Female leaders and financial inclusion: Evidence from microfinance institutions

We investigate if the CEO's gender plays a role in microfinance institutions (MFIs) inclusion of poor families into a formal financial relation. Financial inclusion comprises inclusion of the poorest segments of borrowers (the intensive margin), and the number of borrowers (the extensive margin). The data set is a unique global panel of MFIs collected from MFI raters' reports where about 25% of all MFIs have a female CEO. Using instrumental variables regressions, we find evidence the female CEOs have an impact upon the intensive margin (smaller average loans, more gender bias), but no evidence of greater inclusion on the extensive margin (credit client growth). The results fit theories of women being more benevolent and universalistic than men. We run robustness tests of our financial inclusion variables and other leadership categories.

Keywords: Female CEO, financial inclusion, microfinance institutions, cross-country panel data.

JEL codes: G34; M12; M14

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1 INTRODUCTION

Does a microfinance institution's (MFIs) social mission improve with a female CEO? Here, we define the social mission as financial inclusion of poor families and small businesses into formal financial institutions. The number of unbanked is 1.7 billion or roughly 25% of the world according to the latest FINDEX report (2017; globalfindex.worldbank.org/). To include more persons is one of the most important development goals (see for instance the UN SDG-indicator 8.10 and "Target 1.4" at sustainabledevelopment.un.org/sdg8). The importance of the financial inclusion is underlined in Chaia, Dalal, Goland, Gonzalez, Morduch, and Schiff (2013). We find that an MFI led by a female CEO targets customers with low incomes more than a male-led does. The effect is economically substantial at about 3.7% relative to male peers.

Why is a female CEO more likely than a male CEO to follow a financial inclusion objective? An MFI can find it advantageous to hire a female CEO because she carries personality traits that match with the MFI's objectives more often than a male CEO. A woman tends more towards benevolence and universalism, while men tend towards power and achievement (Adams and Funk 2012). Thus, we would expect that the more the MFI prefers financial inclusion, the better is the match with a female CEO.

In this paper we investigate the impact of the female CEO in two main dimensions, that is, the lowest income households and small businesses, and the number of customers included. The first is financial inclusion at the intensive margin, the second at the extensive margin. We utilise a proprietary data set obtained from reports from rating agencies. Our data count about 3,000 observations from 575 MFIs in 87 developing countries. The data are from third-party rating agencies and not self-reported.

We find that a female CEO influences MFIs lending at the intensive margin, but not at the extensive. The main regression is the two-stage least squares (2SLS) estimation methodology (Wooldridge 2010). The conclusion finds further confirmation in a population difference-in-differences (DID) analysis (Angrist and Pischke 2008). Furthermore, we try different definitions of financial inclusion at the intensive margin, first the average loan, then the percentage of female borrowers, MFIs preference for female borrowers, and their rural bias. All except the rural bias are significant in the direction we expect, confirming our main result. Moreover, we try other female leadership categories, such as the female chair or the percentage of female directors on the board. Results are mixed here. We conclude that a good match between the MFI and a female CEO exists.

The good match implies a selection bias. The MFI may hire a female CEO because it is already placing a heavy weight on its social mission, that is, the MFI's pursuit of its social mission is not due to its female CEO, but the reverse. Thus, we stand before an endogeneity problem of the reverse causation kind. We use an instrumental variables method to correct for this, specifically, the 2SLS estimation methodology and supplement with DID analysis of the change from a female to male director and from a male to female (Wooldridge, 2010).

We contribute to at least two research traditions. First, our results are relevant to the literature on "mission drift", that is, the tendency for MFIs to give less priority to financial inclusion, but more to financial performance over time. The MFI has a two-sided objective, that is, financial inclusion and financial performance. (Morduch 1999). In the mission-drift literature, researchers do not consider gender, but investigate the trade-off between performance and inclusion (Cull, Demirgüç-Kunt, and Morduch 2007); (Hermes, Lensink, and Meesters 2011), the importance of cost (Mersland and Strøm 2010), macroeconomic conditions and competition (Ahlin, Lin, and Maio 2011); (Hossain et al. 2020), and the MFI's revealed

preference for inclusion (Salim 2013). We show that the gender identity of the CEO is important for mission drift, that is, a female CEO is more apt to target the poorest clients.

The finding is new in the microfinance literature. Hartarska, Nadolnyak, and Mersland (2014) find that MFIs' financial inclusion in rural districts increases with a female CEO on a sample of MFIs in 73 countries. Their findings apply to only the extensive margin of financial inclusion, and they do not take endogeneity problems into account. (Zulfiqar 2017) reports that gender equality does not improve following better access to finance in Pakistan. Furthermore, (Strøm, D'Espallier, and Mersland 2014) report that female leaders produce superior financial performance to male peers in a similar multi-country sample of MFIs. (Périlleux and Szafarz 2015) explore the leadership role of female directors and top management in 36 local cooperatives in Senegal. Their panel data study reveals that social performance increases with female directors, but not with female top managers. Thus, there is a lack of studies on the female CEO in the microfinance literature.

A second contribution is to the corporate finance literature on personal identity. We show that the gender of the CEO can cause corporate outcomes in a financial institution such as the microfinance institution. In the literature on managerial traits (Bertrand and Schoar 2003; Graham, Harvey, and Puri 2013; Malmendier and Tate 2005:2008; Malmendier, Tate, and Yan 2011; Nguyen, Hagendorff, and Eshraghi 2015; Amore and Garofalo 2016) a general result is that personal characteristics have real effects on company policies and outcomes. For instance, firms led by women tend to exhibit lower risk characteristics than male-managed firms (Faccio, Marchica, and Mura 2016; Huang and Kisgen 2013), they are less prone to commit financial fraud (Cumming, Leung, and Rui 2015), they are more committed to environmental concerns (Liu 2018) and are less likely to involve their companies in labour lawsuits (Liu 2021). Our contribution comes in a setting where we can avoid a small sample

that sometimes biases studies in settings where female leaders are few. In our sample, the fraction of female CEOs is on average 26.4%.

In general, microfinance provides an advantageous setting for studying female CEOs and business outcomes. First, a relatively high fraction of MFIs has female CEOs. Second, female founders of MFIs are often prominent spokespersons for the microfinance financial inclusion idea. Third, a large part of MFIs' loan allocations is to women: Maes and Reed (2012) report that MFIs allocate 82% of loans to women. A fourth reason is that microfinance is a homogeneous business across different countries (Armendáriz and Morduch 2010). The implication is that industry effects will not bias our results.

