

# Women and Repayment in Microfinance\*

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## Abstract

This paper analyzes gender-differences with respect to microfinance repayment-rates using a large global dataset covering 350 Microfinance Institutions (MFIs) in 70 countries. The results indicate that *more* women clients is associated with *lower* portfolio-at-risk, *lower* write-offs, and *lower* credit-loss provisions, ceteris paribus. These findings confirm common beliefs that women in general are a better credit-risk for MFIs. Interaction effects reveal that the effect is stronger for NGOs, individual-based lenders, 'finance plus'-providers and regulated MFIs. This indicates that two types of MFIs benefit more than others from focussing on women: First, those MFIs that develop hands-on, women-friendly procedures tailored to individual women's need, and Second, those MFIs that apply coercive enforcement methods to which women are more responsive.

**Key-words:** Microfinance, Gender, Repayment, Portfolio-at risk, Write-offs, Provisions

**JEL-classification codes:** O10,O12

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\* All remaining errors remain our own responsibility.

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## 1. Introduction

Microfinance, financial services tailored for poor people, has been celebrated for its ability to reach out to women and enhance their welfare. From the starting point of experimental schemes in Asia and Latin America in the 1970ties microfinance has been above all a matter of women. Even today, the gender argument continues to be at the forefront. 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]<sup>2</sup>. When the Nobel Prize was awarded to Mohammad Yunus and the Grameen Bank the Nobel committee highlighted the role of microcredit in women liberation (Norwegian Nobel Committee, 2006).

Among many Morduch (1999) argues that one of the main reasons for the success of microfinance in the public eye is because the targeting of women. Indeed, Micro Finance Institutions (MFIs) do target women. In this study’s dataset covering 350 MFIs from 70 countries women represent 73% of microfinance customers on average. This figure is close to what has been found in previous literature (see for instance Cull et al. 2007; Daley-Harriss 2007: among others).

Another strong appeal of microfinance is the success of achieving high repayment records. From an historical perspective this is not surprising. After all, modern microfinance was born as a response to the frustrated development resulting from subsidised rural credit in the 1950s-1980s. For example, Hulme and Mosley (1997) report default rates of up to half the loan amount on small loans in Indian state banks in the late 1980’s. In addition to the use of group collateral (Ghatak and Guinnane, 1999) and dynamic incentives like sequential loans (Aghion and Morduch, 2003), the targeting of women has been put forward as a main determinant of

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<sup>2</sup> <http://www.microcreditsummit.org/>

microcredit repayment. In this paper we test this assertion empirically: Do MFIs targeting women experience higher repayment rates than other MFIs?

The assertion of women being good credit risks is regularly put forward by microfinance advocacy networks and sponsors. For example ever since its first report in 1997 the Microcredit Summit reports that “*women are consistently better in promptness and reliability in payment*” (Result 1997:8). The argument is repeatedly taken up by bilateral and multilateral development aid agencies, including the World Bank “[...] *experience has shown that repayment is higher among female borrowers, mostly due to more conservative investments and lower moral hazard risk*” (World Bank 2007: 124). Armendariz and Morduch (2005, p. 139 *sq*), when they assess the different techniques to reduce repayment defaults, consider targeting women as a technique in its own right alongside group lending or dynamic incentives.

Strangely, the question of the link between the efficiency of the MFI and the targeting of women has barely been rigorously studied and the existing empirical evidence is mixed. Sponsors seem to evoke the repayment argument without ever furnishing it with empirical evidence. Beside a lot of anecdotic evidence as well as the analysis of one or two MFIs in a given country (see for instance Khandker et al., 1995 in Bangladesh or Kevane and Wydick, 2001 in Guatemala) no paper of which we know has provided a detailed empirical analysis of the gender-repayment issue within an international and longitudinal context.

This paper makes use of a global dataset spanning 350 MFIs in 70 countries over 10 years to study whether the targeting of female customers significantly influences the MFIs’ repayment rates. Repayment is being studied through a wide variety of measures such as *portfolio-at-risk*, *write-offs* and *loan-loss provision expenses*. Thereby, we take into account the specific methodological problems related to this type of estimation such as a. isolating the gender-effect from other MFI or institutional effects influencing repayment and b. the time-invariant

nature of many covariates. The paper thus claims to be the first rigorous global empirical study searching for evidence to the argument put forward that women are a good credit risk for the MFI.

The findings indicate that *more* women clients is significantly associated with *lower* portfolio-at-risk and *lower* portfolio write-offs, after properly controlling for a number of MFI-specific factors as well as institutional factors. The gender-effects, which are not only statistically significant, but are also economically relevant, indicate that women in general are indeed a better credit risk for the MFI. Additionally, MFIs with more women clients carry *less* loan-loss provisions *ceteris paribus*, providing additional evidence that focus on women significantly reduces the MFI's perceived credit-risk.

Looking at the issue more in detail, interaction effects indicate that the positive repayment effect is particularly strong for certain categories of MFIs. Specifically, NGOs, individual-based lenders, 'finance-plus'-providers and regulated MFIs seem to benefit more actively from focussing on women. This suggest that, although there is a consistent overall positive impact of female clients on repayment, two types of MFIs are able to benefit even more from focusing on women: a. MFIs who have developed individual women-friendly procedures tailored to women's needs and b. MFIs facing regulatory constraints and who might use coercive enforcement methods to which women are more sensitive. These findings might be of interest to policymakers and practitioners concerned with MFI-development and repayment.

The rest of this paper proceeds as follows. A brief literature review on women and microfinance is put forward in section 2 followed by section 3 where the literature on gender and repayment is reviewed and the specific hypotheses to be tested are laid out. Section 4 explains the dataset and the statistical methodologies employed while section 5 reports the findings. Section 6 concludes and presents the main implications of this study.

## **2. Women and microfinance**

Various arguments that relate to both *supply* and *demand* for microcredit can explain the targeting of women by microfinance organisations (Armendariz and Morduch 2005; Mayoux 1999; World Bank 2001; World Bank 2007).

