to Leite, Mendes, and Sacramento (2019), one such form of trade-off is known as "mission drift." This happens when MFIs pursue commercial objectives at the expense of their social mission to reduce poverty.

The competitivity of this sector has prompted a debate regarding the *trade-off* between financial and social performances. MFIs may be tempted to prioritize financial goals over social focus (Ben Soltane, 2012), which includes women's access to these services. Therefore, it is highly relevant to identify characteristics of MFIs that even in the face of potential "mission drifts", can still manage to achieve their goal of providing services to women.

2.5 Variables related to women's access to credit

As Leite, Mendes, and Sacramento (2019) point out, there is no consensus on how MFIs should be structured in order to achieve the best results when meeting various established objectives. In this sense, little attention is given to investigating the characteristics of institutions that successfully fulfill their social mission. Given the potential for mission drift to undermine social objectives, such as women's access to financial services, in favor of

financial sustainability, it makes sense to explore whether variables related to financial performance are associated with the proportion of female borrowers.

Memon, Akram and Abbas (2020) argue how understanding the role and effects of female participation in the microfinance market can enable the development of specific plans for the sector. This way, exploring issues related to MFIs characteristics and how they are organized may help build strategies that simultaneously achieve goals, such as financial sustainability, as well as expand social outreach.

Initially, the first aspects to be selected relate to the composition of human resources, or human capital, used by the institutions. These characteristics become highly relevant as they are connected to institutions' organizational factors. More specifically, the potential for promoting internal changes, such as recruiting frontline professionals, training, and incentive systems that enhance social performance (Copestake, 2007).

In this context, the study conducted by Memon, Akram, and Abbas (2020) contributes significantly, given that it investigates different roles (i.e., borrower, board member, manager, and loan officer) played by women in MFIs and how they affect the institution's financial sustainability and outreach; that is, this study specifically analyzes the effects of these variables on dimensions that are relevant to the mission drift dilemma.

Results indicate there is a negative impact from female borrowers and loan officers on financial sustainability, with the exemption of managerial positions, where the impact is rather insignificant. On the other hand, female participation has a positive effect on outreach dimensions, except for the role of loan agent, which has a significantly negative influence on social outcomes. Therefore, one may conclude that female participation in microfinance enhances social performance while diminishing financial sustainability.

Regarding female participation and its implications for financial performance, the study by Boehe and Cruz (2013) revealed that women's leadership roles in the upper management of MFIs have a positive and significant effect on these institutions' financial sustainability. Also, the work of Strøm, D'Espallier, and Mersland (2014) indicates that a higher presence of women on the boards of MFIs can be associated with positive effects on these organizations' financial returns.

The previously reported results alone would be sufficient to justify the use of the variables in the study by Memon, Akram, and Abbas (2020), as they demonstrate the existence of significant effects on both social and financial performance of MFIs. However, in addition to issues related to mission drift, Banerjee, Karlan, and Zinman (2015) also highlight the possibility of supply-side selection bias, as creditors may select borrowers based on factors related to the likelihood of investment success, grounded in the potential for profit. Alternatively, it could be based on the level of poverty faced by borrowers, in which case the focus would be on the potential for promoting social change.

The study conducted by Beck, Behr, and Madestam (2018) indicated that borrowers served for the first time by loan officers of the opposite gender were less likely to return to the institution for a new loan. Additionally, these borrowers received smaller loans, with higher interest rates and shorter terms, even though they did not exhibit higher default rates. The situation identified by this study points to a significant gender bias in the microfinance sector.

Some hypotheses for this potential identification of gender can be drawn from Hartarse (2009), who argues that a higher number of women in upper management jobs increase access to underprivileged clients. This is because female managers and board members have more suitable skills for assessing clients, particularly female clients. Furthermore, this enhanced understanding could translate into lower operational costs, increased outreach, and reduced information asymmetry. This is because gender identification allows these professionals to better understand their clients' needs and limitations (Mersland & Strøm, 2008).

Thus, having women participate in these institutions as human capital could also be related to their participation in the institution's loan portfolios. Consequently, this research relates the proportion of women working within the structure of MFIs to the proportion of female borrowers.