We organise the remainder of the paper as follows: We next present the theory and hypotheses. Then we present data and variable definitions, we discuss methodological issues, before turning to econometric evidence, robustness checks, and conclusions.

2 THEORY AND EVIDENCE

We investigate the relation between the MFI's financial inclusion of poor households and small businesses, and the gender of the CEO.

2.1 Gender and social mission

The MFI objectives are financial inclusion and financial performance (Morduch 1999). Suppose the MFI gives priority to either inclusion or performance. The CEO is motivated by either mission or monetary reward (Besley and Ghatak 2005). An inclusion-oriented MFI is likely to attain higher inclusion with an inclusion-motivated leader. We argue that a female CEO is, on average, more inclusion motivated than male. We therefore expect greater

inclusion with female CEO. The endogeneity problem arises because the inclusion-oriented MFI can choose a female CEO in its search for "female" characteristics, in particular altruism.

The literature on gender differences underlines that women's motivations tend towards benevolence and universalism rather than self-enhancement, in short, towards altruism (Andreoni and Vesterlund 2001; Eckel and Grossman 1998). The MFI's inclusion objective corresponds to this altruism personality trait. The good MFI-Female CEO match implies that a female CEO pursues social mission objectives to a greater extent than a male.

The good match is repeated in other personality traits that differ between men and women, in particular risk and competition avoidance. Women tend to be more risk averse than men (Eckel and Grossman 2008; Charness and Gneezy 2012). A female CEO of an MFI prefers to restrain risk by lending to safe borrowers, most likely women (D'Espallier, Guerin, and Mersland 2013), and to lend small amounts that are more easily repaid. Preferring female clients also matches the MFI's social mission, namely, to offer loans to women. The MFI limits risk by keeping a policy of small loans and a short repayment period. Therefore, risk aversion can be a personality trait the MFI is looking for. On the other hand, Adams and Funk (2012) find that female board members in Sweden are less risk averse than their male peers in a survey of board members.

Investigations using experiments reveal that competition avoidance is more prevalent among women than men (Gneezy, Niederle, and Rustichini 2003; Niederle and Vesterlund 2007); (Reuben Rey-Biel, Sapienza, and Zingales 2012; Flory, Leibbrandt, and List 2015). Historically, microfinance has provided the formerly "unbanked" customers access to formal financial institutions. Thus, its business strategy is competition avoidance from the outset. Competitiveness can induce female leaders to choose a career in social mission-oriented MFIs, and social mission-oriented MFIs can find competition avoidance an advantageous trait in leaders.

An objection can be that gender differences in personality traits are country specific, so that the differences uncovered from experiments conducted on persons in rich, Western countries are not applicable to developing countries that we study here. However, Schmitt, Realo, Voracek, and Allik (2008) cross-country study provides evidence that gender differences increase with development level.

An information argument can support the good match. A female leader is likely to have better knowledge of the poorer segments of credit clients from her experience as a microfinance practitioner. Strøm et al. (2014) argue that female managers and directors understand the MFI's customers better because most of these customers are women. A female leader can identify the needs of their female customers and, thus, design a product strategy that better suits them. For instance, Lusardi and Mitchell (2008) show that financial literacy is much lower among women than men. A female CEO is more likely to take this fact into account than a male CEO. This matching argument mirrors the Beck, Behr, and Guettler (2013) argument that women can build a better trust relationship with clients.

2.2 The MFI's social mission

In this section, we develop our main dependent variable. Providing poor households and small enterprises in developing countries with financial services remains the MFI's main social mission (Reed 2015).

The MFI can fulfil its social mission along two dimensions. When the number of credit clients is fixed, the MFI is more likely to serve the poorest parts of the community the lower its average loan is, this is social mission at the *intensive margin*. The other dimension is the number of credit clients served. Fixing the average loan size, *extensive margin* increases with the number of credit clients. Salim (2013) uses the extension of MFIs' branch offices in

Bangladesh in a study of MFI preference for inclusion at the extensive margin. In this paper, we concentrate on the MFI's intensive margin since the female CEO's altruistic characteristic is more likely to find its expression here than at the extensive margin. If this is so, we expect a female CEO to impact financial inclusion at the intensive margin, but not the extensive. We test for the female CEO's impact at the extensive margin in a robustness test.

The average loan size is commonly used in studies of mission drift (Abeysekera, Oguzoglu, and Le 2014; Bhatt and Tang 2001; Cull et al. 2007; Mersland and Strøm 2010). However, the average loan size has limitations, as discussed in the robustness section. Therefore, we include the percentage of loans to women in the loan portfolio, the MFI's gender bias, and the MFI's rural bias as additional indicators of inclusion at the intensive margin. Armendáriz and Morduch (2010) note that credit extended to the woman in the family has a beneficial effect for all the family members, while the effects of a loan to a man tend to stay with the man.

We draw upon (Freixas and Rochet 2008, p. 78) to arrive at an estimable function for the average loan. The fundamental operating income function

$$\pi(\mathrm{D},\mathrm{L}) = (\mathrm{r_L} - \mathrm{r})\mathrm{L} + (\mathrm{r}(1-\alpha) - \mathrm{r_D})\mathrm{D} - \mathrm{C}(\mathrm{D},\mathrm{L}),$$

where, r_L is the rate of loans, r_D is the rate of deposits, r is the rate on the interbank market, L is loans, D is deposits, α is the percentage of deposits for compulsory reserves, and $C(D,L)$ is the production function or management costs. After some manipulations, Mersland and Strøm (2010) show that an inclusion at the intensive margin, the average loan, may be expressed as:

$$\bar{\mathrm{L}} = \frac{1}{\mathrm{r_L} - \mathrm{r}}\frac{\mathrm{P}}{\mathrm{CC}} - \frac{\mathrm{r}(1-\alpha) - \mathrm{r_D}}{\mathrm{r_L} - \mathrm{r}}\frac{\mathrm{D}}{\mathrm{CC}} + \frac{1}{\mathrm{r_L} - \mathrm{r}}\frac{\mathrm{C}(\mathrm{D},\mathrm{L})}{\mathrm{CC}} + \frac{1}{2}\frac{1}{\mathrm{r_L} - \mathrm{r}}\rho\frac{\sigma^2(\mathrm{L})}{\mathrm{CC}},$$

which we term the *average loan relation*. The right-hand side shows operating income, deposits, management costs, and loan risk, all per credit client. The model yields the predictions that average loan size will increase with higher operating income, lower deposits,

higher management costs, and higher risk per credit client. Notice that the intermediation margins are the same for average operating income and average cost. If the signs are equal, but coefficients differ, either average operating income or average cost will be the more important variable. Testing takes this relation as the point of departure. We add the *Female CEO* and control variables to this fundamental relation.

