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Article — Accepted Manuscript (Postprint)

Women and Repayment in Microfinance: A Global Analysis

World Development

Suggested Citation: D'Espallier, Bert; Guérin, Isabelle; Mersland, Roy (2011) : Women and Repayment in Microfinance: A Global Analysis, World Development, ISSN 1873-5991, Elsevier, Amsterdam, Vol. 39, Iss. 5, pp. 758-772,
<https://doi.org/10.1016/j.worlddev.2010.10.008>

This Version is available at:

<https://hdl.handle.net/10419/323965>

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This paper has been published as: D'Espallier, B., Guerin, I. & Mersland, R. (2011), "Women and repayment in microfinance: A Global Analysis", *World Development*. Vol. 39(5), pp. 758-772.

doi:10.1016/j.worlddev.2010.10.008

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Women and Repayment in Microfinance: A Global Analysis

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Abstract

This paper uses a global data set of 350 microfinance institutions (MFIs) in 70 countries to study the common belief that women are generally better credit risks in microfinance than men. The results confirm that a higher percentage of female clients in MFIs is associated with lower portfolio risk, fewer write-offs, and fewer provisions, all else being equal. Interaction effects reveal that, while focus on women is generally associated with enhanced repayment, this trend is stronger for nongovernmental organizations, individual-based lenders, and regulated MFIs.

Keywords: Microfinance, gender, women, repayment, portfolio at risk, write-offs

JEL classification codes: O10, O12

Acknowledgements

The authors thank participants at the First European Research Conference on Microfinance (Brussels, Belgium, June 2-4 2009); participants at the 2nd International Workshop on Microfinance Management and Governance (Kristiansand, Norway, August 31th, 2009); participants at internal seminar of the Institute for Economics, Econometrics and Finance (Groningen, The Netherlands, November 18th, 2009); and Isabelle Agier, Cyril Fouillet, Rienst Galema, Niels Hermes, Marek Hudon, Marc Labie, Solène Morvant-Roux and Ariane Szafarz for useful comments and suggestions.

1. INTRODUCTION

Microfinance—financial services tailored to the poor—has been celebrated for its ability to reach out to women and enhance their welfare. Since its beginning as experimental schemes in Asia and Latin America in the 1970s, microfinance has been concerned, above all, with women. The objective of the Microcredit Summit Campaign, which plays a central role in the promotion of microfinance, is “to ensure that 175 million of the world’s poorest families, *especially women*, receive credit for self-employment and other financial and business services” (our emphasis).¹ Indeed, many microfinance institutions (MFIs) do target women. In this study’s data set, women represent 73% of microfinance customers, similar to figures reported in previous literature (e.g., Cull et al., 2007). The strong appeal of microfinance also lies in its high repayment records. In our data set, only 6% of the total loan portfolio, on average, is overdue more than 30 days, and only 1% will be written off, on average. From a credit design perspective, this is interesting, since modern microfinance was intended as a response to the high default rates in subsidized rural credit, mostly provided to men, in the 1950–1980’s (Hulme and Mosley, 1996).

The targeting of women has been suggested to generate high repayment rates for MFIs. Microfinance advocacy networks and sponsors, as well as bilateral and multilateral development aid agencies, regularly assert that women are good credit risks. For example, the World Bank argues (2007), “Experience has shown that repayment is higher among female borrowers, mostly due to more conservative investments and lower moral hazard risk” (p. 124). Armendariz and Morduch (2005, p. 139), evaluating different techniques to reduce repayment defaults, consider the targeting of women as a technique in its own right, alongside group lending and dynamic repayment incentives.

But do we actually know that women are better credit risks than men? The fact is that the relation between an MFI's repayment performance and its targeting of women has hardly been rigorously studied, and existing empirical evidence is mixed. Besides anecdotal evidence and the analysis of one or two MFIs in a given country (see, e.g., Khandker et al., 1995, in Bangladesh and Kevane and Wydick, 2001, in Guatemala), no paper provides a detailed empirical analysis of the gender–repayment relation within a global and longitudinal context. Sponsors seem to raise the repayment argument without ever furnishing empirical evidence. We thus respond to Cornwall et al. (2007), who argue that gender development discourses are too often based on myths and simplistic slogans.

This paper sets out to be the first rigorous global study of the relation between MFI gender focus and repayment performance, using a data set spanning 350 MFIs in 70 countries over 11 years. Repayment is studied through a variety of measures, such as *portfolios at risk*, *write-offs*, and *provision expenses*. We take into account the specific methodological problems associated with this type of estimation, such as a) isolating the gender effect from other MFI or institutional influences on repayment and b) the time-invariant nature of many covariates.

The findings indicate that a *higher* percentage of female clients is significantly associated with *lower* portfolio risk and *fewer* portfolio write-offs, after controlling for a number of MFI-specific factors, as well as institutional factors. Additionally, MFIs with a higher proportion of female clients carry *fewer* provisions, additional evidence that focusing on women significantly reduces MFIs' perceived credit risk. Findings further indicate that not all MFIs benefit to a similar degree from targeting women. Interaction effects reveal that specifically nongovernmental organizations (NGOs), individual-based lenders, and regulated MFIs benefit more from focusing on women. The finding that identifiable MFI characteristics interact with

the targeting of women is particularly interesting, since this can inform both microfinance practitioners and those interested in gender policies.

The rest of this paper proceeds as follows. Section 2 reviews the literature on gender and repayment and presents the hypotheses to be tested. Section 3 describes the data and the statistical methods employed. Section 4 reports our findings and discusses a number of robustness checks carried out. Section 5 presents the study's conclusions and possible implications.

2. GENDER AND REPAYMENT

There is no lack of studies arguing that women outperform men in terms of repayment in microfinance. For instance, Armendariz and Morduch (2005) report that, in its initial phase, the Grameen Bank included men among its customers. However, the bank decided to switch to a nearly entirely female clientele due to repayment problems with men. Hossain (1988) reports that in Bangladesh, 81% of women had no repayment problems, compared with 74% of men. Similarly, Khandker et al. (1995) find that 15.3% of Grameen's male borrowers had repayment problems, compared with only 1.3% of the women. In addition, in Bangladesh, Sharma and Zeller (1997) report that credit groups with higher percentages of women had significantly better repayment rates. From Malawi, Hulme (1991) reports that 92% of women paid on time, compared with 83% of men, and Gibbons and Kasim (1991) find that in Malaysia 95% of women repaid their loans, compared with 72% of the men. Finally, in a study from Guatemala, Kevane and Wydick (2001) report that female credit groups had better loan repayment records than male groups.

On the other hand, a number of more recent studies find that, when controlling for other factors, there is no significant relation between gender and repayment. Enhanced female repayment rates are driven by a focus on nonfinancial services in the case of Bangladesh (Godquin, 2004), the adaptation of loan methodologies to local contexts in the United States (Bhatt and Tang, 2002), and group methodology, local economic opportunities, and types of clients' livelihoods in Ethiopia (Brehanu and Fufa, 2008). Finally, BRI, in Indonesia, has never had any specific focus on women but has achieved nearly perfect repayment rates over several years (Armendariz and Morduch, 2005). Perhaps the argument of women being better credit risks is not as clear-cut after all? The fact that former studies are based on anecdotal evidence or are very limited in geographical and institutional scope warrants the need for this global study.

Why would women be better in honoring their loan contracts than men? One argument is that women invest in types of businesses that allow easier repayment. For instance, based upon her experience in Grameen villages in Bangladesh, Todd (1996) argues that women are more conservative or cautious in their investment strategies and therefore have better repayment records. Recently, Agier and Szafarz (2010) find similar results in Brazil. Johnson (2004) highlights that women's business activities often imply a quick turnover, which is more adaptable to the regular repayments demanded by most MFIs. By contrast, seasonal and risky activities such as agriculture, which are more often a male preserve, are a poor fit to microfinance modalities (Morvant-Roux, forthcoming). In many countries, there is also a long collective history of debt forgiveness in agriculture, which often translates into a male culture of "nonrepayment" (Servet, 2006). Another argument is that women have fewer credit opportunities than men and must repay their loans to ensure continued access to credit (Armendariz and Morduch, 2005). A premise of these arguments is that the women are

actually the ones controlling the loans; however, several studies indicate that loans taken out by women are in some cases used and controlled by the men within their households (Goetz and Gupta, 1996; Rahman, 1999; Kabeer, 2001; Mayoux, 2001). Thus, if men are the ones using the loans, the former arguments do not hold.