Another highly discussed aspect in microfinance concerns the effects of the governance model (profit orientation) on financial and social performance (Abdullah & Quayes, 2016; Leite & Civitarese, 2019; Leite, Mendes & Moreira, 2020). As D'Espallier, Guérin, and Mersland (2011) point out, this characteristic can result in impacts both on the development of gender policies and on the operational approaches of these organizations.

Leite, Mendes, and Sacramento (2019) indicate that profit orientation can be considered one of the characteristics that most influence the behavior of managers in MFIs when making decisions about resource allocation. Also, nonprofit institutions initially face less pressure regarding expected returns, thus encountering fewer difficulties in achieving social objectives.

The importance of this aspect is reinforced by the study conducted by Quayes (2012), which demonstrates how profit-oriented MFIs have better operational self-sufficiency and a higher average loan balance per borrower than nonprofit organizations operating in the sector. This strengthens the perception that profit-driven institutions focus on financial performance at the expense of outreach.

Leite and Civitarese (2019) identified that between 2010 and 2014, Latin American nonprofit MFIs had a higher percentage of female borrowers compared to their profit-oriented counterparts. Therefore, this study theorizes the existence of a relationship between the governance model of MFIs and the proportion of female borrowers in their loan portfolios.

The size of MFIs is another perspective worth considering, as it is significant for their financial and social performance. Abdullah and Quayes (2016) point out that the size of MFIs, measured by the gross loan portfolios, has a considerable effect on financial performance. Given the potential for mission drift, the size of institutions could also impact social performance, consequently affecting women's access to financial services.

According to Ben Soltane (2012), the size of MFIs may have an inverse relationship to their propensity to serve female borrowers. As these institutions grow and have a larger number of active clients, they may lose interest in serving women. Thus, they may be more inclined to drift from their mission as the organization increases in size, given how they begin to serve clients with higher income levels. In this scenario, it is possible to propose the existence of a relationship between the size of MFIs and the proportion of female borrowers.

Another factor that could impact women's access to financial services is the composition of the capital structure of MFIs. As Quayes (2012) explains, the greater the volume of resources obtained from third-party capital is, the greater the pressure for achieving financial sustainability will be. In this context, the goal of providing more accessible credit to the poorest segments of the population would be threatened, as third-party capital financiers would have incentives to push for reducing credit portfolio risks in order to protect their capital, especially when the profit-oriented governance model is considered.

As expected, the research carried out by Abdullah and Quayes (2016) found that the level of equity holds a positive and statistically significant effect on financial performance. Thus, institutions with a certain level of equity may be more inclined to focus on financial performance at the expense of social objectives, consequently impacting their service to female clients. Therefore, it is reasonable to theorize the existence of a relationship between the capital structure of MFIs and the proportion of female borrowers.

D'Espallier, Guérin, and Mersland (2011) recognize that loan methodologies also influence the relationship between gender and repayment. They further add that group lending

is considered a feminine method, as women tend to join groups more easily and participate more actively in them.

Ben Soltane (2012) identified evidence that suggest an increasing trend in loans made through group methodologies directed toward women. Thus, it would be feasible to establish an association between the credit methodology—specifically, group loans—and women's greater access to financial services. This finding allows for theorizing the existence of a relationship between the loan methodologies of MFIs and the proportion of female borrowers.

Another important aspect for our discussion is the size of the granted loans. Mersland and Strøm (2010) outline three main hypotheses that imply mission drift: profitability per client, costs per client, and client risk. The first two are linked to the need to increase average loan sizes in order to improve financial results, which could lead to the abandonment of the poorest segment. Meanwhile, risk can be managed by either making smaller loans or shifting to clients who have better financial situations.

Thus, the size of the loans would also be a relevant variable, given the expectation that institutions which focus on women would issue smaller loans. This prospect arises from a number of factors, such as supply and demand issues, or even a greater risk aversion exhibited by women, leading them to take out smaller amounts (D'Espallier, Guérin & Mersland, 2011). In light of these arguments, this study theorizes the existence of a relationship between the average loan size granted by MFIs and the proportion of female borrowers.