The relation also highlights the double nature of an MFI, that is, to provide access to financial services for the poor and to achieve financial performance. In the relation above the first term on the right-hand side represents operating income. Hermes et al. (2011) perform a full-blown analysis of the relation between financial inclusion and financial performance, but this is beyond our analysis.

3 DATA AND VARIABLE DEFINITIONS

Our data set on MFIs comes from rating assessment reports gathered by major agencies specialized in the rating of MFIs like M-CRIL, Microfinanza and Microrate. Officials from the rating agencies collect information during on-site visits to the MFI, and a rating committee at the main office screens data and allocates an overall rating grade. We report on 575 MFIs operating in 87 different countries in 1998–2018. At each rating, the raters collect data for the rating year and years preceding it. Up to 18 years of data for an MFI are thus available for the period with an average of ten yearly observations per MFI. No data set is perfectly representative of the microfinance field. Our data set contains relatively few huge MFIs and does not cover the virtually endless numbers of small savings and credit cooperatives. Big international rating agencies, such as Moody's and Standard & Poor's, rate the largest MFIs. No rating agency looks at small savings and credit cooperatives, hence data are unavailable for this group. Nevertheless, ratings data are among the most representative available for the microfinance industry (Mersland and Strøm 2009).

The MFI rating assessments are wider than traditional credit ratings, including the MFIs' ability to reach their multiple objectives (Beisland and Mersland 2012). The core information in this study consists of standard indicators similarly calculated across the industry and by all rating agencies. The reports do not contain the gender of the CEO in each year, generally only in the rating year. However, since the CEO's tenure is in the report, we can map the gender of the CEO with high accuracy.

The rating of MFIs is a main transparency initiative in the microfinance industry. The Rating Fund of the Consultative Group to Assist the Poor (CGAP), a microfinance branch of the World Bank, participated in funding the start-up years of the rating agencies. Rating of MFIs finds active support among donors such as the Interamerican Development Bank and the European Union (Beisland, Mersland, and Randøy 2014).

Microfinance began as experimental development schemes in Asia and Latin America in the 1970s and is a major industry today. In 2013, MFIs provided 211 million people with credit (Reed, 2015). The number of *poorest* families with a microloan grew from 8 million in 1997 to 114 million in 2013 (Reed 2015). More than 100 international funds invest in microfinance offering equity, loans, bonds, and collateralized debt obligations (www.mixmarket.org). The industry is young and entrepreneurial; the median MFI age is 10 years in our sample. MFIs exhibit diverse incorporation, covering ordinary shareholder-owned firms (39%), mutually held institutions (16%), NGOs (43%), and state banks (less than 1%). No MFI in our sample lists on a stock exchange.

Table 1 contains the definitions of female leadership and inclusion and the MFI characteristics and country control variables.

Table 1

The table shows the definitions of our main financial inclusion variables, the average loan, and the number of credit clients. We have also social mission variables in the percentage of female borrowers and the MFI's female bias, that is, its deliberate policy of lending to women. Finally, we also test if the MFI led by a female CEO has a rural bias. Thus, we can explore several dimensions of the MFI's financial inclusion.

Most of the variables in the *average loan relation* are self-explanatory. The portfolio at risk measured as 30 days overdue (*PaR30*) is our measure of the portfolio's risk. The higher the *PaR30* is, the larger is the part of the portfolio where repayment problems occur. This measure is especially relevant in microfinance since loans are predominantly short term. The measure of overdue loans is often found in the banking literature, e.g., Berger, Klapper, and Turk-Ariss (2009).

In addition to the variables from the *average loan relation*, we add adjustments for MFI size, age, its regulated status, its founding, and the competition in its market. We use the rater's assessment of the MFI's competitive challenge in its area (*Competition*), as our measure.

Aguilera and Jackson (2003) point out that country-specific traditions and institutions can be important. We adjust for country differences employing several procedures. We consider the size of the average loan relative to the Gross National Income *per capita*, the average income per person. The second procedure is to include the UN Human Development Index (*HDI*) in the regressions. The *HDI* variable is a summary welfare measure covering levels of income, education, and health. *HDI* data for each country are readily available for all the years in our sample. The *GII* index in the instrument list also gives a country adjustment. We include region and year indicators in every regression.

Table 2 gives descriptive statistics of the variables used in the analysis.

Table 2

The table shows that our main measure of financial inclusion, the average loan, is small, only 0.58. Thus, the average loan is a little more than half the average income level in the country. The percentage of female customers MFIs portfolios is 65.1, close to reports in Cull, Demirgüç-Kunt, and Morduch (2009) on MixMarket data. The number of credit clients and MFI assets shows that the dispersion of MFI size is substantial.

Table 2 exhibits the high percentages of female leaders. *Female CEO* in 26.4% of the observations, *Female chair* in 23.8%, and a *Female director percentage* of 28.7% are well above corresponding numbers in most countries and in most former studies of gender diversity. In particular, the high percentage of *Female CEO* is uncommon, and underlines that a study of the CEO impact can yield valuable insight in various directions. The *Female CEO* share has a U-shaped form during the period we study with a share above 30% in the first years of the Millennium, falling to a low of about 22% around 2010, but rising above 30% again in later years. The distribution by *MFI age* is more volatile but keeps mostly within a band with a low of 20% and a high of 35%. Thus, *Female CEO* is neither trending upwards or downwards. Yearly change in the share of *Female CEO* underlines the necessity of including *Year* indicator variables.

The table also reveals the variation in the MFI's background variables: a local banking authority regulates 39.5% of MFIs, and 39.0% of MFIs have an international founder. Furthermore, 39.4% of MFIs offer a deposit account. This variation means that we can filter out background noise in the relationship of female leaders and MFI inclusion.

How important is the *Female CEO*? Table 3 explores the relations between *Female CEO* and *Average loan* and the growth in the number of *Credit clients* in a simple cross-sectional comparison between female and male groups. The same type of analysis is then repeated for the instruments we use for the *Female CEO*, that is, the *Board size* and the *GII*.