However, regardless of who controls the money, it still make sense for the MFI to know whether contracting with women lead to better repayment performance than contracting with men. Along this line, several papers argue that contracts with women are easier to monitor and enforce. For example, Rahman (2001) and Goetz and Gupta (1996) indicate that women are more easily influenced by peer pressure in credit groups and more sensitive to the interventions of loan officers. Ameen (2004) states that women have a lower opportunity cost of time than men and are therefore more inclined to have contact with the MFI and credit groups, with a positive impact on repayment. Moreover, female customers tend to stay closer to home rather than going out to work, and can therefore be more easily monitored by the MFI (Goetz and Gupta, 1996; Armendariz and Morduch, 2005).

Not all arguments favor women as a good credit risk, however. The simple fact that women, on average, are poorer than their male peers should indicate that repayments are more troublesome. Phillips and Bhatia-Panthaki (2007) contend that women entrepreneurs tend to be overrepresented in traditional sectors with lower profits, fewer growth opportunities, and harsher competition, which should make them less able to honor their credit contracts.

Given the previous discussions, the relation between gender and repayment-rates remains unclear. However, in line with common beliefs in the industry, we propose the following main hypothesis:

H1. MFIs with a greater female focus exhibit better repayment performance.

Female focus is measured by the proportion of female customers and with a dummy indicating whether the MFI has a female gender bias in its lending policies. Better repayment performance is measured by the proportion of portfolios overdue by at least 30 days (*portfolio at risk*) and the percentage of the loan portfolio that is written off because of nonrepayment (*write-off ratio*). For robustness, we also analyze the relation between gender and loan loss provisions² and call this the perceived credit risk hypothesis:

H2. MFIs with a greater female focus exhibit lower perceived credit risk.

In addition to our main hypotheses, it is interesting to know whether the relation between gender and repayment performance is greater for certain categories of MFIs. We analyze whether the gender effect on repayment differs with MFI *experience*, *legal status*, *scope of activities*, *lending methodology*, and *regulation*.

a. Experience

An MFI's experience can influence the relation between gender and repayment in different ways. First, the gender difference can be a short-run effect. It is likely that women repay better simply because they enjoy the accessibility to a service that was previously denied to them, but then this effect should decrease over time. Second, MFIs can change their internal procedures for stimulating repayment as they grow older. For instance, they could move toward either stricter and more coercive enforcement methods or, instead, a system based on trust and responsibility. Since male and female customers may respond differently toward

these altered repayment procedures, we expect the gender–repayment relation to be influenced by MFI experience, which can be described by the following hypothesis:

H3a. The relation between female focus and repayment differs with the MFI's experience.

b. Legal status

Mersland (2009a) explains how differences in legal status and ownership structure differentiate MFIs. Often NGOs have broader objectives and can be more interested in developing specific gender policies influencing their mobilization methods or repayment policies (Mayoux, forthcoming). For instance, an NGO dedicated toward serving more marginalized customers such as women could emphasize closer monitoring, whereas a bank may adopt a more formal enforcement policy. Male and female customers can respond differently toward these differences in repayment policies. We thus propose the following hypothesis:

H3b. The relation between female focus and repayment differs with the MFI's legal status.

c. Scope of activities

Some MFIs offer a range of nonfinancial services alongside microfinance, such as health services and basic literacy training (Godquin, 2004) or business training (Khandker et al., 1995). Edgcomb and Barton (1998) suggest that nonfinancial services improve not only the borrower's ability to repay but also the quality of the relations between MFIs and their clients. Since they are generally poorer and have lower education, women can be expected to be more responsive and more in need of the additional training (Mayoux, 2001; Armendariz and Morduch, 2005). Therefore, the following hypothesis is proposed:

H3c. The relation between female focus and repayment differs with the MFI's scope of activities.

d. Lending methodology

MFIs employ various lending methodologies, such as village banking, solidarity groups, and individual-based lending (Sharma and Zeller, 1997; Kevane and Wydick, 2001). There is no clear evidence that group lending (solidarity groups and village banks) leads to better repayment rates for women (see, e.g., Sharma and Zeller, 1997; Kevane and Wydick, 2001). However, it is still considered a *female* method, since women more readily join groups and spend time in group meetings. (Armendariz and Morduch, 2005; Mayoux, forthcoming). In conclusion, the relation between gender and repayment can be influenced by the MFI lending methodology:

H3d. The relation between female focus and repayment differs with the MFI's lending methodology.

e. Regulation

Regulated MFIs are monitored by banking authorities. It is argued that regulation can lead to *mission drift* if requirements divert attention away from serving the poor, but this has not been rigorously studied (Mersland and Strøm, 2010). Others argue that regulations can hold back innovation in lending technologies, which has been a driving force in microfinance development and outreach to women (Dichter, 1997; Hardy et al., 2003). Regulated MFIs can experience more pressure than non-regulated MFIs from regulating authorities, who can have an influence on their enforcement strategies. Male and female customers may respond

differently to diverse repayment procedures resulting from regulation, as pinpointed in the following hypothesis:

H3e. The relation between female focus and repayment differs with the MFI's regulatory status.

3. DATA AND ESTIMATION METHODS

(a) Data and summary statistics

Data for 350 MFIs from 70 countries have been extracted from assessment reports gathered by specialized rating agencies supported by the first rating fund of the Consultative Group to Assist the Poor (www.ratingfund2.org). A major advantage of using these assessment reports is that they are compiled by a third party and cover a wide range of organizational features, along with social and financial indicators. For example, with respect to gender, the data set contains information on the proportion of female customers, and, in addition, the rating agencies in the reports attest to whether the MFIs have a female gender bias in their policies and lending practices.

The data set contains a wide variety of different MFI types, with 187 NGOs (53.4%), 44 cooperatives (12.5%), and 119 (34.1%) bank institutions. The latter category contains banks, non-bank financial institutions, and state banks. The distributions across countries and legal statuses are given in Appendix A. In most cases (48.8%) we have four firm-years of data.³ The ratings are performed in the period 2001–2008, which means that we have data from 1998 to 2008. Most data are from the period 2001–2007. No data set is perfectly representative of the microfinance field. In particular, ours contains relatively little data from mega-sized MFIs and does not cover the virtually endless numbers of small savings and credit

cooperatives. However, rating data are considered among the most representative available for the microfinance industry (Mersland, 2009b), and compared to data from the Mixmarket (www.themix.org) a large firm bias is better avoided. For example, while Mixmarket 2006 Benchmarks based on data from 704 MFIs report mean and median total assets of 45,6 and 6,2 million US dollars respectively, the mean total assets for the MFIs included in this study are 6,5 million and the median MFI holds 1,9 million in assets.

Table 1 reports the mean, standard deviation, minimum, maximum, and quartiles for a number of key variables in our sample. We see that the average MFI has a total loan portfolio of \$4,225,000, serves 17,111 clients, and has nine years of experience in microfinance. The average outstanding loan is \$787 and annual net returns are \$209,000. The annual portfolio yield is 0.39, on average, illustrating the high interest rates typical in microfinance, and operational self-sufficiency (OSS) is 1.12, indicating that, on average, the MFI covers its operating costs.

As far as the repayment variables are concerned, PaR30 equals 0.06, on average, which means that 6% of the total loan portfolio is 30 days or more overdue. However, the median value is only 3%, which indicates that the distribution is somewhat skewed, with a number of MFIs with high PaR30 values. On average, write-offs comprise around 1% of the total loan portfolio, and the median value is also 1%. The provision expense rate is 3%, on average, with a median value of 2%.

For the gender variables, we see that, on average, MFIs have 73% female clients. Moreover, the 75th percentile in the distribution of female clients is 1, indicating that at least 25% of the

MFIs focus exclusively on women. The conscious gender bias dummy variable indicates that around 40% of MFIs have a female bias in their lending.

< Insert “Table 1. Summary statistics” here >

Table 2 shows the correlation matrix of the gender and repayment variables (Panel A), as well as discrete median values for some key variables for different proportions of female borrowers (Panel B). As can be seen from Panel A, there is a negative correlation between the proportion of female borrowers and both PaR30 (-0.02) and write-offs (-0.09), indicating that MFIs with more female borrowers have better repayment rates (Hypothesis 1). Additionally, the correlation between the proportion of female borrowers and the provision expense rate is also negative (-0.14; Hypothesis 2).