3 Methodological Procedures

In short, and regarding methodological aspects, one may argue it is possible to consider this study a descriptive research in terms of its objectives, according to the classification criteria presented by Vergara (1998). As the author clarifies, it corresponds to a type of research aimed at revealing the characteristics of a given population. Regarding its methods, this investigation can be characterized as bibliographic and documentary, also considering Vergara's criteria (1998). It is also important to highlight this study is structured based on a quantitative research method, as it employs statistical procedures to demonstrate existing relationships between the investigated attributes in order to specify the characteristics of the elements under study (Markoni & Lakatos, 2013).

3.1 Population and Sample

This research adopted Vergara's (2016) concept of population, which refers to a set of elements with characteristics of interest for the study. Thus, the population of this research is defined as the totality of Microfinance Institutions (MFIs) operating worldwide. The concept of sample also follows the author's definition and consists of a fraction of the population selected based on criteria that ensure its representativeness. Therefore, the sample used includes all MFIs that publish their information on the Microfinance Information eXchange (MIX) platform, or MIX Market. According to Quayes (2012), the MIX Market is a web platform that presents financial information on various MFIs. Initially, the sample comprised a total of 3,237 MFIs distributed across the globe.

3.2 Data collection

This study used a chronological criterion to guide the data collection, selecting the period from 2014 to 2018. This timeframe was selected because it is still an underexplored period in the literature, yet a significant number of institutions supplies their information in

the database used for this study. The following step was to select information related to the indicators used in the model constructed for this analysis.

The employed method requires that all information used in the construction of the indicators be available for the entire period. However, there was an absence of information throughout data collection. This situation led to a significant reduction in the initial sample. In the end, the final sample was made of 59 institutions with data raging from 2014 to 2018, which resulted in 295 observations.

Collected observations are structured as panel data, that is, the same units (MFIs) are tracked over time. This enables the recording of variations both between units, as well as inside them throughout time, thus addressing how diverse these units are.

3.3 Model construction

The employed model assumes a relationship between its dependent model, PMGF, and other independent variables. The latter were selected based on the literature on the topic. Thus, the relationships can be summarized in the following function:

$$PMGF = f(PMC, PMG, PMAC, MG, TI, PCP, PCS, TME) \quad (1)$$

In which:
PMGF: Proportion of Female Borrowers
PMC: Proportion of Women Advisors;
PMG Proportion of Women Managers;
PMAC: Proportion of Women Loan Officers;
MG: Governance Model (Profit Oriented);
TI: Institution Size;
PCP: Proportion of Shareholder Equity;
PCS: Proportion of Solidarity-Group Lending
TME: Average Loan Size

Regarding the independent variables which were used, shown in Table 2, the first group of variables – PMC, PMG, and PMAC – relates to MFI's human assets. This selection was based on a study that linked these variables to financial sustainability (Memon, Akram & Abbas, 2020) and also on the possibility, suggested by Beck, Behr, and Madestam (2018) of borrower-selection bias based on gender. Additionally, Hartarska (2009) points out that women have a better ability to assess the situation of their peers.

Another group, which is made of the variables MG, TI and PCP, corresponds to the structural variables that describe institutional aspects. The variable MG indicates whether the MFI is profit-oriented or not (D'Espallier, Guérin & Mersland, 2011; Leite & Civitarese, 2019; and Leite, Mendes & Moreira, 2020). The variable TI, discussed by Ben Soltane (2012), captures the size of the institution based on its gross loan portfolio, indicating its financial capacity. Finally, the variable PCP, used by Quayes (2012), expresses the institution's capital structure by indicating the proportion of equity.

PCS is related to PMGF because, as emphasized by D'Espallier, Guérin, and Mersland (2011), this modality is characterized by a high participation of women among its borrowers, making it essentially a female-oriented method. Finally, the inclusion of the variable TME is due to the study conducted by Quayes (2012), which indicated a negative impact of the average loan size on the outreach of MFIs. Table 2 clarifies how each variable is measured, its interpretation, and sources.