Table 3

We see from Table 3 Panel A that the *Female CEO* can be a good candidate for explaining MFIs *Average loan*. The *Average loan* in MFIs led by a *Female CEO* is considerably lower than in MFIs led by a male. The difference is significant at the 1% level. Thus, on average the *Female CEO* favours financial inclusion at the intensive margin to a greater extent than men. But when we define financial inclusion at the extensive margin as the *Growth of credit clients*, it turns out that the *Female CEO* has a somewhat higher, but insignificant, growth rate than male peers. The growth difference can occur since male CEOs oversee larger MFIs than women. The difference is significant at 1% significance level.

Table 3 Panel B demonstrates that *Board size* and *GII* are good candidates for instruments for the *Female CEO*. Both are significant at 1% level (*Board size*) and 5% level (*GII*) in a t-test assuming unequal variances, and both are of the expected sign. Notice that a higher *GII* means greater inequality in the country. The *Female CEO* is associated with a larger board, and with a lower *GII*.

4 METHODOLOGY

Our main explanatory variable, the *Female CEO,* is likely to be endogenous. We solve this by introducing instruments for the *Female CEO* in a two-stage least squares (2SLS) framework. We find independent variation in the instrumental variables *Board size* and the *Gender Inequality Index (GII). Board size* is an instrument because a mission-oriented MFI is likely to place a heavy weight on representativeness to different customer groups, employees, and the larger community. The MFI uses the board as a platform for representing groups. Thus, the larger the board is, the more likely it is that the CEO is female. A similar finding comes from Adams and Mehran (2012) who establish that board size can be a solution to organisational problems in large bank holding companies. The *GII* is a country gender inequality index from

United Nations Development Programme. A higher *GII* means higher inequality. This means that we expect the likelihood of a *Female CEO* to increase with a lower *GII*.

Both instruments fulfil statistical requirements, see Table 3 Panel B. The *Board size* is higher for female CEOs than male (on average 7.14 vs. 6.76), *GII* is lower (0.44 vs. 0.45) and both are highly significant. At the same time, the instruments are non-significant in OLS regressions where they are included along with our set of explanatory variables.

We also perform a Hausman (1978) endogeneity test of the IV regression against an OLS specification and find that they differ significantly. This means that an IV methodology is warranted. Regression tables include the Hausman test. Our instruments might be weak, that is, having a low correlation with the endogenous variable *Female CEO* (Wooldridge, 2010). We include a Stock and Yogo (2005) test for this case. This is an *F*-test in a pooled OLS regression with the instruments included. This test, too, is reported in tables. Both conditions are met in our basic regression.

Furthermore, we lag explanatory, continuous variables as in Dittmann, Maug, and Schneider (2009) to reduce some of the endogeneity in simultaneity bias. We run regressions with standard errors clustered at the MFI level since we have panel data (Petersen 2008; Thompson 2011). De Mel, McKenzie, and Woodruff (2009) warn against clustering in cross-sectional data, and that "… there is in fact harm in clustering at too aggregate a level". We cluster at the lowest level, the unit of investigation, since we expect the correlation between the same unit at different time periods is greater than clustering at an aggregate group level. Regressions also include *Year* and *Region* indicator variables to control for time shocks and regional characteristics.

We then run a population difference-in-differences analysis (Angrist and Pischke, 2008) to see if we can confirm the main finding in the basic regression. A problem in a DID analysis is to fix the event date that separates the state of the *Average loan* before the event from the state

after the event. In our case, we know from the CEO's tenure data when the new CEO starts, and since we have panel data, we can study developments in the *Average loan* before and after the event. We follow Megginson, Nash, and Van Randenborgh (1994) in forming an average of the *Average loan* before and after the event for both male and female CEOs, and then testing if differences in these averages differ or not. We drop the year of change, that is, the event year is not in the calculations. It turns out that switches from one gender to another are few, implying that we have few observations and that the results must be treated with caution.

We run robustness test, first to investigate if the *Female CEO* also impacts other social mission variables on the intensive margin. We choose the percentage share of women in the loan portfolio, the MFI's gender bias, and last, its rural bias. Lower-income customers to microfinance are often identified as women and rural customers in the literature. Furthermore, not only the CEO, but also board members can impact the intensive margin. We test for this by substituting the *Female CEO* with the *Female chair* and then with gender diversity in the board.

The last estimation concerns the extensive margin. If women are more altruistic and favour the poor, we expect smaller difference in male and female CEO performance at the extensive margin of the social mission. We test for this using growth in the number of credit clients.

5 ECONOMETRIC EVIDENCE

5.1 The basic regression

We explore the relationship between the *Average loan* and the *Female CEO* with the model-predicted explanatory variables and control variables in table 4. Since the main explanatory

variable, *Female CEO* is binary, we need to estimate the relationship with the random effects panel date method.

Table 4

The main finding is that *Female CEO* is negatively related to *Average loan*. This means that a female CEO tends to concentrate more lending to small loans than her male peer, and thus, to favour financial inclusion for the poorest clients. This indicates that women tend to more altruism than men in their targeting of customers. The effect is also economically significant. A move from a male to a female CEO will in general reduce the average loan per capita by 3.7%. Thus, our finding implies that the search for better financial inclusion in the microfinance industry needs to take the gender dimension into account. A social mission-oriented MFI can confirm and strengthen its mission orientation by hiring a female CEO. This can also be of relevance to the banking industry in general.

Furthermore, our result is rather new to the literature of gender effects on company outcomes. These have centred on corporate performance (Adams and Ferreira 2009), risk-taking (Faccio et al., 2016; Bernile, Bhagwat, and Yonker 2018), and employee relations (Liu, 2021), to cite a few examples. We show that gender matters in the choice of customer groups, and that the female CEO tends to choose the least-privileged customers to a greater extent than men do, emphasising benevolence and universalism more than risk aversion. We do so in a setting where the female CEO is quite common, at more than 25% of all CEOs, thus enriching the literature on the CEO gender effect. Former literature has to a great extent been limited to study diversity in boards rather than the CEO for lack of observations.

The remaining control variables are in line with the results in Mersland and Strøm (2010). In particular, the variable *Operating costs* is an important driver of higher *Average loan*. The implication is that if the MFI can reduce costs, it can include more of the poorest customers in their portfolio. The negative sign on *Operating income* is a sign that there is a trade-off

between financial inclusion and financial sustainability, however, the relation is not significant. From this evidence, financial inclusion can thus be done at various levels without jeopardising financial sustainability, which is against common findings in the microfinance literature. A fuller analysis of this question is beyond this paper.