Panel B of Table 2 analyzes the median values of a number of key variables in classes that differ in their proportions of female borrowers, from “very low” to “very high.” The different cut-off points correspond to the quartiles in the distribution of female clients. As can be seen from Panel B of Table 2, the median PaR30 values are 0.03 and 0.05, respectively, for the classes with very low and low proportions of female clients, higher than for the classes with high (0.02) and very high (0.01) proportions. Median write-offs more or less mirror the PaR30 results. Similar findings emerge for the provision expense rate, indicating that MFIs with a higher proportion of female clients carry fewer provisions, supporting our second hypothesis, that female clients are perceived as a better credit risk. Other variables indicate that lending to women usually occurs in a different context than lending to men. For instance, the portfolio yield usually increases with a gender bias, suggesting higher interest rates are being charged to female clients. Furthermore, smaller loan sizes are usually associated with

greater female focus. The relation between costs and female focus is less clear. While the variable *costs per dollar lent* is higher in the high female focus class, it is lower in the very high class.

< Insert “Table 2. Correlations and univariate statistics” around here>

(b) Estimation methods

To test our hypotheses, we use panel data regression techniques where we regress repayment in terms of PaR30, write-off rate, and provision expense rate on our gender variables (proportion of female clients and the conscious gender bias dummy), controlling for a variety of MFI-specific and institutional controls. For instance, to test Hypothesis 1, we regress PaR30 on the proportion of female borrowers as follows:

$$PaR30_{i,t} = \beta_0 + \beta_1 FEM_{i,t} + \beta'_2 Z_{i,t} + \beta'_3 X_{i \in C,t} + u_{i,t} \quad (1)$$

where $PaR30_{i,t}$ is the portfolio at risk for MFI i in year t ; $FEM_{i,t}$ is the percentage of female clients; $Z_{i,t}$ is a matrix of MFI-specific controls, such as size, experience, average loan size, dummies for lending methodology, and rural/urban market activity; and $X_{i,t}$ is a matrix of controls that capture the conditions of the country C in which the MFI is active.

A number of methodological issues surrounding this kind of estimation require close attention. First, it is important that all variables potentially affecting repayment be included explicitly as controls in the regression equation. If variables are omitted that affect repayment and which are also correlated with the proportion of female borrowers, ordinary least squares (OLS) estimates could be biased (Stock and Watson, 2007, p. 186). Therefore, in addition to

OLS, we also analyze a pooled random effects (RE) model that takes into account unobserved MFI-specific effects as follows:

$$PaR30_{i,t} = \beta_0 + \beta_1 FEM_{i,t} + \beta'_2 Z_{i,t} + \beta'_3 X_{i \in C,t} + \mu_i + u_{i,t} \quad (2)$$

where μ_i is the unobserved MFI-specific effect. The main benefit of such an RE model is that it accounts for all unobserved heterogeneity potentially affecting the dependent variable, thereby reducing concerns for omitted variables bias (Lensink and Mersland, 2009; Hartarska, 2005).

Second, many of the controls that need to be estimated are time invariant. The RE model is therefore better suited than, for instance, a fixed effects (FE) model, where time-invariant covariates cannot be estimated because all variables are first-differenced. However, incorporating time-invariant covariates in an RE model requires the additional assumption that they never be correlated with the unobserved MFI-specific effect. When this assumption does not hold, the RE estimator can yield inconsistent and biased estimates (Baltagi et al., 2003). Therefore, besides performing pooled OLS and RE, we also report the fixed effects vector decomposition (FEVD) estimator developed by Plümper and Troeger (2007) and applied to microfinance performance regressions in Lensink and Mersland (2009). This estimator is designed to tackle time-invariant covariates and unobserved effects in the context of panel data and employs a three-stage estimation procedure. The first stage estimates a pure fixed-effects model to obtain an estimate of the unobserved MFI-specific effects. The second stage decomposes the fixed effects into two parts, one explained by the time-invariant variables and the other unexplained. The third stage re-estimates the model, including the time-invariant variables and the error term of the second stage, using pooled OLS.

Finally, repayments can vary over time because of idiosyncratic or macro-level shocks. We account for this by including time dummies in all regressions and using clustered standard errors.

4. RESULTS AND DISCUSSION

(a) Relation between gender and repayment

Table 3 reports the impact of gender on repayment in terms of the portfolio at risk (Panel A) and write-off rate (Panel B). The different columns correspond to the different estimation methods (*OLS*, *RE*, and *FEVD*). Looking at columns (1) to (3) in Panel A, we see that the proportion of female borrowers is negatively related to the portfolio at risk, regardless of the estimation method. This negative relation is statistically significant at the 5% level for *OLS* and *RE*, and at 1% level for *FEVD*.⁴ Moreover, the coefficients are quite robust over the estimation methods with estimated values -0.05 for *OLS*, -0.08 for *RE*, and -0.09 for *FEVD*. A value of -0.05 suggests that a marginal increase in female clients with 10 percentage points (say from an average 60% to 70%) decreases PaR30 with 0.5 percentage points (say from an average 6% to 5.5%). Additionally, the regression statistics (F-statistic for *OLS* and *FEVD* and χ^2 statistic for *RE*) always denote joint significance of the models. Note that the number of MFIs per country is always added as an extra time-invariant control to address the bias resulting from varying degrees of MFI intervention in different countries.

Examining the other controls, we see that mainly *size*, *portfolio growth*, *dumRURAL*, and *HDI* are significantly related to PaR30. In particular, a lower PaR30 is associated with larger MFIs, MFIs with higher portfolio growth, and MFIs operating in rural areas, as well as in more developed countries. These effects are robust over the estimation methods. Finding that MFIs

that grow faster have a lower PaR30 is not surprising, since a significant part of the portfolio is new and still uncontaminated. It is interesting to find that rural lending carries less risk, since lending to farmers has historically been associated with high risk. This finding could suggest that lending in rural areas does not necessarily mean agricultural lending, but rather finance non-farm activities in rural areas (Morvant-Roux, forthcoming). Alternatively, this finding could indicate that typical enforcement mechanisms like credit officer pressure, social pressure and peer pressure work best in rural communities. It should also be kept in mind that few of the small savings and credit cooperatives that typically operate in rural areas are included in our sample. The rural MFIs included in the sample might thus not be fully representative for rural microfinance lenders. The coefficients for *experience* and the efficiency measures (*staff efficiency*, *credit officer efficiency*) are insignificant and close to zero. Similarly, whether the MFI is an NGO or not and whether it practices group or individual lending have little or no effect on portfolio at risk. This finding is in line with Mersland and Strøm (2008), who find that performance differences between NGOs and non-NGOs are minimal, and Mersland and Strøm (2009a), who demonstrate that group lending has only a limited effect on repayment.

In columns (4) to (6) of Table 3, gender preference is measured through the dummy variable for conscious gender bias. As can be seen, this dummy is, like the proportion of female clients, negatively related to the portfolio at risk, with the coefficients being highly significant. Those MFIs that report a conscious bias toward women have a significantly lower PaR30, and estimated coefficients range between -0.01 for *OLS* and -0.02 for *RE* and *FEVD*. A value of -0.02 indicates that the PaR30 of MFIs that have a deliberate focus on women is, on average, 2 percentage points lower. Given an average PaR30 of 6% in the entire sample, this result is not only statistically significant, but also economically relevant. Looking at the

controls, we again see a negative association with *size*, *portfolio growth*, *dumRURAL*, and *HDI* consistent with the previous discussion.

In Panel B of Table 3, repayment is measured by the actual loan loss write-offs, and again gender is measured through both the proportion of female borrowers and the dummy for conscious gender bias. As can be seen from columns (1) to (3) of Panel B, the negative relation between the proportion of female borrowers and the write-off rate is highly significant at the 1% level (coefficients are -0.03, regardless of the estimation method). Similarly, columns (4) to (6) indicate that an MFI that focuses on women has 1% lower write-offs, the effects being significant at the 1% level. Overall, the results from Table 3 imply a negative association between the number of female clients and repayment, confirming Hypothesis 1.