Table 2
Variables used in the model

Variables	Description	Formula	Interpretation	Authors	Expected effect
PMGF	Proportion of Female Borrowers	$\frac{Number\ of\ female\ clients}{Amount\ of\ clients}$	Proportion of female borrowers in relation to the total amount of borrowers of the MFI.	Memon, Akram e Abbas (2020); Leite e Civitarese (2019); D'Espallier, Guérin e Mersland (2011)	-----
PMC	Proportion of Women Advisors	$\frac{Number\ of\ female\ advisors}{Amount\ of\ advisors}$	Proportion of women in the Administrative Council of MFIs.	Memon, Akram e Abbas (2020)	Positive
PMG	Proportion of Women Managers	$\frac{Number\ of\ female\ managers}{Amount\ of\ managers}$	Proportion of women in relation to the total amount of managers who work in the MFI.	Memon, Akram e Abbas (2020)	Positive
PMAC	Proportion of Women Loan Officers	$\frac{Number\ of\ female\ loan\ officers}{Amount\ of\ loan\ officers}$	Proportion of female loan officers in comparison to the total amount of loan officers of the MFI.	Beck, Behr e Madestam (2018); Memon, Akram e Abbas (2020)	Positive
MG	Governance Model	$\begin{cases} 1, with\ lucrative\ means \\ 0, without\ lucrative\ means \end{cases}$	It is a binary variable that indicates the MFI's profit orientation. If it is profit-oriented, this variable takes the value of 1; otherwise, it takes the value of 0.	Leite, Mendes e Moreira (2020); Leite, Mendes e Sacramento (2019); Quayes (2012)	Negative
Ln (TI)	Institution Size	*Ln (Gross Loan Portfolio Value)*	It measures the size of an MFI in a logarithmic scale. In this case, it is represented by the value of the gross loan portfolio.	Abdullah e Quayes (2016); Ben Soltane (2012)	Negative
PCP	Proportion of Shareholder Equity	$\frac{Shareholder\ equity}{Shareholder\ equity + Third\ party\ \text{capital}}$	Proportion of shareholder equity in relation to the principal used by the institution.	Quayes (2012)	Positive
PCS	Proportion of Solidarity-Group Lending	$\frac{Total\ amount\ of\ solidarity - group\ lending}{Average\ loan\ size}$	Proportion of the solidarity-group lending in the composition of the gross loan portfolio	D'Espallier, Guérin e Mersland(2011); Ben Soltane (2012)	Positive
Ln (TME)	Average Loan Size	$Ln\left(\frac{Average\ loan\ size}{Number\ of\ clients}\right)$	Average loan size on a logarithmic scale. It is calculated as the quotient of the gross loan portfolio divided by the number of clients.	D'Espallier, Guérin e Mersland (2011); Quayes (2012	Negative

Source: The author, 2024.

This way, the basic model was made in order to specify possible existing relationships between the dependable variant, PMGF, and other independent variables which may influence the MFI's focus on women. The proposed model is described according to equation (2), in which β indicates the regression coefficients to be estimated; i represents each MFI that composes the sample; t corresponds to the year; and ε represents the error term, which is supposed to be white noise.

$$PMGF_{it} = \beta_{0,i} + \beta_1 PMC_{it} + \beta_2 PMG_{it} + \beta_3 PMAC_{it} + \beta_4 MG_{it} + \beta_5 Ln(TI_{it}) + \beta_6 PCP_{it} + \beta_7 PCS_{it} + \beta_8 TME_{it} + \varepsilon_{it} \quad (2)$$

in which:

i= 1,...,93
t= 2014,...,2018

The fact that PMGF represents a proportion, varying in the range between 0 and 1, is a relevant characteristic which indicates the need to seek linear regression models as alternatives, in which the response variable is continuous and unbounded. Thus, this study employed the Beta Regression Model (BRM), proposed by Ferrari and Cribari-Neto (2004).

In general, in BRM, the observations of the response variable $y_1,..., y_n$, correspond to a random sample in which y_i is a continuous random variable, confined to the interval [0,1] and follows distribution $Beta(\mu\ \phi_i,(1-\mu)\phi)\ \ \forall\ i$= 1, 2, ...,$n$.