The overall statistics R2 and the Wald chi-square test are high, and high number of significant coefficient results shows that our regression specification is relevant. The Hausman test of endogeneity is significant at the 1% level. This indicates that estimation with instruments improves significantly upon an OLS regression., in other words, that estimation with instruments is necessary. We also note that the Stock and Yogo statistic indicates that the instruments are not weak. This means among other things that instruments provide independent variation for our endogenous variable, the *Female CEO*. To find further confirmation of the main results from our basic regression, we investigate what happens to the average loan when the CEO gender changes.

5.2 Confirmation in Difference-In-Difference analysis

We perform a population DID analysis (Angrist and Pischke, 2008) of the effects of moving from a male to a female CEO compared to a move from a female to a male CEO. We calculate the average of *Average loan* before the change and compare to the average of the *Average loan* after the change. The results are set out in Figure 1 and in Table 5.

Figure 1

Table 5

Figure 1 shows that a change from a male to a female CEO means that the *Average loan* drops noticeably, while changing from a female to a male CEO implies a rise in the *Average loan*.

When there is no change in gender, the *Average loan* stays about the same. Figure 1 is an illustration of the change in the averages before and after the change.

Table 5 shows the numbers in better detail. In the *From female to male* case, we see that the difference in average loan is significant and negative, meaning that the *Average loan* has increased. The reverse happens in the *From male to female* case, but this time the difference in averages before and after is not significant. This can be due to the lower number of observations in case 2. The DID analysis is now a comparison of the two differences in Case 1 and Case 2. The DID results are at the bottom of Table 5. We find the comparison of male and female CEOs is significant, although at only a 10% level. Comparing the two cases with difference in the *No gender change* Case 3 in the two DID results at the bottom of Table 5 shows no significant difference.

Taken together we find that our DID analysis supports the finding in Table 4 that a female CEO is better at targeting the poorest clients, thus providing better financial inclusion, than a male CEO. The low number of observations must be taken as a caveat to this conclusion, that is, more observations can alter results.

6 ROBUSTNESS TESTS

The average loan can increase almost automatically. First, MFIs usually practice conditional renewal with amount escalation, so that they grant higher loan amounts if the borrower repays the first loan. Bolton and Scharfstein (1990) show that such a lending scheme gives the borrower an incentive to build a credit history as a reliable borrower. Second, MFI customers may experience rising incomes, making them better able to repay a larger loan amount. Third, average loans could also result from MFIs internal allocations to higher-income customers as it diversifies its loan portfolio. By targeting higher-income customers, the MFI can cross-

subsidize the poorest customers (Armendáriz and Szafarz 2011). Thus, it is necessary to complement the average loan with other measures. In this section we present results when we try other measures of financial inclusion, we next investigate if the female chair and female directors have effects similar to the female CEO, and last, we study the impact of the *Female CEO* on financial inclusion at the extensive margin.

6.1 Alternative financial inclusion measures

We follow Mersland and Strøm (2010) in using the MFI's deliberate *Gender bias* and the extent of its lending to rural clients. Women are generally poorer than men and rural inhabitants are generally poorer than urban inhabitants. Targeting women and rural areas are main objectives of microfinance since its beginnings in the 1970s (Yunus 1998). Besides *Gender bias* we also include the MFIs' actual lending to female borrowers.

We investigate if the *Female CEO* has an impact upon the percentage of *Female borrowers* in MFIs portfolios, MFIs preference for female customers, their *Gender bias*, and likewise MFIs *Rural bias*. Table 6 gives results.

Table 6

Table 6 shows that the *Female CEO* has a positive impact on the percentage of *Female borrowers* in their portfolio. A *Female CEO* tends to allocate more loans to their female clients to a greater extent than their male peers. The impact on *Female bias* has the expected sign, but it is not significant. The *Female bias* gives information about what MFIs intend to do, the *Female borrowers* what they actually do. Thus, the difference in the significance between the two is not surprising. But whether the woman keeps the borrowed money is

another question that we cannot answer. Roy, Ara, Das, and Quisumbing (2015) find that this depends on the power distribution between husband and wife.

We cannot find a significant relation to *Rural bias* and the sign is not as expected. Additionally, we have run DID tests for *Gender bias* and *Rural bias* in the same way as in Table 5. We lack observations for *Female borrowers* to perform a DID analysis. Table 6 shows that no DID result is significant, that is, a change in the gender of the CEO has no impact upon either *Gender bias* or *Rural bias*, thus confirming the regressions results. It is possible that these policy variables are so ingrained that a change of CEO does not matter.

6.2 Female chair and female directors

In this section we now use female chair and female directors instead of *Female CEO* to investigate if gender impacts the *Average loan*. *A priori* we do not expect as much impact from directors as from the CEO. For instance, Bennedsen, Pérez-González, and Wolfenzon (2020), find that the adverse effects upon firm profitability and investments when the CEO is sent to hospital are not repeated for other senior managers. Table 7 gives our results.

Table 7

Table 7 exhibits no significant results for either *Female chair* or the two female director categories. The primacy of the CEO in microfinance institutions stands out from our analyses.

6.3 The extensive margin

We now turn to the question if gender has an impact on the extensive margin, that is, on the number of credit clients and the rate of increase in the number of credit clients.

The extensive margin concerns the MFI's customer numbers. For many years, the microfinance industry experienced double-digit growth rates (Mersland and Strøm 2012). Our measure is the MFI's growth rate of credit clients. The sign of this variable is uncertain. For instance, de Mel, McKenzie, and Woodruff (2009) and Faccio et al. (2016) find that male CEOs expand their businesses faster than women and with greater risks. A higher growth rate in MFIs led by men can follow from the male tendency towards power and achievement. Thus, the tendency of male leaders to pursue growth could counterbalance female leaders' desire for inclusion in the extensive dimension.

Table 8

Table 8 shows that the sign of the *Female CEO* is negative, but not significant. Thus, we cannot conclude that the *Female CEO* induces a lower growth rate in MFIs than men do. In this table, too, we include the summary results from DID analyses. We perform two analyses, one for growth in the number of credit clients as above, and one for the level of credit clients. However, none of the DID analyses is significant, confirming the results of the regression.

The implication for our analysis is that the *Female CEO's* benevolence and universalism is evident in the greater preference for inclusion of the poorest customers compared to male peers, and not in the inclusion of as many customers as possible.