Firstly, *demand* for microfinance services is probably higher among women for a number of reasons. In many countries, women are more credit constrained than men. They are more restricted in their access to finance and control over land (Agarwal 1994) and capital (Fletschner 2009). Consequently they are considered less creditworthy by traditional banks. Lower education levels, as well as limited time and mobility also prevent them from engaging with the complex and lengthy procedures usually requested by the formal banking sector. Social norms are another factor: restrictions exerted by in-laws (in many countries the financial dependence of women is fully integral to patriarchy) combine with discrimination from bank staff. In some countries women do not even have the legal right to open a bank account.

Gender aspects of the labour market are a second cause. A growth in the numbers of women in self-employment and entrepreneurial activities explains increased demand for microcredit (Armendariz and Morduch 2005; Kevane and Wydick, 2001). Moreover, women are more likely to pay the high interest rates required by many MFIs since they are more restricted in their access to the formal labour market (Emran et al. 2006).

As far as *supply* is concerned, three main arguments are usually put forward by donors or practitioners in favour of targeting women: gender equality, poverty reduction and efficiency (Mayoux 2001). With respect to gender equality, microfinance is considered an effective means to promote the empowerment of women. Drawing on the findings of household

economics developed over the last three decades<sup>3</sup>, it is suggested that gender inequalities result in great part from inequalities in bargaining power in the context of decision-making within the household. It is also suggested that women's weaker bargaining power results from their smaller contribution (real or perceived) to household cash flows and to market-based income generating activities. By enabling women to develop or strengthen income generative activities, microfinance is likely to increase their monetary income, their control over their income and their bargaining power. These effects are then expected to lead to various social, psychological and even political effects which are mutually reinforcing: better self-esteem and self-confidence, improvement in status within the family and the community, better spatial mobility and visibility of women in public spaces, etcetera.

As far as poverty reduction and efficiency is concerned, it is argued that women invest their income to nurture the well being of their families— and this is supported by various empirical studies conducted all over the world<sup>4</sup>: therefore one dollar loaned to a woman has greater development impact than one dollar loaned to a man (World Bank 2007 p. 165).

### **3. Gender and repayment**

The relation between gender and repayment has been analyzed in a number of studies. However, the evidence is mixed and usually anecdotic or very limited in geographical and/or institutional scope. On the one hand, a number of studies find that women consistently outperform men in terms of repayment. For instance, Armendariz and Morduch (2005) report that in its initial faze the Grameen Bank also included men as customers. However, the bank decided to move over to a nearly full concentration on women due to repayment problems related to male customers. In a first empirical investigation, Hossain (1988) reports that in Bangladesh 81 percent of women encountered no repayment problems compared to 74

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<sup>3</sup> See for instance Sen (1990).

<sup>4</sup> See for instance Chant (1985); Kabeer (1997); Haddad et Hoddinod (1995); Senauer (1990); Thomas (1990).

percent of men. Similarly, Khandker et al. (1995) find that 15,3 percent of Grameen's male borrowers had repayment problems compared to only 1,3 percent of the women. Also from Bangladesh, Sharma and Zeller (1997) report that credit groups with higher percentage of women had significantly better repayment rates. From Malawi, Hulme (1991) reports that 92 percent of women pay on time, compared to 83 percent for men, and Gibbons and Kasim (1991) find that in Malaysia 95 percent of women repay their loans compared to 72 percent of the men. Finally, in a study from Guatemala Kevane and Wydick (2001) report that female credit groups performed better than male groups.

On the other hand, a number of studies find that there is no significant relation between gender and repayment. In Bangladesh, the analysis carried out by Godquin (2004) shows that correlation between gender and repayment is positive but not significant after controlling for a number of MFI-specific effects. In a study reporting from four of the oldest microfinance programs in the US Bhatt and Tang (2002) find that gender is in fact not a significant determinant for loan repayment. The work done in Ethiopia by Brehanu and Fufa (2008) leads to similar conclusions. Finally, BRI, a most reputed MFI in Indonesia, has never had any specific focus on women, but still it has achieved nearly perfect repayment rates over several years (Aghion and Morduch, 2005, p. 139). So in spite of popular belief, perhaps the women repayment argument is not as clear cut as promoters seem to believe?

When it comes to theory, a number of arguments have been put forward to explain gender-differences with respect to repayment rates (Armendariz and Morduch 2005). 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. Also from Bangladesh, Rahman (2001) and Goetz and Gupta (1996) argue that women are more easily influenced by peer-pressure and the interventions of the loan-managers. For matters pertaining to reputation and honor, women are believed to be

more sensitive to verbal hostility on the part of the loan-manager, while men are able to default with a sense of impunity.

Another argument put forward is that female customers tend to stay closer to their homes rather than going out to work. They can therefore be more easily monitored and followed up by the MFI (Aghion and Morduch, 2005; Goetz and Gupta 1996). Aghion and Morduch (2005) also argue that since men can more easily access credit in other formal or informal channels, women have more at stake when enrolling in a credit-program. They thus have to repay to ensure continued access to credit. Ameen (2004) argues that women have a lower opportunity cost of time than men making their time less valuable than for their male-counterparts. As a result, they are more inclined to have more contact with the MFI (including group-meetings, meetings with loan-officers) which altogether has a positive impact on their repayment. Goetz and Gupta (1996) suggest that women may have a higher incentive than men for loan repayment since it allows them to retain access to village groups, whereas men have many more opportunities for social contact.

However, theoretical counter-arguments of women being better credit risk can also be put forward. For instance, Philips and Bhatia-Panthaki (2007) argue that women entrepreneurs tend to be over-represented in traditional sectors with relatively lower profits, fewer growth opportunities and harsher competition. This should make them *less* able to honour credit contracts. Somewhat in line with this argument, various studies point out that many women borrowers don't have any control over their own microcredit: loans are in fact used and controlled by men within the household (Goetz and Gupta 1996; Rahman 1999; Kabeer 2001; Mayoux 2001; Montgomery et al. 1996). This could have a negative impact on women repayment-rates. The previous discussion shows that the relation between gender and repayment remains largely unresolved.

Based upon the arguments put forward in the above literature review we propose the following main hypothesis:

*H1. The proportion of female customers in an MFI has a negative impact on its default rates.*

The proportion of portfolio overdue with more than 30 days (*portfolio-at-risk*) and the percentage of the loan portfolio that is written-off because of non-repayment (*write-off ratio*) are used as proxies for the default rate.