In this case, the Beta probability density function in (3) can take on many formats, due to the parameters represented by the mean (μ) and the precision of the (ϕ) model (Travassos, Leite & Costa, 2018).

$$f(y;\mu,\phi) = \frac{\Gamma(\phi)}{\Gamma(\mu\phi)\Gamma((1-\mu)\phi)} y^{\mu\phi-1}(1-y)^{(1-\mu)\phi-1}, \quad 0<y<1 \quad (3)$$

In which: $0 < \mu < 1$, $\phi > 0$ e $\Gamma(s)$ é gamma function evaluated at s.

In the Beta Regression Model (BRM), Travassos, Leite, and Costa (2018) noted the variance of the response variable is a function of its mean (μ), and when the mean is fixed, the variance of the response variable decreases as the prediction parameter ϕ increases. Therefore, the heteroscedasticity of the response variable is naturally accommodated by the beta regression model. Furthermore, as Ferrari and Cribari-Neto (2004) explain, the density can have both symmetric and asymmetric shapes, depending on the combined values of the two parameters. This aspect gives the beta regression model great flexibility to reflect the actual distribution of the dependent variable.

In general terms, a Beta Regression Model establishes the following relation between the i-th unit (μ_i) and their respective values in the k explanatory variables $X_{ij}\ \forall\ j$=1,k:

$$g(\mu_i) = \sum_{j=1}^{k} \beta_j X_{ij} \quad (3)$$

Where β_j is the regression coefficient of the j-th explanatory variable and $g(.)$ is a link function, for instance, o logito$g\ (\mu_i) = ln[\mu_i/(1-\mu_i)]$

The estimation of parameters of the beta regression model is performed by the maximum likelihood method. In the logit link function, the expected proportion value of the i-th unit has the following relationship with regression coefficient estimates $(\hat{\beta}_j \forall j = 1, k)$:

$$\hat{\mu}_i = \frac{exp\left(\sum_{j=1}^{k} X_{ij}\widehat{\beta}_j\right)}{1+exp\left(\sum_{j=1}^{k} X_{ij}\widehat{\beta}_j\right)} \quad (4)$$

The Beta Regression Model in (2) can be adapted for a panel data case, by simply including a *t* index both in variables and means of units to denote the observation year ($t \in \{2014,...,2018\}$), that is, $y_{i,t}$, $X_{ij,t}$ e $\mu_{i,t}$. In this way, annual observations can be grouped by MFI and indexed in time throughout the period 2014-2018. Data structure indicates two effects on the response variable: 1) the data structure points to two effects on the response variable: 1) the average effect of the independent variables on the response variable, considered constant and represented by the regression coefficients (fixed effect); and 2) the effect of heterogeneity or differences between the units, a randomly considered effect represented by a Gaussian variable $\alpha_i \sim N(0,\sigma_\alpha^2)$ added on the right side of equation (3) and associated with the i-th MFI, but independent of the random effects of other units and the usual error term in regression models. Due to the presence of fixed and random effects, the resulting model is called a *generalized linear mixed model* (GLMM).

The proposed approach proved to be suitable, as the set of analyzed MFIs is a sample and this study's main goal is to identify relevant variables for the PMGF variable and estimate their (fixed) effects on this variable while controlling any random effects (Frees, 2004).

In what concerns model fitting, the parameters estimation was conducted by means of a glmmTMB package (Brooks et al., 2017) available for the R environment (R Core Team, 2022).

4. Analysis and Result Discussion

This section intends to analyze the data that make up the samples used in this study. To this end, basic statistic tools were initially used to perform a descriptive analysis of the variables (mean, median, standard deviation, minimum, and maximum) in a way the reader could understand the characteristics of the sample. This type of information is relevant for quantitative analysis. The aforementioned statistics will be presented in the following Table 3:

Table 3

Descriptive Statistic of the Sample

	PMGF	PMC	PMG	PMAG	PDCC	MG	Ln (TI)	PCP	PCS	Ln(TME)
Mean	0.58	0.299	0.36	0.42	0.0025	0.339	17.47	0.261	0.1089	7.1625
Median	0.5	0.273	0.33	0.39	0	0	17.5	0.186	0	7.0896

Mode	1	0	0	0	0	0	18.63	0.153	0	8.8454
Std Desviation	0.22	0.214	0.25	0.23	0.0092	0.474	1.492	0.194	0.2741	1.2334
Minimum	0	0	0	0	0	0	11.76	0.007	0	4.3706
Maximum	1	0.9	1	1	0.103	1	21.23	0.95	1	10.486

Source: The author (2024)

The main focus of this section is to understand which variables may be considered to be statistically associated to PMGF in the MFIs, identifying the impact of those variables in said proportion. Thus, the results which were obtained when applying MRB to the data are summarized in Table 4, which presents the estimate regression coefficient values (β), as well as their respective *p*-values.