7 CONCLUSION

We investigate whether lending from microfinance institutions (MFIs) to the poorest households and small businesses is greater when a female CEO runs the MFI rather than a male CEO. We differentiate between financial inclusion at the intensive margin (lending to the poorest) and the extensive (lending to more clients). We find that a female CEO grants

more smaller loans and thus extends lending to the poorest customers to a significantly greater extent than men. We also find that a female CEO tends to lend female borrowers more than men. However, we cannot confirm that the female CEO is better able to grow an MFI's credit client base than the male CEO is. We believe the contrasting results for the intensive and the extensive margin reflect the female tendency towards benevolence and universalism (altruism) and the male tendency towards power and achievement (Adams and Funk, 2012). The results parallel the finding of Strøm et al. (2014), that female leaders generate better financial performance for their MFIs. Gender matters for corporate decisions.

We arrive at this conclusion using a unique data set from designated rating agencies' reports covering 575 MFIs in 87 countries, stretching from 1998 to 2018. The CEO's gender is endogenous. We account for this by using the Two-Step Least Squares method (2SLS) with board size and the worldwide Gender Inequality Index as instruments. We show that instruments are necessary in a Hausman (1978) test and that instruments are not weak in a Stock and Yogo (2005) test. Furthermore, we perform a population difference-in-differences (DID) analysis for the change of gender in the MFI as in Megginson et al. (1994). The change of gender is the event, and we form averages for the female and male CEO before and after the event. The DID analysis confirms the results from the regression analysis.

We contribute to the literature on the question of mission drift in microfinance. Mission drift is the supposed tendency of MFIs to allocate a larger part of their lending portfolio to better customers who can take up larger loans. We show that the CEO's gender matters for this allocation. Gender matters for financial inclusion in microfinance.

Furthermore, we contribute to the general literature on managerial traits (Bertrand and Schoar, 2003; Graham et al., 2013; Malmendier and Tate, 2005, 2008; Malmendier et al., 2011; Nguyen et al., 2016), particularly the impact of gender on firm outcomes (Adams and Ferreira, 2009). We do so in sector of financial institutions that has more than 25% female

CEOs. The literature has been mostly concerned with risk aversion. Our results indicate that benevolence and altruism play a part in decisions. A policy implication for MFIs is that when they intend to maintain the focus on financial inclusion of the poorest customers, they should consider hiring a female CEO.

The high presence of a female CEO in microfinance, and in fact also female directors, makes the industry a fruitful arena for future research. Research in microfinance should include the gender aspect to answer questions of risk, investments, and the like.

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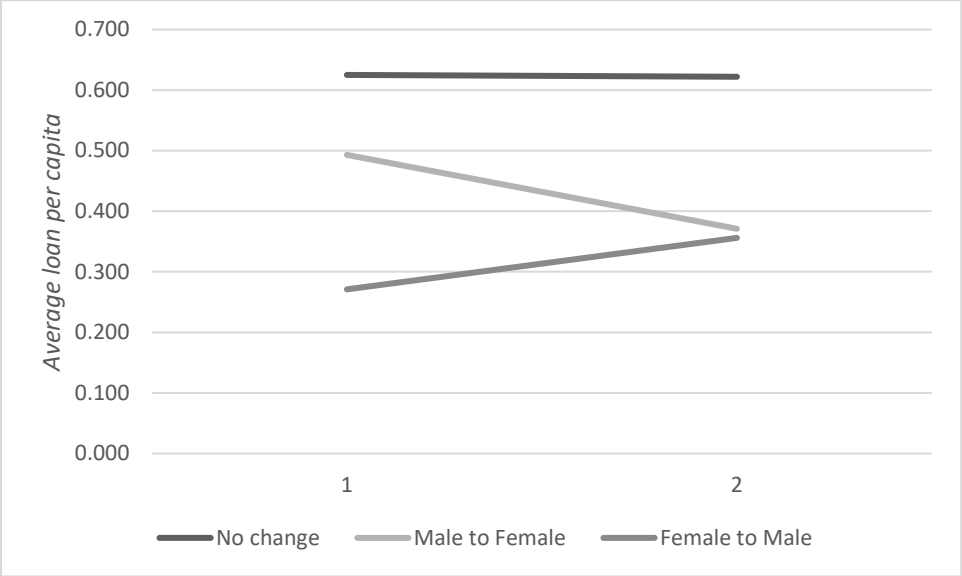
FIGURES

Figure 1: Illustration of changes in the averages of *Average loan* before change and after changing from either male to female CEO or from female to male.



In the figure, 1 means the period before the change in CEO gender, 2 the period after the change. Variable definitions are in Table 1. The figure shows the average of the *Average loan* before and after the change of gender for the MFIs where a change from male to female CEO took place, from female to male, and where no change in gender, either male or female, took place. A transition from male to female CEO means that the *Average loan* falls, while *Average loan* rises when the transition is from female to male. With no change in gender, there is no change in *Average loan.*
See Table 1 for variable definitions.

TABLES
Table 1: Variable definitions.

Variable name	Abbreviation	Definition
Social mission		
Average loan	*AvgL*	Total loan portfolio divided by credit clients and divided by the country's GDP per person
Female borrowers		The percentage of female borrowers in the portfolio
Female bias		Binary: 1 if MFI emphasizes female clients
Rural bias		Binary: 1 if MFI emphasizes rural borrowers
Credit client	*CC*	Number of credit clients in period t divided by the average loan
Female leadership		
Female CEO	*Femceo*	Binary: 1 if a female CEO
Female chair	*Femchair*	Binary: 1 if a female chair
Female director	*Femdir*	Binary: 1 if one or more female directors
Female director percentage	*Femdirpct*	The fraction of female directors in the board
Control variables		
Operating income	*OpInc*	(Revenue – Interest expenses – OPX) / (Credit clients)
Deposits	*Dep*	Deposits / (Credit clients)
Operating costs	*OPX*	OPX / (Credit clients)
PaR30		Fraction of loan portfolio 30 days overdue
Assets	*TA*	Total assets (USD 1,000) divided by the country's GDP per person
Age		Number of years in operation as an MFI
Regulated	*Regul*	Binary: 1 if regulated by a local banking authority
Founder	*Found*	Binary: 1 if internationally initiated, 0 if local
Competition	*Comp*	Index from no competition (1) to high competition (7)
HDI		Human Development Index encompassing dimensions of GNI *per capita*, education, and health
Board size	*Bsize*	The MFI's number of directors
Gender Inequality index	*GII*	Index measuring gender inequality in dimensions of health, empowerment, and labour market participation
Year	*Yr*	Year indicator variable in calendar time
Region	*Reg*	Indicator variable for world regions from World Bank

Data sources: Rating reports from international, accredited rating agencies are the source for all variables at the MFI level, including *Competition*. GNI *per capita* is from the World Bank. *HDI* and *GII* are from the United Nations Development Programme. World Bank regions are East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, South Asia, Sub-Saharan Africa, and North America.