< Insert “Table 3. Gender and loan repayment” around here >

In Table 4 we use a similar methodology as in Table 3 to analyze the impact of gender on provisions, measured as the provision expense rate. As can be seen from columns (1) to (3) of Table 4, the coefficient for the proportion of women clients is always negative and significance levels vary between 10% for *RE* and 1% for *OLS* and *FEVD*. This means that an MFI with a higher proportion of female clients carries significantly fewer provisions. Similarly, columns (4) to (6) of Table 4 indicate negative coefficients for conscious gender bias, regardless of the estimation method. Regarding the control variables, the main difference with Table 3 is that NGOs carry more provisions than non-NGOs. This is not surprising, since the former are generally unregulated and often do not pay taxes, allowing them to fix their

own level of provisions and write-offs. Overall, we find consistent evidence that MFIs that focus on women clients carry fewer provisions, confirming Hypothesis 2.

< Insert “Table 4. Gender and provisions” around here>

(b) Interaction effects

As outlined in the theory section, the effect of female focus on MFI repayment performance can be more prevalent under certain conditions or apply more for certain categories of MFIs. Interaction terms in the regression equations are therefore included as follows:

$$PaR30_{i,t} = \beta_0 + \beta_1 FEM_{i,t} + \gamma_1 (FEM_{i,t} * INT_{i,t}) + \beta'_2 Z_{i,t} + \beta'_3 X_{i \in C,t} + \mu_i + u_{i,t} \quad (3)$$

where all variables are defined as in equation (2) and $FEM_{i,t} * INT_{i,t}$ is the interaction term that measures whether the effect of gender on repayment differs with the interaction variables $INT_{i,t}$.

Regression outputs with respect to the interaction terms are shown in Table 5, where *RE* is used as the estimation method. Panel A of Table 5 analyzes gender in terms of the proportion of female clients, and Panel B measures gender in terms of the conscious gender bias dummy. The different columns represent the different interaction terms that were added subsequently. In the last column, all interaction variables are taken up simultaneously to study the isolated impact of each interaction. Note that the coefficient for women clients (Panel A) and conscious gender bias (Panel B) now represents the relation between gender and repayment in the reference category, whereas the sum of the reference coefficient and the coefficient for the interaction term indicate the gender repayment relation for the different categories.

As can be seen from column (1) of both Panels A and B of Table 5, the interaction term (*women clients * experience*) returns an insignificant coefficient close to zero, which indicates that the relation between gender and repayment does not differ with MFI experience. Therefore, Hypothesis 3a cannot be supported. On the other hand, when it comes to legal status, both Panels A and B of Table 5 indicate that NGOs benefit more than non-NGOs from a female focus when it comes to repayment performance. The effect not only is found in the individual regression but also persists when the other interactions are added, as can be seen from column (6). Hypothesis 3b is thus supported.

Column (3) of Panels A and B of Table 5 indicate that the relation between gender focus and repayment performance does not depend on whether the MFI provides microfinance services only or whether it has a broader scope of activities. Hypothesis 3c is thus rejected. As for regulation status and lending method, we note that the signs for the former are generally negative and the signs for the latter generally positive, and most often significant in columns (4) and (5) of both panels of Table 5. Moreover, the signs and significance levels are upheld when all interaction variables are included (column 6). Hypotheses 3d and 3e are therefore supported. The relation between female focus and enhanced repayment is stronger for MFIs that provide individual loans and for regulated MFIs.

Overall, we find that the *general* positive relation between focus on women and repayment is indeed different for different categories of MFIs. We find substantial support for Hypotheses 3b, 3d, and 3e, indicating that the association between female focus on repayment varies with the MFI's legal status, regulatory status, and lending methodology. We find no support for

Hypotheses 3a and 3c, indicating that the female focus - repayment relation does not vary with the MFI's experience or scope of services.⁵

These findings suggest that there are two mechanisms that can actively reinforce the positive relation between women and repayment: First, MFIs that practice a more personalized, tailor-made approach adapted to the needs of women are likely to increase the positive impact of women on repayment. Compared to banks, NGOs are more likely to adopt specific gender policies such as a women-friendly design of financial products. For instance, amounts and repayment modalities can be adapted to women's specific financial needs (Johnson, 2004) and collateral requirements can include female forms of property (Mayoux, 2001). Gender policies can also include women-friendly customer relationships, such as easy procedures, flexible timing, and accessible locations of service (Mayoux, 2001) or general gender awareness in staff recruitment and staff management (Goetz, 2001; Mayoux, 2001).

In addition, it is easier for individual lenders to design more personalized services. In microfinance this is particularly interesting, since a common belief is that women usually enjoy group lending. However, as argued by Harper (2007), group lending is all too often a "second-hand" method, and a way to shift transaction costs onto female borrowers (Mayoux, 2001; Wright, 2006; Rao, 2008). Our findings illustrate that when women are offered individual tailor-made loans, repayment is enhanced, compared to group-lending methods.

Second, MFIs that are regulated are likely to increase the positive relation between women and repayment. This result supports Fernando (2006), who finds that regulation can translate into more coercive enforcement methods (social pressure, verbal hostility, harassment, etc.), and that women can be more responsive to such practices. Indeed, in the face of close

regulatory supervision, the MFI may install harsher enforcement policies to avoid penalties from failing to meet high repayment standards. In Bangladesh, for instance, regulation and commercialization have strongly influenced credit officers' behaviors, leading to stricter enforcement methods (Goetz and Gupta, 1996; Rahman, 1999, 2004). In India, where women sometimes represent 95% of an MFI's clientele, regulation and competition constraints have led to "abusive collection methods" (Ghate, 2007).

< Insert "Table 5. Interactions on the gender-repayment relation" around here >

(c) Further analyses

A number of tests have been carried out to test the robustness of the results and analyze findings more in detail. Specifically, since the legal status dummy only includes NGOs versus non-NGOs, we want to see whether the results hold for more specific groups of MFIs. Table 6 presents split-sample regressions, where the main regressions are repeated for different MFI types. We distinguish between all MFIs, NGOs, cooperatives, and the category BANK, consisting of banks, non-bank financial institutions, and state banks. The results, shown in Table 6, reconfirm that, in general, more women clients are associated with a lower PaR30 (Panel A), lower write-offs (Panel B), and lower provision expenses (Panel C), but that the effects are more pronounced for NGOs and cooperatives than for banks.

Outliers may be driving the statistical results. While obvious outliers have been omitted from all analyses, we want to see whether the results remain stable when enforcing tougher procedures for treating outliers. Table 7 presents an outlier robustness check, where the main analyses are repeated for the sample and observations below the fifth and above the 95th percentile for the repayment variables have been dropped. As can be seen, the coefficients of

the proportion of female clients are -0.05, -0.03, and -0.03, respectively, for the PaR30, write-off, and provision expense regressions, similar to the previous analyses.⁶

Finally, in Table 8 we repeat some of the main analyses, using Tobin's truncated regressions to account for the fact that the bulk of observations for the repayment variables often lie within a very specific range and could therefore be considered dependent variables truncated above and below certain threshold values. As can be seen from Table 8, coefficients for the gender variables remain negative, with similar confidence levels and values.

< Insert "Table 6. Split-sample regressions for different organizational types" around here >

< Insert "Table 7. Robustness check for outliers" around here >

< Insert "Table 8. Tobit truncated regressions" around here >

5. CONCLUSIONS

This paper uses a large global data set covering 350 MFIs in 70 countries to test for gender effects on MFI repayment performance. This is important, given the undocumented popular belief that women honor their microfinance loans more readily than men. As far as we know, no rigorous worldwide empirical study has been devoted to this issue. Repayment behavior is studied through a variety of measures, such as the portfolio at risk, loan loss write-offs, and provisions. Gender is studied through the proportion of female clients, as well as a dummy variable that indicates whether the MFI has a female gender bias in its lending policies. To test our hypotheses, panel data regression techniques such as OLS, pooled random effects

(RE), and fixed effects vector decomposition (FEVD) are applied. In addition, several tests have been carried out to test the robustness of the results.