Table 4

Estimates of Regression Coefficients – Sample

Explanatory variable	Estimators (β)	Pr(>|z|)
Intercept	-0.45465	0.625313
PMC	-0.88465	0.001303 **
PMG	0.38592	0.070471 .
PMAC	0.29203	0.364554
MG	-0.94856	0.002620 **
Ln (TI)	0.23362	0.002229 **
PCP	-0.20620	0.625594
PCS	0.72332	0.001719 **
Ln(TME)	-0.30521	0.000302 ***

. Significant at 10% level

* Significant at 5% level

** Significant at 1% level

*** Significant at 0.1% level

Source: The author (2024)

Therefore, the first step is identifying which variables are statistically associated with the behavior of MFIs regarding the participation of women in their loan portfolio. For this purpose, this study adopted the *p*-value of the estimated regression coefficient of the explanatory variable as criterion for identification. This criterion is relevant, as it indicates whether the estimated regression coefficient is statically significant. For the purpose of the present analysis, estimates that were significant at significance levels equal to or below 10% were considered statistically relevant. The quality of the model fit is confirmed by the high value achieved for the "pseudo" R^2 (Travassos, Leite e Costa, 2018), which is approximately 0.92.

Based on the results obtained by regression and summarized in Table 1, it is possible to indicate that PMG proved to be significant at a 10% level, given the variables PMC, MG, Ln(TI) e PCS proved to be significant at a 1% level. Finally, it is important to highlight the

variable Ln(TME), which proved to be significant at a 0.1% level. This shows the explanatory variables which are considered to be statistically associated to the variable PMGF.

Another highlight concerns the categories of variables associated with the PMGF of microfinance institutions (MFIs). In the model, three categories were identified: human resources, structural or institutional, and operational. The results show that there is a lack of predominance of any category regarding the proportion of MFI's female clients.

Thus, it is important to note that PMAC did not show statistical significance according to the adopted criteria. Among the same category, only PMC and PMG are relevant. This result is intriguing, as Beck, Behr, and Madestam (2018) identified a possible gender bias in their study, suggesting a strong influence of employee gender on access to MFI services. However, here the result suggests that PMAC has no relation to the proportion of women served.

On the other hand, PMC and PMG showed statistical significance, suggesting that they are relevant to the behavior of PMGF. In this case, it is interesting that both functions are characterized by having greater influence and autonomy. This offers a logical explanation for this finding, as positions with these attributes hold greater decision-making power and can impose their interests, including the promotion of gender equality.

Regarding the structural aspects of MFIs associated with PMGF, the results indicate that only MG and Ln(TI) can be considered statistically relevant. This conclusion aligns with the literature, as studies like D'Espallier, Guérin, and Mersland (2011), Leite and Civitarese (2019), and Leite, Mendes, and Moreira (2020) indicate that MG has a significant impact on MFIs' social and financial goals. Furthermore, Ben Soltane (2012) notes that TI affects the proportion of women served by the institution.

It is also surprising that the PCP variable, which measures the institution's capital structure, showed no relevance. According to Quayes (2012), a higher proportion of third-party capital would make the organization more susceptible to pressures from the owners of those resources, thereby increasing the likelihood of mission drift. However, the result found in this study did not confirm this expectation.

Finally, the operational aspects expressed by PCS and Ln(TME) are statistically related to PMGF. This result is consistent with most studies found in the literature. For example, D'Espallier, Guérin, and Mersland (2011) are characterized by predominantly serving a female audience. Meanwhile, TME is related to MFIs' social goals, being used as a metric for access to credit for the poorest.