For robustness, we also analyze the relation between gender and the perceived credit-risk directly as follows:

*H2. The proportion of female customers in an MFI has a negative impact on its perceived credit risk.*

We use *loan-loss provisions* (measured in terms of the provision expense rate) as an indicator of the MFI's perceived credit risk<sup>5</sup>.

The impact of women on repayment might be more prevalent in certain categories of MFIs or be more prevalent under certain conditions. In other words, while the previous hypotheses investigate whether gender influences repayment *in general*, we also want to provide a more detailed analysis by looking whether the gender-repayment relation differs for certain categories or features of the MFI. Therefore, we analyze whether the effect differs with *experience, legal status, activities, lending methodology and regulation*.

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<sup>5</sup> For some of the regulated MFIs the regulator defines minimum levels of provisions while in some countries the local tax authorities may indicate maximum levels. Most MFIs do however themselves define their final level of risk provisions.

*a. MFI experience*

Experience might be a variable influencing the gender-repayment relation. For instance, MFIs might adapt their internal procedures and rules as they gain more experience over time. Similarly, more experienced staff members might influence customers' repayment behavior. Therefore we expect that the gender-repayment relation might differ with MFI-experience which can be described by following hypothesis:

*H3a. The impact of the proportion of female borrowers on repayment differs with MFI-experience.*

*b. Legal status*

Gender-differences with respect to repayment might differ with the MFI's legal-status. For instance, non-profit organizations like NGOs have broader objectives and governance forms that make them more likely to service efficiently marginalized customers like women (Mersland, 2009). As a result, they are also more likely to develop specific gender policies which might influence the relation of gender on repayment. Therefore, the following hypothesis can be derived:

*H3b. The impact of the proportion of female borrowers on repayment differs with the MFI's legal status.*

*c. Activities*

The different activities that an MFI is involved in might have an impact on the gender-repayment relation. For instance, the provision of non-financial services alongside microfinance – often referred to as 'microfinance plus' - like health services and basic literacy

training (Godquin 2004), or business training (Khandker et al. 1995) could improve repayment performance. As suggested by Edgcomb and Barton (1998) non-financial services not only improve the economic ability of the borrower to repay but also the quality of the relationships between MFIs and their clients, helping to strengthen trust and confidence. MFIs providing non-financial services normally do so in order to service poorer and more marginalized customers (Lensink and Mersland, 2009). It also argued that that women more readily accept non-financial services, whilst also needing them more (Armendariz and Morduch 2005; Mayoux 2001). In conclusion, the impact of gender on repayment might be influenced by the MFI's activities which can be described by the following hypothesis:

*H3c. The impact of the proportion of female borrowers on repayment differs with the MFI's activities.*

*d. Lending methodology*

MFIs employ different lending methodologies such as *village-banking*, *solidarity groups* or *individual-based* lending (Sharma and Zeller, 1997; Kevane and Wydick, 2001). The relation between gender and repayment might differ with the lending methodology that is being used. Group lending is usually considered as a 'female' method: women would accept more easily to join groups and to spend time in group meetings. But the group-lending methodology as such is more and more criticized (Harper 2007) and recently MFIs switch towards individual-based methods. Indeed, there is no clear evidence that group-lending lead to better repayment for women<sup>6</sup>. Individual-based lending methodologies might give a more personal monitoring and direct enforcement which could influence the repayment rates for either male or female

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<sup>6</sup> Some studies focused on group lending and repayment have paid a specific attention to gender (see for instance Sharma & Zeller (1997); Wydick et al. (1999); Kevane & Wydick 2001). But in many studies it is not an issue since all or almost all borrowers are women. See for instance Paxton et al. (2000); Karlan & Giné (2006); Karlan (2007); Cassar & al. (2007). There is no information about gender in Alhin & Townsend (2007).

borrowers. In conclusion, the gender-repayment relation might be influenced by the MFI lending methodology described by the following hypothesis:

*H3d. The impact of the proportion of female borrowers on repayment differs with the MFI's lending methodology.*

#### *e. Regulation*

Regulated MFIs are monitored by banking authorities. Regulation sometimes leads to a “mission drift” if demands to fulfil requirements divert attention away from serving the poor (e.g. by shifting the focus from serving poor clients to improve capital adequacy ratios). Similarly, regulation may hold back innovation in lending technology that has been the driving force behind MFIs' ability to expand outreach and serve poor clients (Dichter, 1997, Hardy et al., 2003). Alternatively, regulated MFIs might have more pressure on behalf of the regulating authority than non-regulated ones, which could have an influence on their gender and repayment-strategies. As a result, the effect of gender on repayment might differ between regulated and unregulated MFIs as described by the following hypothesis:

*H3e. The impact of the proportion of female borrowers on repayment differs between regulated and non-regulated MFIs.*

## **4. Data and estimation methods**

### *4.1 Data and summary statistics*

We use observations of 350 rated MFIs from 70 countries. Specialized rating agencies perform the assessment reports. A main motive behind submitting to a rating is the potential access to external funding from investors. A major advantage of the assessment reports is that

they are worked out by a third-party and cover a wide range of organizational features alongside financial data and social and financial indicators. For example the dataset contains information on both conscious gender bias towards women and proportion of customers being female in order to study the gender-issue. At each rating four years of data are obtained, at best. The ratings are performed in the period 2001 to 2008, which means that we have data from 1998 to 2008. Most data are from the period 2001 to 2006.

No dataset is perfectly representative of the microfinance field. In particular, our dataset contains relatively fewer of the mega-sized MFI, and it does not cover the virtually endless number of small savings and credit cooperatives. The former are rated by such agencies as Moody's and Standard and Poor, while the latter are not rated.

Different inflation rates in 70 countries make comparisons difficult for all monetary variables. We solve this by converting the monetary variables into USD amounts at the going exchange rate. From the purchasing power parity theorem of international finance (Solnik and McLeavy, 2003), the conversion into USD implies that the local inflation has been adjusted for.

In table 1 we report *mean, standard deviation, minimum, maximum* and *quartiles* for a number of key-variables for our sample. We see that the average MFI has total assets of \$ 6,519,000; a total loan portfolio of \$ 4,225,000; serves 17,111 clients and has 9 years of experience in the sector. The average loan size is \$787 dollar and annual net results are \$209,000. The portfolio yield is 0.39 on average and the OSS is 1.12 indicating that net income exceeds operating expenses on average.