Our findings indicate that MFIs with higher proportions of female borrowers have lower *portfolio at risk* and lower *write-off* rates. A dummy variable indicating whether the MFI has a conscious gender bias toward women yields similar results. Using loan loss *provisions* as an alternative dependent variable also yields similar results. The combined findings provide compelling evidence that focusing on female clients enhances MFI repayment performance and that women in general are better credit risks. Interaction terms further reveal that the positive association between female focus and repayment is particularly strong for NGOs, individual lenders, and regulated MFIs. This suggests a number of mechanisms through which female repayment rates are actively being reinforced. For example, NGOs are more likely to adopt specific gender policies in their design of financial products, repayment modalities, and operational procedures. Likewise, individual-based lending offers interesting opportunities to offer personalized services and better monitoring. The result that regulation impacts on the gender–repayment relation can be indicative of coercive enforcement methods to which women are more responsive.

The results have important implications, for both the microfinance industry and gender policy. This paper confirms policymakers' and practitioners' long-standing argument that women are, on average, good credit risks for MFIs. Despite women's lower objective creditworthiness, they repay their loans better than male clients. This suggests that it may be worthwhile for MFIs to target women in order to reduce credit-risk. However, the univariate findings reported in Table 2 also illustrate that focusing on female clients is associated with smaller loans and lower Operational Self Sufficiency (OSS). Thus, despite women's better repayment

behavior, lending to women might not be the best business case for MFIs. Further research is thus needed to assess the overall economic impact for the MFI of focusing on female clients. Such research should go beyond the gender–repayment relation and look into how focusing on women can influence different MFI outcomes such as cost structures, profitability, funding structures, and MFI governance.

The finding that individual lenders benefit more from focusing on women should motivate researchers to study further how different lending contracts influence MFI performance in general and repayment in particular. This finding should also motivate practitioners to assess whether group loans, which are often not appreciated by the poor, can be replaced with individual loans. Likewise, the finding that NGOs, in terms of repayment performance, benefit more from focusing on women is interesting in the transformation debate, where NGOs are motivated to transform into commercial banks (Ledgerwood and White, 2006).

As far as gender policy is concerned, our findings are mixed. Questions of repayment and MFI performance should not overshadow the more fundamental issue of the well-being of female clients. Higher repayment rates do not necessarily mean improved welfare for women. Microfinance can contribute to female empowerment, but can also lead to the feminization of debt (Mayoux, 2001). Moreover, good repayment performance may not necessarily correspond to client satisfaction but, conversely, can be indicative of debt traps (Cull et al., 2008). As suggested here, improved repayment performance can stem from enforcement practices that are more feared by women than men. The implications of regulation on female repayment should thus be examined more closely.

On a wider scale, future research is needed to analyze in greater detail the reasons for better repayment by women. Is it because they are better in carrying out their businesses or are involved in types of businesses that allow for easier repayment? Is it because they are more

risk averse? Or is it because women honor their contracts more so than men, or that women are easier to monitor and enforce? In addition, given that the microfinance industry is increasingly concerned with the trade-off between financial performance and social mission (Copestake, 2007; Cull et al., 2008; Hudon 2009), it is our belief that the question of gender in this trade-off debate demands particular attention.

As any other study, this paper is not free from data limitations. While we believe that the third-party check related to rating data is a considerable improvement over unmonitored data sources, one could argue that MFIs can influence repayment variables to secure future funds from donors or improved standing with regulators. However, we see no reason why female-focused MFIs should alter their data more than other MFIs. Second, the interaction-analyses could be influenced by non-random selection of specific groups into the dataset. While this influence cannot be fully eliminated, we believe the magnitude and composition of our sample reduce this concern.

ENDNOTES

¹ See www.microcreditsummit.org.

² For some regulated MFIs, the regulator defines the minimum levels of provision, whereas in some countries local tax authorities can impose maximum levels. Most MFIs do, however, define their own final level of risk provisions.

³ For 11 MFIs (3%) we have 5 years of data, for 171 MFIs (49%) we have 4 years of data, for 93 MFIs (27%) we have three years of data, for 21 MFIs (6%) we have two years of data, and for 54 MFIs (15%) we have one observation. Missing values seem to be randomly distributed across the sample, so that we do not expect any bias from missing values.

⁴ It is not surprising that significance levels vary somewhat between estimation methods, given the fact that the different methods require different numbers of parameters to be estimated. Consequently, the number of degrees of freedom can vary substantially over the different methods.

⁵ Besides analyzing the significance of the interaction terms to see whether observed effects differ between categories, one can also analyze the significance for each distinct subgroup by performing a test on the sum of the reference group and interaction group using the delta method. This analysis indicates that the relation between gender and repayment is highly significant for NGOs, regulated MFIs, and individual-based lenders, in line with our other analyses.

⁶ In another unreported outlier–robustness check, we test whether the results remain stable when dropping observations in the lowest quartile for women clients. Again, we obtain similar results. Additionally, a squared term for the proportion of female clients was added to investigate a potential nonlinear relation between gender and repayment. The coefficient of the squared term is always insignificant, and the other terms remain stable.

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Table 1. Summary statistics.

This table presents summary statistics for key variables in our sample. *Q1*, *Q2*, and *Q3* are the first, second, and third quartiles, respectively. *Total assets* are inferred from the balance sheet and measured in \$1,000's. *Loan portfolio* is the total amount of loans outstanding and is measured in \$1,000's. *Clients* is the total number of active credit and savings clients. *Loan size* is the average loan outstanding measured in dollars and defined as the gross outstanding portfolio per client. *Experience* measures the number of years the institution has carried out microfinance activities. *Employers* is the number of full-time employers active in the MFI. *Staff efficiency* is the total number of clients divided by the number of employers. *Loan officer efficiency* is the total number of clients divided by the number of loan officers. *Annual return* is the net result before extraordinary income and expenses, donations, and taxation and is measured in \$1,000's. *Portfolio yield* is the percentage yield on the MFI's total portfolio. *OSS* is measured as operating income divided by operating expenses. *Costs per dollar lent* are operating expenses divided by total loan portfolio. *dumNGO* is a dummy that is 1 if the MFI has an NGO-status and 0 otherwise. *dumRURAL* is a dummy that is 1 if the MFI operates mainly or exclusively in rural areas. *dumGROUP* is a dummy that is 1 if the firm uses mainly group-lending methods. *PaR30* is the portfolio at risk, that is, the part of the loan portfolio over 30 days overdue. *Write-offs* measure the portion of the total loan portfolio that has been written off and therefore accepted as a loss. *Provision expense rate* is the loss loan provision as a percentage of the total loan portfolio. *Conscious gender bias* is a dummy variable equal to 1 if the MFI has a conscious gender bias, and 0 otherwise. *Women clients* is the percentage of the MFI's clients who are female.

	<i>n</i>	<i>Mean</i>	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>St. dev.</i>	<i>min.</i>	<i>max.</i>
General								
Total assets	1,201	6,519	1,036	2,593	6,876	1,470	19	250,000
Loan portfolio	1,217	4,225	752	1,918	4,921	6,222	12	59,700
Clients	1,001	17,111	2,329	5,780	14,625	41,924	113	534,342
Loan size	1,155	787	147	381	886	976	0	28,693
Experience	1,201	9	4	7	12	8	0	84
Employers	1,147	89	24	50	94	140	2	1,842
Staff efficiency	1,138	129	67	108	170	100	2	1,893
Loan officer efficiency	1,083	289	160	239	358	270	5	4,591
Annual return	1,191	209	-14	48	254	701	-3,533	11,800
Portfolio yield	1,147	0.39	0.24	0.34	0.49	0.24	0.02	5.00
OSS	716	1.12	0.95	1.11	1.32	0.38	0.07	2.94
Costs per dollar lent	1,170	0.27	0.14	0.20	0.34	0.20	0.01	0.80
DumNGO	1,201	0.53	0	1	1	0.49	0	1
DumRURAL	1,151	0.27	0	0	1	0.44	0	1
DumGROUP	1,150	0.47	0	0	1	0.49	0	1
Repayment								
PaR30	1,100	0.06	0.01	0.03	0.07	0.10	0.00	0.98
Write-off rate	1,020	0.01	0.00	0.01	0.02	0.10	0.00	0.74
Provision expense rate	1,075	0.03	0.01	0.02	0.04	0.04	-0.06	0.63
Gender								
Conscious gender bias	2,934	0.40	0	0	1	0.49	0	1
Women clients	1,267	0.73	0.55	0.76	1	0.25	0.08	1

Notes: Obvious special cases have been omitted from the analyses. In addition, the influence of outliers has been checked by re-running all analyses where the fifth and 95th percentiles of the variables have been removed. This robustness check is discussed in the text. Both gender variables women clients and conscious gender bias are assumed constant over the sample period.