Table 2: Descriptive statistics of variables

Variable	Mean	Stand.dev.	Min	Median	Max	N
Average loan	1,016	1,313	21	587	9,973	3,449
Average loan per capita	0.583	1.099	0.000	0.298	33.002	3,621
Female borrowers pct	0.651	0.239	0.010	0.620	1.000	805
Female bias	0.443	0.497	0.000	0.000	1.000	3,293
Rural bias	0.176	0.381	0.000	0.000	1.000	3,447
Credit clients	23,361	52,401	0	8,005	1,046,062	3,540
Female CEO	0.264	0.441	0.000	0.000	1.000	3,229
Female chair	0.238	0.426	0.000	0.000	1.000	2,973
Female director (binary)	0.771	0.420	0.000	1.000	1.000	1,696
Female director percentage	0.287	0.256	0.000	0.200	1.000	1,803
Operating income	732,014	3,138,868	-60,900,000	109,668	63,800,000	3,723
Deposits	9,660,193	60,400,000	0	0	1,140,000,000	3,723
Operating costs	2,951,514	7,559,458	0	801,713	105,000,000	3,723
PaR30	0.074	0.428	-0.271	0.036	16.000	3,428
Assets	27,600,000	95,200,000	1,848	5,248,000	1,370,000,000	3,723
MFI age	12.078	8.371	0.000	10.000	79.000	3,709
Regulated	0.395	0.489	0.000	0.000	1.000	3,685
Founder	0.390	0.488	0.000	0.000	1.000	3,700
Competition	4.774	1.425	1.000	5.000	7.000	3,654
HDI	0.004	0.003	-0.018	0.004	0.057	2,935
Board size	6.873	3.253	0.000	7.000	40.000	3,354
*Gender Inequality Index**	0.450	0.183	0.000	0.470	0.818	3,588

* Gender inequality is higher the higher the index is.
See Table 1 for variable definitions.

Table 3: Social mission measures and instruments distributed by CEO gender with t-test.

Panel A: Social mission and the *Female CEO*

	Mean	Std. err.	Std. dev.	Obs
Average loan per capita				
Male CEO	0.596	0.024	1.157	2,320
Female CEO	0.475	0.030	0.876	848
Combined	0.563	0.019	1.090	3,168
Diff	0.121	0.038		
t-value	3.142			
Credit client growth				
Male CEO	0.387	0.029	1.278	1,918
Female CEO	0.433	0.108	2.840	698
Combined	0.399	0.036	1.830	2,616
Difference	-0.045	0.111		
t-value	-0.405			

The change in the number of credit clients (*dCC*) is defined as:

$dCC = (Credit\ clients)_t/(Credit\ clients)_{t-1} - 1.$

Panel B Instruments and the *Female CEO*

Gender	Mean	Std. err.	Std. dev.	Obs
Board size				
Male CEO	6.762	0.069	3.329	2,330
Female CEO	7.065	0.103	2.978	833
Combined	6.842	0.058	3.243	3,163
Difference	-0.303	0.124		
t-value	-2.438			
Gender Inequality Index				
Male CEO	0.453	0.004	0.187	2,417
Female CEO	0.439	0.006	0.183	898
Combined	0.449	0.003	0.186	3,315
Difference	0.014	0.007		
t-value	1.999			

See Table 1 for variable definitions and data sources.

Table 4:
Basic instrumental variables regressions with the *average loan* per capita as dependent.

Dependent: *Average loan*	Basic regression	Standard error	z value
Female CEO	-0.037	0.017	-2.140
Operating income$_{t-1}$	-11.672	8.182	-1.430
Deposits$_{t-1}$	0.013	0.004	3.030
Operating costs$_{t-1}$	0.117	0.016	7.430
PaR30$_{t-1}$	0.555	0.225	2.470
Assets$_{t-1}$	0.032	0.012	2.770
MFI age$_{t-1}$	-0.024	0.020	-1.150
Regulated	0.053	0.020	2.660
Founder	-0.065	0.023	-2.810
Competition$_{t-1}$	0.071	0.029	2.430
HDI$_{t-1}$	-3.311	0.346	-9.580
Constant	138.283	96.452	1.430
Year and region indicators?	Yes		
Observations	1,948		
MFIs	443		
Overall R2	0.506		
Wald chi-square test	0.000		
Hausman test	0.000		
Stock and Yogo test	64.500		

The estimating 2SLS equation is:

$$\ln AvgL_{it} = \alpha + \gamma_1 FemCEO + \beta_1 \ln Oplnc_{it-1} + \beta_2 \ln Dep_{it-1} + \beta_3 \ln OPX_{it-1} + \beta_4 \ln PaR30_{it-1} + \beta_5 \ln Ass_{it-1} + \beta_6 \ln Age_{it-1} + \beta_7 Regul + \beta_8 Found + \beta_9 \ln Comp_{it-1} + \beta_{10} \ln HDI_{it-1} + Yr_t + Reg + u_{it}$$

where variables appear in the order given in the table column (1). Table 1 contains definitions of other variables. The regressions are performed with instruments ln*Bsize* and ln*GII*. *Average loan*, *Operating income*, *Deposits*, and *Operating costs* are divided by the number of *Credit clients*. Continuous variables are lagged one period. Standard errors are clustered at the MFI level. The Hausman test is the test of the 2SLS regression against an OLS regression. A significant value means that the coefficients in the 2SLS and the OLS are different, indicating that an IV regression is warranted. The Stock and Yogo test is an F test against weak instruments. If the OLS regression also containing the instruments is above 10.00, Stock and Yogo assume that the instruments are not weak.