Looking at the repayment-variables, we see that PaR30 equals 0.06 on average which means that 6% of the total loan portfolio is 30 days or more on arrear. However, the median value is only 3%, which indicates that the distribution is somewhat skewed with a number of MFIs having high values for PaR30. On average, write-offs are around 1% of total loan portfolio

and the median value is also 1%. The provision expense rate is 0.03 on average, which means that provisions are held for 3% of the total loan portfolio.

For the gender variables, we see that on average, MFIs have 73% women clients, indicating that there is in general a substantial focus on women within our sample. Moreover, the 75<sup>th</sup> percentile in the distribution of female clients is 1, indicating that at least 25% of the MFIs focus *exclusively* on women. The dummy on conscious gender bias indicates that around 40% of the MFIs report to have a conscious bias towards women.

< Insert 'Table 1. Summary statistics' around here >

In Table 2 we report the correlation matrix of the gender and repayment variables (Panel A) as well as discrete *mean* values for some key-variables in different classes of proportion of female borrowers. 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). Although this is only a univariate correlation, this is a first indication that MFIs who have more female borrowers obtain better repayment rates (hypothesis 1). Additionally, the correlation between the proportion of female borrowers and the provision expense rate is also negative (-0.14) which provides a first indication that MFIs who have a higher proportion of female clients carry less provisions and therefore are potentially a better credit risk (hypothesis 2).

In Panel B, we analyze *mean* values for a number of key variables in classes that differ in their proportion of female borrowers going from 'very low' to 'very high'. The different cut-off points for the classes correspond to the quartiles in the distribution of the proportion of female clients. As can be seen from Panel B, mean PaR30 is 0.03 and 0.05 for the classes 'very low' and 'low', respectively. This is higher than for the classes 'high' (0.02) and 'very high' (0.01). Mean write-offs are also somewhat lower in the classes 'high' (0.007) and 'very

high' (0.004) when compared to the classes 'low' (0.02) and 'very low' (0.01). Again, this seems to support the findings of the correlation matrix that higher proportion of female borrowers is associated with lower portfolio-at-risk and lower loan-loss write-offs.

For the provision expense rate we see that the mean values are lower in the classes 'high' and 'very high' indicating that MFIs with more female clients carry less provisions. This supports our second hypothesis that female clients are perceived as better credit risk.

< Insert 'Table 2. Univariate statistics' around here >

#### 4.2 Estimation methods

To test our hypotheses, we use panel data regression techniques where the independent variables are the proportion of female borrowers and a wide variety of MFI-specific and institutional controls. This enables us to quantify the impact of the proportion of female borrowers on the different repayment-variables while holding constant other variables that potentially affect repayment. For instance, to test hypothesis 1, we regress PaR30 on the proportion of female borrowers, controlling for a wide range of MFI-specific factors as well as institutional factors as follows:

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

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*, *rural/urban market activity* etc, and  $X_{i,t}$  is a matrix of controls that capture the conditions of country  $C$  in which the MFI is active.

Two important methodological issues surrounding this kind of estimation require close attention<sup>7</sup>. Firstly, it is important that all control variables that potentially affect repayment should 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, the OLS-estimates could be biased as a result of omitted variables bias (see for instance Stock and Watson, 2007, p.186). While we take up controls for a wide variety of MFI-specific and institutional factors, it is possible that some *unobserved* factors related to both repayment and proportion of female borrowers could cause the OLS-estimates to be inconsistent and potentially biased. Therefore, besides OLS-estimates we also analyze pooled random coefficients models (*RE*) that takes up a MFI-specific unobserved effect 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  $\mu_i$  is the unobserved MFI-specific effect. The main benefit of such a random coefficients model is that *all* unobserved heterogeneity potentially affecting the dependent variable is taken up by the MFI-specific effect and therefore a potential omitted variable bias is avoided (see for instance Stock and Watson, 2007, p 349).

Secondly, many of the controls that need to be added are time-invariant such as institutional dummies, dummies on rural or urban market, etcetera. Incorporating time-invariant covariates in the context of panel-data requires the additional assumption that the time-invariant covariates are always uncorrelated with the unit-fixed effect. When this assumption does not hold, the random effects estimator might yield inconsistent and biased estimates (see Baltagi et al., 2003 for a detailed discussion). Therefore, besides performing *OLS* and *RE*, we also report the Fixed Effects Vector Decomposition-estimator (*FEVD*) developed by Plümper and

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<sup>7</sup> These methodological issues are more rule than exception within the microfinance-context. For more information, see for instance Mersland and Strøm (2009b) or Hatarska (2005).

Troeger (2007). This estimator is designed to tackle time-invariant covariates and unit- fixed 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 unit- fixed effect. The second stage decomposes the fixed effects into a part explained by the time-invariant variables and an unexplained part. The third stage re-estimates the model including the time-invariant variables and the error term of the second stage using pooled OLS.

## 5. Results and discussion

### 5.1 The gender-repayment relation

In Table 3 we analyze the impact of gender on the repayment-measures in terms of *portfolio-at-risk* (Panel A) and *write-offs* (Panel B). For gender we use two proxies, namely the proportion of female clients and the conscious gender dummy that is 1 if the MFI reports to have a conscious bias towards women and 0 otherwise. The different columns correspond to the different estimation methods that have been used for robustness (*OLS*, *RE* and *FEVD*).

Looking at columns (1) to (3) we see that the proportion of female borrowers is negatively related to the portfolio-at-risk and the coefficients are quite robust over the estimation methods. These estimated effects are statistically significant, although confidence levels may vary somewhat between estimation methods<sup>8</sup>. Additionally, the regression statistics (*F-stat* for *OLS* and *FEVD* and  $\chi^2$ -*stat* for *RE*) always denote joint significance of the models.

Looking at 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 who have a higher portfolio-growth, MFIs who operate in rural areas and MFIs operating in richer countries. These effects are robust over the estimation methods and fully in line with our expectations. MFIs that grow will normally have lower PaR as a significant part

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<sup>8</sup> This is not surprising given the fact that the different estimation methods require a different number of parameters to be estimated and hence, loss in degrees-of-freedom may vary substantially over the different estimation methods.

of the portfolio is new and still uncontaminated and rural clients are easier to monitor and control.