The next objective is to verify the effects of these variables on PMGF. For this purpose, the sign of the estimated regression coefficient from the MRB was selected as the criterion for determining this impact. Thus, using the values of regression coefficient estimates (β) presented in the second column of Table 1 as a reference, it is possible to identify that the variables PMG, Ln(TI), and PCS are positively related to the proportion of women clients in MFIs. Meanwhile, the variables PMC, MG, and Ln(TME) were found to be negatively related.

The positive relationship between the proportion of women managers (PMG) and PMGF can be explained by Hartarska's (2009) view, which suggests that women in decision-making positions within MFIs are better equipped to assess clients of the same gender. The size of the institution, represented by Ln(TI), is also positively related to PMGF. This result contradicts Ben Soltane (2012), who points to an inverse relationship between TI and women's access to credit. The result indicates the opposite: MFIs with larger portfolios are more inclined to serve a female audience, which may be associated with a decrease in individual client risk.

The last variable positively related to PMGF is the proportion of social credit (PCS). This finding aligns with what Ben Soltane (2012) observed and is based on the idea that group

loans represent a method with a predominant female participation, as argued by D'Espallier, Guérin, and Mersland (2011).

Among the characteristics which are negatively associated with PMGF, the variable PMC stands out. However, if this result is viewed from the perspective of Strøm, D'Espallier, and Mersland (2014) – who relate the presence of women in this position to better financial performance – then it is possible to link this negative impact to mission drift. Another explanation is that less inclusive MFIs might include more women on their boards in an attempt to convey an image of gender inclusion.

The governance model (MG) also showed a negative relationship with PMGF. One way to interpret this result is that nonprofit institutions have a higher PMGF, as described by Leite and Civitarese (2019). This suggests that the lack of profit motive makes these organizations less susceptible to mission drift (Abdullah & Quayes, 2016).Lastly, a negative relationship was identified between the average loan size (TME) and PMGF. The explanation is that women are considered poorer and hold fewer guarantees. Additionally, they are thought to be more risk-averse, which leads to smaller loans (D'Espallier, Guérin & Mersland, 2011). This result allows us to conclude that the model worked satisfactorily to estimate PMGF.

5 Final Remarks

Microfinance rise as a means to access financial services and promote entrepreneurship. Among the poorest, the situation of women stands out, as they are excluded both socially and financially. Therefore, they depended on mechanisms that promote their empowerment and autonomy.

In this way, microfinance has the ability to promote women's empowerment, specially through credit. However, this access may become difficult due to the "mission drift" phenomenon. This term expresses how MFIs neglect social goals, such as catering to women, in favor of financial goals.

In this context, this study aimed to identify which elements associated to MFIs prioritized women. The chosen methodology identified as relevant the following variables: Proportion of Women Advisors, Proportion of Women Managers, Governance Model, Institution Size, Proportion of Solidarity Group Lending, and Average Loan Size. In addition, results also show that the variables Proportion of Women Advisors, Governance Model, and Average Loan Size also have a negative relationship to women's access to credit, while the variables Proportion of Women Managers, Institution Size and Proportion of Solidarity Group Lending are positively associated to the Proportion of Female Borrowers.

A surprising result was how the PMC proved to be negatively related to the PMGF, as having more women in the MFIs' councils was expected to result in a higher access of women to the institution's loans. In this case, it is possible that the MFIs with a less inclusive profile used a higher proportion of women in their boards in order to show an image of being engaged in gender-inclusion policies.

Therefore, for the analyzed sample, MFIs that enable women's access to their loans can be described as large institutions organized as non-profit entities that operate with a high proportion of solidarity lending in their portfolio and with a smaller loan size. Also, they have a smaller proportion of women acting as advisors, and a higher one acting as managers.

The conclusions of this study can also provide support to MFIs that are interested in organizing themselves to prioritize women's access to their loans. In this sense, the information obtained may be used to create management control systems which include aspects, resources, and characteristics that are proved to be related to a more effective

inclusion of the female audience. This can also contribute to these institutions' plannings and organization.

It is possible to suggest the examination of MFIs' characteristics that prioritize women in specific regions of the world as a topic for future studies. Finally, which other factors, such as the institution's volume of administrative expenses, the number of active credit agents, or the number of mobile units, beyond the ones that were addressed in this study, could also stimulate women's access to these services.

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