Table 5: Difference in difference (DID) analysis of changes in *Average loan* when the CEO's gender changes

	Average	St.error	Obs
Case1	*From female to male*		
Before event: Female CEO	0.271	0.027	98
After event: Male CEO	0.356	0.032	78
Difference	-0.084	0.042	
t-value	-2.007		
Case 2	*From male to female*		
Before event: Male CEO	0.493	0.059	36
After event: Female CEO	0.371	0.048	23
Difference	0.122	0.076	
t-value	1.609		
Case 3	*No gender change*		
Before event	0.625	0.034	1,430
After event	0.622	0.023	1,927
Difference	0.003	0.041	
t-value	0.070		
DID t-value FtoM - MtoF	-1.750		
DID t-value FtoM - Noch	-1.050		
DID t-value MtoF - Noch	1.020		

FtoM = From *Female CEO* to *Male CEO*
MtoF = From *Male CEO* to *Female CEO*
Noch = No gender change

The Difference-In-Differences (DID) test is:

$$\text{DID} = \frac{(\overline{\text{AvgL}}_{\text{F}_1} - \overline{\text{AvgL}}_{\text{M}_2}) - (\overline{\text{AvgL}}_{\text{M}_1} - \overline{\text{AvgL}}_{\text{F}_2})}{\text{SE}(\overline{\text{AvgL}}_{\text{F}_1} - \overline{\text{AvgL}}_{\text{M}_2}) + \text{SE}(\overline{\text{AvgL}}_{\text{M}_1} - \overline{\text{AvgL}}_{\text{F}_2})} \sim \text{t}$$

Here, subscripts F and M mean *Female* and *Male CEO,* respectively. 1 signifies the period before the change in CEO gender event, and 2 the period after. The horizontal bar above *AvgL* signifies the average of observations. *SE* is standard error of the expression in the parenthesis, the difference in each case. The averages do not contain the event year, i.e. the year that gender changes, as in Megginson, Nash, and Van Randenborgh (1994). In Case 3 the event year is set in the middle of the data sample, at year 9.

Table 6: *Female CEO* and other financial inclusion measures: Female and rural borrowers

	Dependent		
	Female borrowers	*Female bias*	*Rural bias*
Female CEO	0.028***	0.291	-0.681
Operating income $_{t-1}$	-1.118*	-94.407*	-1.446
Deposits $_{t-1}$	-0.003	-0.166***	-0.219**
Operating costs $_{t-1}$	-0.030***	-1.139***	-0.676***
PaR30 $_{t-1}$	-0.253*	-6.284*	-7.939**
Assets $_{t-1}$	-0.006	0.205**	-0.532***
MFI age $_{t-1}$	-0.010	0.418**	-0.057
Regulated	-0.041***	-1.038***	0.651
Founder	0.030**	0.467*	-0.128
Competition $_{t-1}$	-0.013	-1.504***	-3.114***
HDI $_{t-1}$	0.329*	-3.897**	-2.193
Constant	13.893*	1118.575*	29.679
Year and region indicators?	Yes	Yes	Yes
Observations	566	2,072	2,128
MFIs	279	460	475
Overall R2	0.354		
Wald chi-square test	0.000	0.000	0.000
Hausman test	0.000		
Stock and Yogo test	11.050		
DID test t-value		0.944	-0.352

Table 1 contains definitions of variables. Table 6 contain the same set of explanatory variables as in Table 4, but now with different dependent variables. The *Female borrowers* regression follows the same setup as in Table 4, for *Female bias* and *Rural bias* we employ probit panel data estimations, since these two dependent variables are dichotomous, but without instruments. *Average loan*, *Operating income*, *Deposits*, and *Operating costs* are divided by the number of *Credit clients*. Continuous variables are lagged one period. Standard errors are clustered at the MFI level. The DID test is performed in the same way as in Table 5.
Three stars stand for significance at the 1% level, two stars for the 5% level, and one star for the 10% level.

Table 7: The *Average loan* when *Female chair* and *Female director* substitute for *Female CEO*.

Dependent:	*Female*	*Female*	*Female*
Average loan	*Chair*	*directors*	*dir. pct*
Female chair	-0.008		
Female directors		0.004	
Female dir. pct			0.029
Operating income $_{t-1}$	-6.486	-7.368	-7.348
Deposits $_{t-1}$	0.014***	0.016***	0.016***
Operating costs $_{t-1}$	0.126***	0.117***	0.115***
PaR30 $_{t-1}$	0.619***	-0.068	-0.093
Assets $_{t-1}$	0.034***	0.021	0.021
MFI age $_{t-1}$	-0.034	-0.029	-0.029
Regulated	0.042**	0.044*	0.045*
Founder	-0.064***	-0.053*	-0.056*
Competition $_{t-1}$	0.068**	0.087*	0.086*
HDI $_{t-1}$	-3.614***	-4.178***	-4.209***
Constant	77.294	88.199	87.986
Year indicators?	Yes	Yes	Yes
Observations	1,796	1,183	1,177
MFIs	409	316	314
Overall R2	0.528	0.499	0.497
Wald chi-square test	0.000	0.000	0.000
Hausman test	0.000	0.000	0.000
Stock and Yogo test	62.690	35.780	35.730

Table 1 contains definitions of variables. Table 6 contain the same set of explanatory variables as in Table 4, except that *Female CEO* is substituted for *Female chair*, *Female directors*, and *Female director percentage.* The regressions are performed with instruments ln*Bsize* and ln*GII*. *Average loan*, *Operating income*, *Deposits*, and *Operating costs* are divided by the number of *Credit clients*. Continuous variables are lagged one period. Standard errors are clustered at the MFI level.
Three stars stand for significance at the 1% level, two stars for the 5% level, and one star for the 10% level.

Table 8: Social mission at the extensive margin

Dependent: *Credit client growth*	Regression	Standard Error	z value
Female CEO	-0.022	0.018	-1.200
D(Operating income) $_{t-1}$	-0.178	0.180	-0.990
D(Deposits) $_{t-1}$	-0.005	0.018	-0.280
D(Operating costs) $_{t-1}$	0.013	0.077	0.170
D(PaR30) $_{t-1}$	-0.898	0.255	-3.520
D(Assets) $_{t-1}$	0.084	0.056	1.480
D(MFI age) $_{t-1}$	0.322	0.104	3.090
Regulated	-0.005	0.022	-0.240
Founder	-0.070	0.021	-3.390
D(Competition) $_{t-1}$	-0.041	0.074	-0.550
D(HDI) $_{t-1}$	-0.123	3.424	-0.040
Constant	1.975	0.207	9.560
Year and region indicators?	Yes		
Observations	1,487		
MFIs	410		
Overall R2	0.061		
Wald chi-square test	0.000		
Hausman test	1.000		
Stock and Yogo test	2.560		
DID test t-value growth			0.698
DID test t-value level			-1.625

Table 1 contains definitions of variables with parentheses. The operator *D* before continuous variables means that the variables are transformed into a return form as in Table 3, Panel A. *Operating income*, *Deposits*, and *Operating costs* are now divided by the average loan. Standard errors are clustered at the MFI level.