The coefficients on *experience* and the efficiency measures (*staff efficiency*, *credit officer efficiency*) are insignificant and close to zero. This suggests that there is no significant effect of *experience or efficiency* measures on the portfolio-at-risk. Similarly, whether the MFI is an NGO or not, or whether the MFI practice group or individual lending have little or no effect on portfolio-at-risk. This is in line with Mersland and Strøm (2008) who find that performance differences between NGOs and non-NGOs is minimal, and Mersland and Strøm (2009a) who demonstrate that individual and group lenders don't differ much when it comes to repayment records.

In columns (4)-(6), gender preference is measured through the dummy on conscious gender bias. As can be seen, the dummy on conscious gender bias is, like the proportion female clients, negatively related to the portfolio-at-risk with the coefficients being highly significant. MFIs who report to have a conscious gender bias towards women have a significantly lower Par30. Looking at the control variables, we see again a negative association with *size*, *portfolio growth*, *dumRURAL*, and *HDI*.

In panel B, 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 on a conscious gender bias. As can be seen from columns (1) to (3) the proportion of female borrowers is significantly negatively related with the write-off rate and estimated coefficients are highly significant at the 1% significance level. This means that MFIs who focus more on women have significantly lower write-offs, *ceteris paribus*. Looking at the control variables we see that *size*, *portfolio growth*, *DumNGO* and *dumRURAL* are significant determinants of the MFI's write-off rate. Specifically, a higher write-off rate is associated with *smaller* MFIs, *lower* portfolio growth, NGOs and MFIs operating in *rural* areas.

Overall, the results from Table 3 point towards a negative association between the number of female clients and repayment, confirming hypothesis 1 that the proportion of female clients reduces the MFI's default rate. This effect holds for several measures of repayment (par30 and write-offs), several gender-measures (percentage female borrowers and conscious gender bias) and for several estimation methods (*OLS*, *RE* and *FEVD*).

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

In Table 4 we analyze the impact of gender on the *provisions* measured as the loan-loss provision expense rate. Again gender is measured both in terms of the proportion of female borrowers as well as a dummy for conscious gender bias and the different columns represent different estimation methods that have been used. As can be seen from columns (1) to (3) the coefficient on 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 MFIs with more women clients carry significantly lower provisions.

From columns (4) to (6) we see that the coefficient on the conscious gender bias is also negative regardless of the estimation method that is being used. However, significance levels vary somewhat with the estimation method (1% significance level for *FEVD*, 5% significance level for *OLS* and insignificance for *RE*). Regarding control variables in table 4 the main difference with table 3 is that NGOs carry more provisions compared to non-NGOs. This is not surprising since they are generally not regulated and often don't pay taxes. NGOs can therefore fix their own level of provisions and write-offs.

Overall, we find consistent evidence that MFIs who focus more on women clients carry lower provisions, controlling for other MFI-specific and country-specific effects. This finding

supports hypothesis 2 that the proportion of female customers has a negative impact on its perceived credit risk.

< Insert ‘Table 4. Gender and provisions’ around here >

### 5.2 Interaction effects

The previous discussion shows that focus on women has a positive impact on repayment *in general*. However, as we have argued in the literature review section, this effect might be more prevalent under certain conditions, or apply more for certain categories of MFIs. Analyzing these hypotheses amounts to including additional interaction terms in the regression equations as follows:

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

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 female clients on repayment differs with the different interaction variables  $INT_{i,t}$ .

Regression outputs with respect to the interaction terms are provided in table 5. The different columns represent the different interaction terms that were added. In the last column, all interaction variables were taken up simultaneously to isolate the impact of the each of the interactions. The coefficient on women clients now only represents the impact of female clients on repayment in the *reference* category, whereas the sum of the reference coefficient and the coefficient on the interaction term returns the gender-repayment effect for the different categories.

As can be seen from column (1) the interaction term (*women clients \* age*) returns an insignificant coefficient that is close to zero. This indicates that the gender-repayment relation does not differ with the MFI's experience. Therefore, hypothesis 3a cannot be supported.

Column (2) indicates that for non-NGOs the effect is insignificant and close to zero whereas for NGOs the effect is around -0.09 (0.01 + -0.10) which is in support of hypothesis 3b. This effect remains when the other interactions are added as can be seen from column (6).

Looking at column (3) we see that providing financial services *only* reduces the positive impact of female customers on repayment with 0.01. For MFIs who provide financial services only, an increase in women clients by 1 is associated with a decrease in PaR30 of 4%, whereas for MFIs who provide additional activities, an increase by 1 of the proportion female clients is associated with a decrease in PaR30 of 5%.

From columns (4) and (5) the following main results can be derived: The effect of women on repayment is stronger for MFIs who provide loans on an individual basis (-0.11) in comparison to village bankers (-0.02) and MFIs who operate on the basis of solidarity groups (-0.05). The effect is stronger for regulated MFIs (-0.08) than for non-regulated MFIs (-0.04).

Overall, we find that the *general* impact of women on repayment is indeed different for different categories of MFIs. We find substantial support for hypotheses 3b, 3d, 3e while finding only weak support of hypothesis 3c and no support for 3a.

Specifically, the positive effect of women on repayment seems significantly stronger for NGOs, MFIs who provide loans on an individual basis, MFIs who provide other services alongside pure financial services and regulated MFIs. These findings suggest that there are two mechanisms that actively enhance the positive effect of women on repayment. First, MFIs who apply more personal individual methods such as NGOs, finance plus providers and individual-based lenders benefit more from their focus on women. This suggests that a more personalised, tailor-made approach that is better adapted to the specificities of women

increases the positive impact of women on repayment. For instance: gender awareness in the staff recruitment, working hours adapted to women's domestic obligations, easy procedures, repayment schedules appropriate to businesses activities which are specific to women, seem to enhance women's repayment rates.

In contrast to commonly held ideas, it is interesting to see that the positive impact of women on repayment is greater in the case of individual loans. This kind of result could be illustrative of the poor quality of particular forms of group-lending. As argued by Harper (2007), group lending is all too often used as a « second-hand » method. This seems to be especially true for women, for whom group-lending is mainly a way to shift transaction costs onto female borrowers (Mayoux 2001 ; Molyneux 2002; Rankin, 2002 ; Rao 2008 ; Wright 2006).