Table 2. Correlations and univariate statistics.

Panel A reports correlations between gender and repayment variables. Panel B reports median values in classes with a different female focus. Columns 1 to 4 report median values in classes that differ in the proportion of female borrowers. The classes correspond to different quartiles in the distribution of women clients, from very low (women clients < Q1 = 0.55) to low (Q1 = 0.55 < women clients < Q2 = 0.76) to high (Q2 = 0.76 < women clients < Q3 = 1) to very high (women clients > Q4 = 1). Columns 5 and 6 report, respectively, median values for MFIs with and without a conscious gender bias.

Panel A. Correlations

	Women clients	PaR30	Write-off rate	Provision expense rate
Women clients	1			
PaR30	-0.02	1		
Write-off rate	-0.09	0.12	1	
Provision expense rate	-0.14	0.23	0.58	1

Panel B. Univariate statistics

	<i>Women clients</i>				<i>Conscious gender bias</i>	
	<i>Very low</i>	<i>Low</i>	<i>High</i>	<i>Very high</i>	<i>Yes</i>	<i>No</i>
PaR30	0.03	0.05	0.02	0.01	0.02	0.04
Write-off rate	0.01	0.02	0.007	0.004	0.008	0.010
Provision expense rate	0.03	0.02	0.02	0.01	0.02	0.02
Total assets	3,149	1,866	2,506	1,225	1,973	2,648
Portfolio yield	0.30	0.38	0.47	0.40	0.38	0.33
OSS	1.16	1.14	1.11	0.99	1.10	1.12
Loan size	931	525	218	101	157	653
Loan portfolio	2,092	1,457	2,051	878	1,241	1,964
Staff efficiency	102	99	120	112	142	98
Costs per dollar lent	0.18	0.24	0.28	0.22	0.24	0.19

Table 3. Gender and loan repayment.

This table analyzes the impact of gender on loan repayment in terms of *PaR30* (Panel A) and *write-offs* (Panel B). *DumNGO* is a dummy that is 1 if the MFI is an NGO, and 0 otherwise; *DumGroup* is a dummy that is 1 if the MFI provides loans on a group basis (such as village bankers or group lenders), and 0 otherwise; *DumRURAL* is 1 if the MFI operates mainly in rural areas, and 0 otherwise; and *Dum performance pay* is 1 if the MFI pays incentive-based salaries, and 0 otherwise. *HDI* is the human development index. All other variables are defined as in Table 1. *OLS* indicates that pooled OLS was used as the estimation method, *RE* means that a pooled RE model was estimated, and *FEVD* means that the FEVD estimator was used. Robust standard errors clustered at the MFI level are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Repayment in terms of PaR30

Dep. var. PaR30	(1)	(2)	(3)	(4)	(5)	(6)
Gender						
Women clients	-0.05 (0.024)**	-0.08 (0.046)**	-0.09 (0.003)***			
Conscious gender bias				-0.01 (0.012)*	-0.02 (0.012)**	-0.02 (0.001)***
Controls						
Experience	0.002 (0.001)**	0.004 (0.001)**	0.001 (0.001)	0.002 (0.001)***	0.001 (0.001)	0.001 (0.002)
lnTA	-0.01 (0.009)**	-0.01 (0.004)***	-0.01 (0.001)***	-0.01 (0.006)*	-0.01 (0.003)***	-0.01 (0.001)****
Loan size	0.02 (0.016)	-0.02 (0.025)	-0.02 (0.002)***	0.01 (0.015)	0.01 (0.003)	0.00 (0.001)
Portfolio growth	-0.06 (0.021)***	-0.02 (0.006)***	-0.02 (0.002)***	-0.07 (0.018)***	-0.02 (0.005)***	-0.02 (0.002)***
DumNGO	0.00 (0.021)	0.00 (0.021)	0.00 (0.001)	0.02 (0.012)	0.02 (0.012)	0.02 (0.002)
DumGROUP	0.00 (0.015)	-0.02 (0.015)	-0.02 (0.002)***	0.00 (0.012)	-0.02 (0.011)	-0.01 (0.001)
DumRURAL	-0.04 (0.022)**	-0.01 (0.005)*	-0.04 (0.001)***	-0.03 (0.014)**	-0.03 (0.012)**	-0.05 (0.002)***
Staff efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Credit officer efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Dum performance pay	0.01 (0.014)	-0.01 (0.014)	0.00 (0.001)	0.02 (0.011)	0.01 (0.011)	0.02 (0.001)
No. MFIs per country	0.002 (0.001)*	0.002 (0.002)	0.003 (0.001)***	0.002 (0.001)*	0.002 (0.001)*	0.002 (0.001)***
HDI	-0.14 (0.078)**	-0.11 (0.062)***	-0.13 (0.006)***	-0.16 (0.057)***	-0.14 (0.052)***	-0.14 (0.006)***
N	830	830	830	1748	1748	1748
R ²	0.25	0.16	0.95	0.27	0.17	0.92
F-statistic/Wald χ^2	2.41***	205.54***	789.25***	5.21***	57.66***	789.26***
Method	OLS	RE	FEVD	OLS	RE	FEVD

Panel B. Repayment in terms of write-offs

Dep. var. write-off rate	(1)	(2)	(3)	(4)	(5)	(6)
Gender						
Women clients	-0.03 (0.015)***	-0.03 (0.015)***	-0.03 (0.003)***			
Conscious gender bias				-0.01 (0.006)**	-0.01 (0.006)*	-0.01 (0.001)***
Controls						
Experience	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)
lnTA	-0.003 (0.002)**	-0.010 (0.002)***	-0.011 (0.001)***	-0.003 (0.003)**	-0.004 (0.003)**	-0.01 (0.001)****
Loan size	0.00 (0.002)	0.00 (0.004)	0.00 (0.002)	0.01 (0.002)	0.00 (0.003)	0.00 (0.001)
Portfolio growth	-0.04 (0.001)***	-0.01 (0.006)**	-0.01 (0.002)***	-0.05 (0.012)***	-0.03 (0.012)***	-0.03 (0.002)***
DumNGO	0.02 (0.005)***	0.02 (0.005)***	0.02 (0.001)***	0.01 (0.004)***	0.01 (0.003)***	0.01 (0.001)***
DumGROUP	0.00 (0.002)	0.00 (0.007)	0.00 (0.001)	0.01 (0.006)	0.01 (0.006)	0.01 (0.002)
DumRURAL	-0.01 (0.002)*	-0.01 (0.006)	-0.01 (0.001)***	0.00 (0.007)	0.00 (0.003)	0.00 (0.002)
Staff efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Credit officer efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Dum performance pay	0.01 (0.005)	0.00 (0.004)	0.00 (0.001)	0.01 (0.005)	0.01 (0.011)	0.02 (0.001)
No. MFIs per country	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
HDI	-0.02 (0.023)	-0.01 (0.024)	-0.02 (0.006)**	-0.05 (0.026)*	-0.04 (0.026)*	-0.06 (0.006)***
N	773	773	773	1621	1621	1621
R ²	0.36	0.32	0.83	0.22	0.30	0.66
F-statistic/Wald χ^2	6.80***	103.97***	133.31***	2.88***	44.67***	111.19***
Method	OLS	RE	FEVD	OLS	RE	FEVD

Notes: Loan size has been scaled by a factor of 1/1000 to make the coefficients easy to read. To ensure sufficient observations, gender-variables and dummies are assumed constant over the sample-period and missing observations for continuous variables are imputed with mean-values. A number of robustness checks were carried out. We experimented with the gender development index instead of the human development index. DumGROUP was divided into separate dummies for village banking (DumVill) and solidarity groups (DumSol). Finally, we experimented with the inclusion of regional dummies and obtained similar results.

Table 4. Gender and provisions.

