FEMALE LEADERS AND FINANCIAL INCLUSION. EVIDENCE FROM MICROFINANCE INSTITUTIONS

R. Øystein Strøm, Bert D'Espallier and Roy Mersland

Corresponding author. Email: oystein.strom@hioa.no. Telephone: +47 67 23 82 55.

Oslo and Akershus University College, Oslo, Norway; University College of Southeast Norway.

Hogeschool-Universiteit Brussel, Brussels, Belgium. E-mail: bert.despallier@hubrussel.be

University of Agder, Kristiansand, Norway. E-mail: roy.mersland@uia.no

ABSTRACT

This research advances the hypothesis that female leaders (CEO, chair, and director) of a microfinance institution (MFI) are better able than male to provide the poorest families with loans. We differentiate between a depth and a width dimension of outreach. We use a global panel data set of MFIs collected from MFI raters' reports. The problem of endogeneity for the female leader is resolved by running Heckman's two-step endogenous dummy variable estimation with G2SLS estimation for the panel data. We find evidence for greater depth outreach (smaller average loan, more gender biased) with a female leader, but not for width outreach (credit client growth). The female leaders exhibit greater altruism, greater competition avoidance, but not greater risk aversion than male peers.

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INTRODUCTION

Does a female leadership better fulfill the microfinance institutions (MFI) social mission than male managed MFIs? The MFI's social mission is to provide poor families and small businesses in developing countries access to financial services. The leadership categories in this paper are the CEO, the chair, and the directors. We employ a unique data set of MFIs to show that female leadership indeed allocates resources more consistently to poor households than men do. We control for the endogeneity problem that a female leadership candidates self-selects into outreach oriented MFIs by controlling for personality traits such as altruism (Andreoni & Vesterlund, 2001), competitiveness (Niederle & Vesterlund, 2007), and risk aversion (Charness & Gneezy, 2012; Eckel & Grossman, 2008), and for the leader's competence measured in business experience and formal business education. Our paper contributes to the discussion on mission drift in microfinance, as well as the emerging literature on "managerial traits", specifically, on gender differences.

Microfinance provides an advantageous setting for studying the impact of female leadership on business outcomes. First, microfinance has a relatively high share of female leaders. In our sample, 29.3% of CEOs in MFIs are women, and 25.5% of all directors are women. This means that we avoid the small samples that sometimes bias studies in settings where female leaders are few and far between. Second, female founders of MFIs are often prominent spokespersons for the microfinance idea, that is, to include more poor households into formal financial institutions. Third, a large part of the MFIs' loan allocations are to women, in fact Maes & Reed (2012) report that 82% of loans are for women. Microfinance has experienced a formidable growth since the 1980s, reaching more than 200 million clients globally, becoming a force for changes in many poor families in poor countries. Women very often constitute the poorest segments of society. Therefore, providing loans to women fulfils the target of reaching out to the poor households. A fourth reason is that microfinance is a fairly homogenous business, building on the model set down in the Grameen Bank in Bangladesh (Yunus, 1998). The implication is that industry effects will not bias our results. On the other hand, heterogeneity may enter as we use a data set spanning 73 countries in the developing world. We are able to control for country heterogeneity by including the Human Development Index from the United Nations Development Programme and by benchmarking monetary variables to the average GDP in the relevant year.

Besides the microfinance mission, the MFI has a financial sustainability objective (Morduch, 1999). Extending loans remains the MFI's chief financial service (Armendáriz & Morduch, 2010). An MFI client/borrower often has little or no collateral and no credit history. Furthermore, the fixed costs of setting up a new loan contract and the ensuing monitoring can be very expensive. Microfinance has found innovative ways to overcome such problems (Mersland & Strøm, 2012). From a microfinance perspective, the most important issue is to provide small loans on short duration, most often less than a year, and to demand frequent repayments. The client is thus able to build a credit history quickly, and the MFI learns the borrower's type.

For many years microfinance enjoyed a high esteem in the public, culminating with the Nobel Peace Prize in 2006 to Muhammad Yunus and the Grameen Bank. However, microfinance has come under severe criticism, being accused of charging a too high lending rate, existing only for making money, and being too vigilant in obtaining repayments on loans (Bateman, 2010). The Andhra Pradesh crisis in India in 2010 further tarnished microfinance' standing in the public eye,

when it was claimed that a MFI client had committed suicide for not being able to meet repayment obligations. Despite these setbacks, microfinance continues to flourish, although Kaur & Dey (2013) show that the government-imposed regulations in Andhra Pradesh have severely curtailed activity there.

We consider two dimensions to the social mission, the width and depth (Schreiner, 2002) of outreach. The depth concerns the poverty of the clients and the width is the number of clients reached. We follow much of the literature e.g. Mersland & Strøm (2010) in using the average loan, the MFI's gender bias, and its lending to rural areas as measures of depth. Furthermore, the average lending rate also enters as a measure of outreach. Thus, the lower the average loan, the greater is the outreach. Likewise, the depth outreach increases when the MFI prefers to lend to women and to rural areas. For width we use the growth in the number of credit clients (Hartarska & Mersland, 2012). We also try other width measures in robustness checks, such as portfolio size. The hypotheses are that a female leader improves both width and depth outreach. Thus, we provide a broad set of measures to the sometimes, fuzzy picture of the MFI's outreach to the poorest.