However, this argument does not explain why the positive women-repayment effect is stronger for regulated MFIs. Therefore, there might be a second mechanism that effectively enhances the positive women-repayment effect. Regulation is often associated with 'mission drift', which is usually understood as less attention being paid to poor clients and towards women. We suggest that individual lending and regulation can also translate into more coercive enforcement methods (social pressure, verbal hostility, harassment, etc.). Moreover, as suggested earlier, it seems that women are more responsive to coercive practices. In Bangladesh for instance, the regulation and financial sustainability constraints of the 1990s have strongly influenced credit officers' behaviors (Goetz and Gupta 1996; Rahman 1999, 2004; Huq 2004). Faced with increasing productivity constraints, credit officers have not only used more robust enforcement methods, but also primarily target women, since they know from experience that they repay better. In the description given by Goetz and Gupta (1996), microcredit officers clearly explain why they avoid men: it is owing to their lack of commitment, their greater ability to evade both development agents and the law, the threat of violence, and the greater range of opportunities available to men for squandering credit in the

context of urbanization and Westernisation (Goetz and Gupta 1996, p. 55). In India, where women represent 95% of clientele, regulation and competition constraints have also led to ‘abusive collection methods’ (APMAS 2006, Ghate 2007, p. 97). Drawing on field work in various parts of the world, Fernando et al. (2006) report similar findings and offer various examples where regulation constraints translate into increased pressure on microfinance clients, especially women.

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

## **6. Conclusions**

In this paper we use a large global dataset covering 350 MFIs in 70 countries to test whether there is a gender effect on microfinance repayment. This is important given the undocumented popular believe that women honour their microfinance loans more than men.

Repayment is studied from a variety of measures such as portfolio-at-risk, loan-loss write-offs and provisions, and gender is studied through the proportion of female clients as well as a dummy variable that indicates whether the MFI has a conscious gender bias towards women or not.

The findings indicate that MFIs with higher proportions of female borrowers have a lower *portfolio-at-risk*. A dummy indicating whether the MFI consciously practice a woman gender bias yields similar results. Using loan-loss *write-offs* and loan-loss *provisions* as alternative dependent variables yield similar results. These combined findings provide compelling evidence that that focus on women clients enhances microfinance repayment, and that women in general are a better credit risk.

Interaction terms reveal that the positive repayment effect is stronger for NGOs, MFIs that practice individual lending, MFIs that provide additional services alongside financial services

and regulated MFIs. These findings suggest two theoretical predictions that significantly affect the women-repayment relation. First, MFIs who offer a more personalised, individual-based service to their client (such as NGOs, finance plus providers and individual-based lenders) benefit more from focussing on women. Therefore developing individual procedures tailored to women's needs might significantly increase repayment rates. This finding is in line with the research by Rahman (2001) and Goetz and Gupta (1996) who argue that more intensive contact and individual monitoring seriously improves repayment-rates.

Secondly, MFIs who face greater pressure might apply more coercive enforcement methods to which women are more responsive. This prediction could explain why regulated MFIs benefit more from focussing on women which is in line with the research by Rahman (2001) and Huq (2004) who suggest that women are more responsive to coercive enforcement. This might also be an alternative explanation to why individual lenders experience increased repayment benefits from focusing on women clients.

All together the paper proves what policy makers and practitioners have long argued, that women are better payers of microfinance loans than men. Is this good news or bad news? First of all, it is interesting to observe that despite a lower objective credit-worthiness, women prove to be good borrowers and good payers. But the issue of repayment should not obscure a much more fundamental question: the well-being of female clients. Does high repayment rate mean higher women welfare? As suggested by Susan Cheston, vice-president of Opportunity International (one leading organisation in the field of microfinance): "women are good for microfinance but is microfinance good for women?" (Cheston 2007: 15). Microfinance might lead to women empowerment but also to feminization of debt (Mayoux 2002). Besides, good repayment performance and loyalty do not necessarily mean clients' satisfaction: it might be the result of a debt trap (Cull et al. 2007). As suggested here, it might also be the result of enforcement practices that women fear more than men. The interesting question to ask is

whether women repay better because they are more successful in their enterprises or simply because they are more sensitive to MFI enforcement practices and social pressure. Besides, the finding that women repay their loans better than men does not mean that women are better customers than men. Maybe servicing women is more costly than servicing men? Or maybe women take smaller loans and thereby reduce MFI scale economies?

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## List of tables

**Table 1. Summary statistics**

In this table, we present summary statistics for key-variables of the sample under study. *Q1*, *Q2* and *Q3* are the first, second and third quartile, respectively. *Total assets* is inferred from the balance sheet and measured in \$ 1,000. *Loan portfolio* is the total loans outstanding and is measured in \$ 1,000. *Total clients* is the total number of credit and savings clients active with the MFI. *Loan size* is the average loan outstanding measured in \$ and is defined as gross outstanding portfolio per client. *Experience* measures the number of years the institution is active in microfinance activities. *Employers* is the number of full-time employers active in the MFI. *Staff Efficiency* is the number of total clients divided by the number of employers. *Loan Officer Efficiency* is the number of total clients divided by the number of loan officers. *Annual return* is the net result before extra-ordinary income and expenses, donations and taxation and measured in \$ 1,000. *Portfolio yield* is the percentage yield on the MFI's total portfolio. *OSS* is operational self-sufficiency measured as net income dividend by operating expenses. *PaR30* is portfolio at risk measuring the part of the loan portfolio more than 30 days in arrears. *Write-offs* measures the part of the total loan portfolio that has been written of and therefore is accepted as a loss. *Provision expense rate* is loss loan provision as a percentage of total loan portfolio. *Risk coverage rate* is the loss loan provisions divided by PaR30. *DUMgender* is a dummy variable that is 1 if the MFI has a conscious gender bias and 0 otherwise. *Women clients* measures which percentage of the MFI's clients is female.

Variables	N	mean	Q1	Q2	Q3	st.dev	min	max
<i>General</i>								
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
Total 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	3,208	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 result	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
<i>Repayment</i>								
PAR30	1,100	0.06	0.01	0.03	0.07	0.10	0	0.98
Write-offs	1,020	0.01	0.00	0.01	0.02	0.10	0	0.74
Provision expense rate	1,075	0.03	0.01	0.02	0.04	0.04	-0.06	0.63
<i>Gender</i>								
DUMgender	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 analysis.
- We have data on DUMgender and women clients only in the MFI's rating year. Therefore, we have assumed DUMgender and women clients to be constant over time.