We analyze the impact of gender on the loan loss provisions measured in terms of the provision expense rate. *DumNGO* is a dummy that is 1 if the MFI is an NGO, and 0 otherwise; *DumGroup* is a dummy that is 1 if the MFI provides loans on a group basis (such as village bankers or group lenders), and 0 otherwise; *DumRURAL* is 1 if the MFI operates mainly in rural areas, and 0 otherwise; and *Dum performance pay* is 1 if the MFI pays incentive-based salaries, and 0 otherwise. *HDI* is the human development index. All other variables are defined as in Table 1. *OLS* indicates that pooled OLS was used as the estimation method, *RE* means that a pooled RE model was estimated, and *FEVD* means that the FEVD estimator was used. Robust standard errors that are clustered at the MFI level are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. var. provision expense rate	(1)	(2)	(3)	(4)	(5)	(6)
Gender						
Women clients	-0.03 (0.012)***	-0.03 (0.012)*	-0.02 (0.003)***			
Conscious gender bias				-0.01 (0.004)**	-0.01 (0.006)	-0.01 (0.001)***
Controls						
Experience	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.002)
lnTA	-0.001 (0.004)	-0.006 (0.004)*	-0.01 (0.001)***	-0.005 (0.002)***	-0.006 (0.002)***	-0.007 (0.001)****
Loan size	0.00 (0.006)	0.00 (0.005)	0.00 (0.002)	0.00 (0.002)	0.00 (0.002)	0.00 (0.001)
Portfolio growth	-0.02 (0.008)***	-0.01 (0.006)**	-0.01 (0.002)***	-0.02 (0.006)***	-0.01 (0.004)**	-0.01 (0.002)**
DumNGO	0.01 (0.005)*	0.01 (0.005)*	0.01 (0.001)***	0.01 (0.004)*	0.01 (0.004)	0.01 (0.001)***
DumGROUP	0.00 (0.001)	0.00 (0.005)	0.00 (0.001)	0.00 (0.004)	0.00 (0.004)	0.00 (0.002)
DumRURAL	0.00 (0.001)	-0.01 (0.006)	0.00 (0.001)	0.00 (0.005)	0.00 (0.003)	0.00 (0.002)
Staff efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Credit officer efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Dum performance pay	0.01 (0.004)	0.01 (0.004)	0.01 (0.001)	0.01 (0.005)	0.01 (0.011)	0.02 (0.001)
No. MFIs per country	0.001 (0.001)*	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
HDI	-0.04 (0.023)*	-0.03 (0.023)	-0.04 (0.006)***	-0.05 (0.019)****	-0.05 (0.017)***	-0.06 (0.006)***
N	751	751	751	1624	1624	1624
R ²	0.28	0.28	0.77	0.15	0.18	0.59
F-statistic/Wald χ^2	11.86***	134.92***	87.11***	10.08***	56.56***	103.38***
Method	OLS	RE	FEVD	OLS	RE	FEVD

Notes: Loan size has been scaled by a factor of 1/1000 to make coefficients easy to read. To ensure sufficient observations, gender-variables and dummies are assumed constant over the sample-period and missing observations for continuous variables are imputed with mean-values. A number of robustness checks were carried out. We experimented with the gender development index instead of the human development index. DumGROUP was divided into separate dummies for village banking (DumVill) and solidarity groups (DumSol). We experimented with the inclusion of regional dummies and obtained similar results. Finally, we carried out a robustness check where the repayment variable is the sum of PaR30 and the write-off rate, because it is the sum of the two that might indicate the MFI's ability to get loans repaid. Again, the gender variables are negative and significant.

Table 5. Interactions on the relation between gender and repayment.

This table analyzes whether the positive effect of women on repayment differs with *experience*, *legal status*, *activities*, *lending methodology*, or *regulation* by investigating various interaction effects on the percentage of women clients (Panel A) and on the conscious gender bias dummy (Panel B), using RE. *Dum fin.only* is a dummy variable that is 1 if the MFI provides financial services only, and 0 if the MFI is engaged in other activities as well; *Dum Vill* is a dummy that is 1 if the MFI is a village bank, and 0 otherwise; *Dum Sol* is a dummy that is 1 if the MFI provides loans on the basis of solidarity groups, and 0 otherwise; and *Dum regulated* is a dummy variable that is 1 if the MFI is regulated by banking authorities, and 0 otherwise. All other variables are defined as in previous tables. Robust standard errors that are clustered at the MFI level are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Percentage of women clients

Dep. var. PaR30	(1)	(2)	(3)	(4)	(5)	(6)
Women clients	-0.05 (0.038)*	-0.01 (0.055)	-0.05 (0.038)*	-0.04 (0.038)*	-0.11 (0.059)**	-0.08 (0.075)*
(Women clients * experience)	0.01 (0.001)					0.00 (0.001)
(Women clients * DumNGO)		-0.10 (0.064)*				-0.11 (0.067)*
(Women clients * Dum fin.only)			0.01 (0.022)			0.01 (0.023)
(Women clients * Dum regulated)				-0.04 (0.031)		-0.05 (0.032)*
(Women clients * Dum Vill.)					0.09 (0.078)	0.11 (0.080)*
(Women clients * Dum Sol.)					0.06 (0.086)	0.09 (0.088)
<i>Other controls</i>	Added	Added	Added	Added	Added	Added
N	830	830	830	830	830	830
R ²	0.10	0.13	0.11	0.12	0.14	0.23
Wald chi ²	100.15***	102.82***	100.38***	101.68***	104.26***	113.83

Panel B. Conscious gender bias dummy

Dep. var. gender bias	(1)	(2)	(3)	(4)	(5)	(6)
Gender bias	-0.02 (0.012)*	-0.03 (0.021)*	-0.02 (0.021)*	-0.02 (0.014)*	-0.04 (0.020)**	-0.06 (0.036)**
(Gender bias * experience)	0.00 (0.004)					0.00 (0.004)
(Gender bias * DumNGO)		-0.02 (0.023)*				-0.03 (0.014)*
(Gender bias * Dum fin.only)			0.01 (0.021)			0.01 (0.021)
(Gender bias * Dum regulated)				-0.06 (0.024)*		-0.03 (0.015)**
(Gender bias * Dum Vill.)					0.05 (0.027)**	0.05 (0.028)**
(Gender bias * Dum Sol.)					0.03 (0.030)*	0.03 (0.031)*
<i>Other controls</i>	Added	Added	Added	Added	Added	Added
N	1748	1748	1748	1748	1748	1748
R ²	0.16	0.16	0.16	0.16	0.16	0.18
Wald chi ²	67.49***	67.82***	67.04***	65.12***	69.76***	68.24***

Table 6. Split-sample regression for different organizational types.

We regress repayment on the gender variables for different MFI types using pooled OLS. We distinguish between all MFIs, NGOs, cooperatives, and the category BK/NBFI/SB, which comprises banks, non-bank financial institutions, and state banks. Repayment is measured by the PaR30, write-offs, and the provision expense rate in Panels A, B, and C, respectively. Robust clustered standard errors are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Repayment in terms of PaR30								
Category	ALL		NGO		COOP		BK/NBFI/SB	
PaR30	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Women clients	-0.05 (0.024)**		-0.09 (0.063)***		-0.07 (0.129)		-0.01 (0.031)	
Conscious gender bias		-0.01 (0.012)*		-0.01 (0.013)*		-0.04 (0.025)**		-0.03 (0.022)*
Other controls	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>
Time dummies	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>
N	830	1748	606	1112	72	142	224	636
R ²	0.25	0.27	0.31	0.34	0.96	0.86	0.83	0.36
F-stat	2.41***	5.21***	7.47***	4.97***	NA	NA	5.14***	2.28***

Panel B. Repayment in terms of write-offs								
Category	ALL		NGO		COOP		BK/NBFI/SB	
Write-off rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Women clients	-0.03 (0.015)***		-0.05 (0.022)***		-0.04 (0.013)**		-0.01 (0.019)	
Conscious gender bias		-0.01 (0.006)**		-0.01 (0.008)**		-0.01 (0.002)***		0.00 (0.004)
Other controls	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>
Time dummies	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>	<i>Added</i>
N	773	1621	556	1032	72	142	217	589
R ²	0.36	0.22	0.44	0.26	0.92	0.89	0.22	0.17
F-stat	6.80***	2.88***	8.77***	3.32***	NA	NA	5.47***	8.34***

Panel C. Repayment in terms of provision expense rate								
Category	ALL		NGO		COOP		BK/NBFI/SB	
Prov. expense rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Women clients	-0.03 (0.012)***		-0.03 (0.018)***		-0.03 (0.238)		-0.05 (0.015)***	
Conscious gender bias		-0.01 (0.004)**		-0.01 (0.005)		-0.02 (0.006)***		-0.01 (0.007)
Other controls	Added	Added	Added	Added	Added	Added	Added	Added
Time dummies	Added	Added	Added	Added	Added	Added	Added	Added
N	751	1624	537	993	62	132	214	631
R ²	0.28	0.15	0.30	0.20	0.93	0.65	0.40	0.15
F-stat	11.86***	10.08***	3.50***	4.31***	NA	NA	5.46***	4.82***

Table 7. Robustness check for outliers.

We regress repayment in terms of PaR30, write-off rate, and provision expense rate on women clients and conscious gender bias, controlling for other factors, using pooled OLS. Observations below 5% and above 95% for repayment variables are dropped. Robust clustered standard errors are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dep. var.	PaR30		Write-off rate		Provision expense rate	
	(1)	(2)	(3)	(4)	(5)	(6)
Women clients	-0.05 (0.025)**		-0.03 (0.013)***		-0.03 (0.012)***	
Conscious gender bias		-0.01 (0.008)**		-0.01 (0.004)*		-0.01 (0.004)*
Experience	0.002 (0.001)*	0.002 (0.001)***	0.001 (0.001)	0.001 (0.001)	0.00 (0.001)	0.00 (0.001)
LnTA	-0.005 (0.006)*	-0.002 (0.004)	-0.003 (0.002)	-0.003 (0.002)*	-0.004 (0.004)	-0.003 (0.004)
Loan size	0.01 (0.010)	0.00 (0.006)	0.00 (0.002)	0.00 (0.002)	0.00 (0.006)	0.00 (0.004)
Portfolio growth	-0.03 (0.016)**	-0.05 (0.012)***	-0.004 (0.009)***	-0.03 (0.006)***	-0.02 (0.007)***	-0.02 (0.007)***
DumNGO	0.02 -0.008	0.02 (0.008)**	0.02 (0.005)***	0.01 (0.003)**	0.01 (0.004)**	0.01 (0.004)***
DumGROUP	0.00 (0.012)	0.00 (0.001)	0.00 (0.001)	0.00 (0.005)	0.00 (0.005)	0.00 (0.005)
DumRURAL	-0.03 (0.015)**	-0.03 (0.009)***	-0.01 (0.005)*	0.00 (0.007)	0.00 (0.002)	0.00 (0.002)
Staff efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Credit officer efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Dum performance pay	0.01 (0.011)	0.02 (0.008)	0.004 (0.004)	0.01 (0.005)	0.01 (0.011)	0.01 (0.011)
HDI	-0.10 (0.048)***	-0.07 (0.035)**	-0.03 -0.029	-0.02 (0.012)**	-0.05 (0.018)**	-0.06 (0.042)***
N	808	1680	772	1600	736	1598
R ²	0.2	0.32	0.36	0.24	0.19	0.19
F-stat	3.98***	7.75***	5.34***	5.25***	18.70***	18.74***

Table 8. Tobit truncated regressions.

We regress repayment in terms of PaR30, write-off rate and provision expense rate on women clients and conscious gender bias, controlling for other factors, using Tobit truncated regressions. Robust clustered standard errors are provided in parentheses. Time dummies are included in all regressions. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dep. var.	PaR30		Write-off rate		Provision expense rate	
	(1)	(2)	(3)	(4)	(5)	(6)
Women clients	-0.04 (0.013)***		-0.03 (0.016)**		-0.03 (0.012)***	
Conscious gender bias		-0.01 (0.011)*		-0.01 (0.005)*		-0.01 (0.005)***
Experience	0.002 (0.001)*	0.002 (0.001)***	0.001 (0.001)	0.00 (0.003)	0.00 (0.001)	0.00 (0.002)
lnTA	-0.01 (0.008)*	-0.001 (0.005)	-0.002 (0.001)	-0.001 (0.002)	-0.002 (0.004)	-0.005 (0.002)**
Loan size	0.01 (0.013)	0.01 (0.013)	0.00 (0.005)	0.00 (0.002)	0.00 (0.006)	0.00 (0.003)
Portfolio growth	-0.05 (0.019)**	-0.06 (0.016)***	-0.05 (0.011)***	-0.05 (0.012)***	-0.02 (0.007)***	-0.02 (0.006)***
DumNGO	0.01 (0.018)	0.02 (0.011)	0.02 (0.007)***	0.01 (0.005)***	0.01 (0.004)**	0.01 (0.004)
DumGROUP	0.00 (0.014)	0.00 (0.012)	0.00 (0.001)	0.01 (0.005)	0.00 (0.005)	0.00 (0.003)
DumRURAL	-0.04 (0.019)***	-0.03 (0.012)**	-0.01 (0.006)	0.00 (0.007)	0.00 (0.002)	0.00 (0.004)
Staff efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Credit officer efficiency	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
Dum performance pay	0.01 (0.013)	0.02 (0.010)	0.01 (0.007)	0.01 (0.005)	0.01 (0.011)	0.01 (0.003)
No. MFIs per country	0.002 (0.001)*	0.002 (0.001)*	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)	0.00 (0.001)
HDI	-0.13 (0.069)***	-0.14 (0.053)***	-0.02 (0.029)*	-0.05 (0.025)**	-0.05 (0.023)**	-0.05 (0.017)***
N	830	1748	773	1621	751	1624
Pseudo-R ²	0.12	0.18	0.16	0.11	0.08	0.05
F-stat	15.85***	15.95***	3.86***	3.99***	6.26***	4.04***

Appendix A.

Distribution of the Sample across Countries

For each country we report the number of MFIs, NGOs, cooperatives (COOPs), and banks.

<i>Country</i>	<i>MFIs</i>	<i>NGOs</i>	<i>COOPs</i>	<i>Bank/NBFI/state bank</i>
Albania	3	1	0	2
Argentina	1	0	0	1
Armenia	3	2	0	1
Azerbaijan	6	0	0	6
Bangladesh	2	2	0	0
Benin	6	4	1	1
Bolivia	15	13	0	2
Bosnia Herzegovina	11	11	0	0
Brazil	13	11	1	1
Bulgaria	2	0	1	1
Burkina Faso	3	0	3	0
Cambodia	12	1	0	11
Cameroon	4	0	0	4
Chad	1	0	1	0
Chile	2	0	1	1
China	1	1	0	0
Colombia	6	6	0	0
Croatia	1	1	0	0
Dominican Republic	4	3	0	1
East Timor	1	0	0	1
Ecuador	15	8	7	0
Egypt	5	5	0	0
El Salvador	4	2	0	2
Ethiopia	9	0	0	9
Gambia	1	0	1	0
Georgia	6	5	0	1
Ghana	3	2	0	1
Guatemala	5	5	0	0
Guinea	1	0	0	1
Haiti	1	1	0	0
Honduras	9	4	2	3
India	31	24	3	4
Indonesia	2	1	0	1
Jordan	3	1	0	2
Kazakhstan	4	0	0	4
Kenya	9	4	0	5
Kosovo	2	1	0	1
Kyrgyzstan	3	1	1	1
Madagascar	1	0	1	0
Malawi	1	0	0	1

Mali	1	0	1	0
Mexico	17	10	1	7
Moldova	2	0	0	2
Mongolia	2	0	0	2
Morocco	5	5	0	0
Mozambique	1	0	0	1
Nepal	5	2	0	3
Nicaragua	10	7	1	2
Nigeria	3	2	0	1
Pakistan	1	1	0	0
Paraguay	1	0	0	1
Peru	28	12	3	13
Philippines	7	6	1	0
Romania	1	0	0	1
Russian Federation	15	3	10	2
Rwanda	1	0	0	1
Senegal	5	0	4	0
Serbia	1	1	0	0
South Africa	3	1	0	2
Sri Lanka	1	1	0	0
Tajikistan	5	4	0	1
Tanzania	4	3	0	1
Togo	1	1	0	0
Trinidad and Tobago	1	0	0	1
Tunisia	1	1	0	0
Uganda	10	4	0	6
Vietnam	1	1	0	0
Yugoslavia	4	2	0	2
Zambia	1	0	0	1
Total	350	187	44	119