**Table 2. Univariate statistics**

**Panel A. Correlations**

This table reports the correlations between the gender and repayment variables.

	Women clients	Par30	write-offs	provision expense rate
Women clients	1			
Par30	-0.02	1		
Write-offs	-0.09	0.12	1	
Provision expense rate	-0.14	0.23	0.58	1

**Panel B. Median values in different gender-classes**

This table reports median values for a number of key-variables in different classes that differ in the proportion of female borrowers in columns 1-4. The different classes correspond to different quartiles in the distribution of women clients going 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). Column 5 (6) reports median values for MFIs with (without) a conscious gender bias.

	Women clients				Conscious gender bias	
	<i>Very low</i> (1)	<i>low</i> (2)	<i>high</i> (3)	<i>very high</i> (4)	<i>yes</i> (5)	<i>no</i> (6)
PaR30	0.03	0.05	0.02	0.01	0.02	0.04
Write-offs	0.01	0.02	0.007	0.004	0.008	0.01
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	522	218	101	157	653
Loan portfolio	2,092	1,457	2,051	878	1,241	1,964

**Table 3. Gender and loan repayment**

In this table we analyze the impact of gender on loan repayment both 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). *DumRural* is 1 if the MFI operates mainly in rural areas and 0 otherwise. *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 has been used as the estimation method. *RE* means that a pooled random effects model has been estimated and *FEVD* means that the Fixed Effects Vector Decomposition-estimator has been used. Robust standard errors are provided in parentheses. \*, \*\* and \*\*\* denote statistical significance at the 10%, 5% and 1% significance level, respectively.

**Panel A. Repayment in terms of PaR30**

<i>Dep.var. PaR30</i>	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FEVD	OLS	RE	FEVD
<b>gender</b>						
women clients	-0.02 (0.015)*	-0.05 (0.038)*	-0.05 (0.003)***			
conscious gender bias				-0.01 (0.005)***	-0.02 (0.012)*	-0.02 (0.001)***
<b>MFI-controls</b>						
<i>general</i>						
Experience	0.002 (0.001)***	0.00 (0.001)	0.00 (0.000)	0.00 (0.002)	0.00 (0.000)	0.00 (0.000)
lnTA	-0.02 (0.004)***	-0.01 (0.002)***	-0.01 (0.001)***	-0.01 (0.002)***	-0.01 (0.002)***	-0.01 (0.004)***
Loansize	0.02 (0.006)	-0.01 (0.005)***	-0.02 (0.002)***	0.01 (0.004)	0.01 (0.005)	0.01 (0.001)
Portfolio growth	-0.05 (0.008)***	-0.02 (0.004)***	-0.02 (0.002)***	-0.07 (0.007)***	-0.02 (0.004)***	-0.02 (0.002)***
<i>Legal status</i>						
DumNGO	0.00 (0.007)	0.00 (0.016)	0.00 (0.001)	0.01 (0.004)***	0.01 (0.011)	0.02 (0.001)***
<i>Loan methodology</i>						
DumGroup	0.00 (0.006)	-0.01 (0.018)	-0.01 (0.002)***	0.01 (0.005)	0.00 (0.012)	0.00 (0.002)
DumRural	-0.04 (0.008)***	-0.01 (0.009)	-0.03 (0.003)***	-0.03 (0.005)***	-0.03 (0.011)***	-0.04 (0.002)***

<i>Efficiency</i>						
Staff efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Credit officer efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Dum performance pay	0.01 (0.005)	-0.01 (0.014)	-0.01 (0.001)	0.02 (0.003)	0.01 (0.011)	0.01 (0.001)
<b>Country controls</b>						
HDI	-0.13 (0.026)***	-0.14 (0.067)**	-0.11 (0.006)***	-0.13 (0.019)****	-0.12 (0.044)***	-0.10 (0.006)***
<b>Model statistics</b>						
N	830	830	830	1748	1748	1748
R <sup>2</sup>	0.21	0.10	0.96	0.24	0.16	0.92
F-stat / Wald $\chi^2$	13.41***	100.22***	1408.59***	38.04***	67.19***	1419.38***

**Panel B. Repayment in terms of write-offs**

<i>Dep.var. Write-off rate</i>	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FEVD	OLS	RE	FEVD
<b>gender</b>						
women clients	-0.02 (0.005)***	-0.03 (0.013)***	-0.03 (0.013)***			
conscious gender bias				-0.01 (0.003)***	-0.01 (0.005)	-0.01 (0.002)***
<b>MFI-controls</b>						
<i>general</i>						
Experience	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
lnTA	-0.002 (0.001)**	-0.008 (0.002)***	-0.01 (0.001)***	-0.004 (0.001)***	-0.004 (0.002)**	-0.005 (0.006)***
Loansize	0.00 (0.001)	0.00 (0.004)	0.00 (0.001)	0.00 (0.001)	0.00 (0.002)	0.00 (0.001)
Portfolio growth	-0.05 (0.004)***	-0.01 (0.004)***	-0.01 (0.002)***	-0.05 (0.007)***	-0.04 (0.01)**	-0.03 (0.002)***
<i>Legal status</i>						
DumNGO	0.02 (0.002)***	0.01 (0.005)***	0.02 (0.001)***	0.01 (0.002)***	0.00 (0.005)	0.01 (0.001)***
<i>Loan methodology</i>						
DumGroup	0.00 (0.003)	0.00 (0.006)	0.01 (0.001)***	0.01 (0.003)***	0.00 (0.005)	0.01 (0.002)***
DumRural	-0.004 (0.002)**	-0.004 (0.006)	-0.01 (0.001)***	0.00 (0.002)	0.00 (0.005)	0.00 (0.002)
<i>Efficiency</i>						
Staff efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Credit officer efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Dum performance pay	0.01 (0.002)	0.00 (0.001)	0.01 (0.005)	0.01 (0.002)	0.01 (0.004)	0.01 (0.001)

<b>Country controls</b>						
HDI	-0.01 (0.009)	-0.01 (0.024)	-0.03 (0.006)***	-0.04 (0.012)***	-0.04 (0.017)***	-0.05 (0.006)***
<b>Model statistics</b>						
N	773	773	773	1621	1621	1621
R <sup>2</sup>	0.35	0.28	0.81	0.22	0.30	0.62
F-stat / Wald $\chi^2$	23.91***	54.62***	239.56***	16.86***	131.01***	199.02***

**Notes:**

- Sometimes, especially in the case of *RE* and *FEVD*, the number of parameters to be estimated exceeds the number of observations which makes the exercise an *underdetermined* problem. As Fraser (2000) points out, classical estimation methods do not apply. In that case, missing values have been imputed with averages over the time-period in order to boost the number of observations to reasonable levels.
- Loan size has been scaled by a factor 1/1000 in order to make the coefficients easier to read.
- For robustness, we have experimented with other country-controls such as GDI (gender-development-index). Similar results obtain.
- For robustness, we have also divided dumGROUP into separate dummies for village-bankers (DumVILL) and solidarity-groups (DumSOL). Similar results obtain.

**Table 4. Gender and provisions**

We analyze the impact of gender on the loan loss provisions measured in terms of 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). *DumRural* is 1 if the MFI operates mainly in rural areas and 0 otherwise. *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 has been used as the estimation method. *RE* means that a pooled random effects model has been estimated and *FEVD* means that the Fixed Effects Vector Decomposition-estimator has been used. Robust standard errors are provided in parentheses. \*, \*\* and \*\*\* denote statistical significance at the 10%, 5% and 1% significance level, respectively.

<i>Dep.var. provision expense rate</i>	(1) OLS	(2) RE	(3) FEVD	(4) OLS	(5) RE	(6) FEVD
<b>gender</b>						
women clients	-0.02 (0.005)***	-0.02 (0.012)*	-0.02 (0.003)***			
conscious gender bias				-0.01 (0.002)**	-0.01 (0.004)	-0.01 (0.001)***
<b>MFI-controls</b>						
<i>general</i>						
Experience	0.00 (0.000)	0.00 (0.001)	0.00 (0.000)	0.00 (0.001)	0.00 (0.000)	0.00 (0.000)
lnTA	-0.002 (0.001)*	-0.006 (0.002)***	-0.01 (0.007)***	-0.01 (0.001)***	-0.01 (0.001)***	-0.01 (0.005)***
Loansize	0.00 (0.002)	0.00 (0.004)	0.00 (0.001)	0.00 (0.016)	0.00 (0.001)	0.00 (0.006)
Portfolio growth	-0.03 (0.004)***	-0.01 (0.004)**	-0.01 (0.005)***	-0.02 (0.003)***	-0.01 (0.003)**	-0.004 (0.002)**
<i>Legal status</i>						
DumNGO	0.01 (0.002)***	0.01 (0.005)**	0.01 (0.002)***	0.01 (0.002)**	0.00 (0.003)	0.003 (0.011)***
<i>Loan methodology</i>						
DumGroup	0.00 (0.002)	0.00 (0.006)	0.00 (0.002)	0.00 (0.002)	0.00 (0.001)	0.00 (0.001)
DumRural	0.00 (0.001)	0.00 (0.006)	0.00 (0.001)	0.00 (0.002)	0.00 (0.005)	0.00 (0.001)

<i>Efficiency</i>						
Staff efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Credit officer efficiency	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Dum performance pay	0.01 (0.002)***	0.01 (0.005)**	0.01 (0.001)***	0.01 (0.002)***	0.01 (0.003)***	0.01 (0.001)***
<b>Country controls</b>						
HDI	-0.02 (0.009)**	-0.03 (0.023)*	-0.04 (0.006)***	-0.05 (0.009)***	-0.04 (0.015)***	-0.05 (0.005)***
<b>Model statistics</b>						
N	751	751	751	1624	1624	1624
R <sup>2</sup>	0.25	0.27	0.72	0.15	0.18	0.59
F-stat / Wald $\chi^2$	20.66***	43.18***	149.04***	22.13***	53.49***	181.74***

**Notes:**

- Sometimes, especially in the case of *RE* and *FEVD*, the number of parameters to be estimated exceeds the number of observations which makes the exercise an *underdetermined* problem. As Fraser (2000) points out, classical estimation methods do not apply. In that case, missing values have been imputed with averages over the time-period in order to boost the number of observations to reasonable levels.
- Loan size has been scaled by a factor 1/1000 in order to make the coefficients easier to read.
- For robustness, we have experimented with other country-controls such as GDI (gender-development-index). Similar results obtain.
- For robustness, we have also divided dumGROUP into separate dummies for village-bankers (DumVILL) and solidarity-groups (DumSOL). Similar results obtain.

**Table 5. Interactions on the gender-repayment relation**

In this table, we analyze whether the positive effect of women on repayment differs with *experience*, *legal status*, *activities*, *lending methodology* and *regulation* by investigating various interaction effects on the percentage of women clients. *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. *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 before. Robust standard errors are provided in parentheses. \*, \*\* and \*\*\* denote statistical significance at the 10%, 5% and 1% significance level, respectively. The estimation method is pooled Random Effects (RE).

<i>Dep Var. PaR30</i>	(1)	(2)	(3)	(4)	(5)	(6)
women clients (reference category)	-0.05 (0.038)*	0.01 (0.055)	-0.05 (0.038)*	-0.11 (0.059)**	-0.04 (0.038)*	-0.08 (0.075)*
<i>experience</i> (women * experience)	0.00 (0.001)					0.00 (0.001)
<i>legal status</i> (women * Dum NGO)		-0.10 (0.064)*				-0.11 (0.067)*
<i>Activities</i> (women * Dum fin.only)			0.01 (0.022)			0.01 (0.023)
<i>Lending methodology</i> (women * DumVill)				0.09 (0.078)		0.11 (0.080)*
(women * Dum Sol)				0.06 (0.086)		0.09 (0.088)
<i>Regulation</i> (women * Dum Regulated)					-0.04 (0.031)	-0.05 (0.032)*
Other controls	<i>added</i>	<i>added</i>	<i>added</i>	<i>added</i>	<i>added</i>	<i>added</i>
N	830	830	830	830	830	830
R <sup>2</sup>	0.10	0.13	0.11	0.14	0.12	0.23
Wald $\chi^2$	100.15***	102.82***	100.38***	104.26***	101.68***	113.83***