Our unique data are from third-party rating agencies (www.ratingfund2.org). The raters visit each MFI and collect both accounting and governance data, in particular the gender of the CEO, the chair, and directors, as well as data on for instance the MFI's product mix. This gives the data an on-site quality check, that is, an extra verification of the data's validity. The data has observations for almost four years on average, including the year when the rating is undertaken and normally three years before the rating year. In all, we are able to collect about 1,500 observations from roughly 400 MFIs domiciled in 73 developing countries.

We perform analyses in two steps, following the Heckman's endogenous dummy variable method (Wooldridge, 2010). This is an instrumental variable method that aid in identifying the causal effect of a female leader, and thus avoid endogeneity problems. In the first step, we identify factors that help to explain why the MFI has a female CEO and/or female directors. In the second, we explore the outreach effects from having a female CEO or female directors with instruments derived from the first step. We also perform other econometric checks in robustness tests, specifically an inverse Mills ratio analysis and simultaneous equation analyses.

Mission drift is generally taken to be the tendency to change the MFI's loan allocation away from the poor clients and to the less-poor. We contribute to this literature by showing that a female CEO allocates more lending to customers with the low income than a male CEO, at the same time, the rate of loan extension to new customers is not significantly different between the female and male CEO. This implies that the female CEO is better able to stem mission drift. Thus, there is a gender difference in this important aspect of MFI policy. Former literature on mission drift does not consider this aspect, but instead focus on the tradeoff between outreach and financial inclusion (Cull & Morduch, 2007), the importance of cost (Mersland & Strøm, 2010), the macroeconomic conditions and competition (Ahlin, Lin, & Maio, 2011), and the MFI's preference for outreach (Salim, 2013). The result indicates that a female CEO is better able to spot the more credit-constrained customers.

A main finding in the literature on "managerial traits" (Bertrand & Schoar, 2003; Graham, Harvey, & Puri, 2013; Malmendier & Tate, 2005, 2008; Malmendier, Tate, & Yan, 2011) is that a CEO's gender or other characteristics have real effects on company policies and outcomes. It is possible that female candidates for managerial positions self-select into outreach-oriented MFIs

due to their greater altruism, less competitiveness, and greater risk aversion. We confirm competitiveness, but cannot find evidence of greater risk aversion or greater altruism among female managers in MFIs. The findings support earlier studies that managerial traits are important in MFIs. (Randøy, Strøm, & Mersland, 2013) find that if the founder of the MFI is still its CEO, outreach is higher, and (Strøm, D'Espallier, & Mersland, 2014) find that a female CEO has better financial performance than a male. In a study of the Norwegian law on equality of gender board representation introduced in 2006, (Matsa & Miller, 2013) find that firms become more altruistic with more equality of gender representation, in that they undertake fewer workforce reductions, increase relative labour costs and employment levels and reduce short-term profits. Investigations into risk characteristics of firms led by women also confirm the risk aversion results from experimental research. (Faccio, Marchica, & Mura, 2015b) find that female-led firms tend to have smaller debt to assets, lower earnings volatility, and is more likely to remain in business than firms run by men, exploiting data from the huge European Amadeus database. (Huang & Kisgen, 2013) uncover greater risk aversion among female managers in their study of acquisitions and debt policy.

Another explanation is greater competence among female CEOs. Strøm et al. (2014) argue that female leaders are better able to fulfil the MFI's goals because she better understands the needs of the clients to the MFI. Since most of the clients are themselves women, the female manager should be able to design products that answer the needs of the MFI's customers.

The following sections are organized so that theory and hypotheses follow next, then we outline the Heckman methodology and other methodological issues, next comes data and variable definitions, econometric evidence, robustness checks, before we round off with conclusions.

THEORY AND HYPOTHESES

We investigate if there is any relation between the MFI's social mission, or its outreach to poor households and small businesses, and the gender of the CEO, the chair and the directors. Thus, the main estimation we perform is

(1) Outreach = A + B(Female leader) + C(Other variables) + Error term.

Our main interest is to determine B, the coefficient for the female leader, and we expect the coefficient to be positive. As will be explained below, the regression is not straightforward, as the female leader variable is probably endogenous. In the methodology section we describe how we identify the causal relation. From (1) it is evident that we need to explain the meaning of outreach, and also to lay out why a female leader is better able to fulfill the MFI's social mission than a male. We use 'outreach' and 'financial inclusion' interchangeably, and we prefer the term 'leader', since our leadership data contain both a manager, the CEO, and directors, the chair and the other directors.

The MFI has a social mission and a financial sustainability objective (Morduch, 1999). We suppose the MFI tends towards either a social mission or a profitability orientation. The leader is motivated by either social mission or monetary rewards. The social mission motivated manager identifies with the outreach goals of the MFI, the monetary motivated is interested in the monetary reward for his or her work effort. An outreach oriented MFI is likely to maximize outreach with a social mission motivated leader. We will argue that female leaders are on average

more social mission motivated than male managers. Thus, we expect more outreach with female managers.

Social mission

Providing poor households and small enterprises in developing countries with financial services, first and foremost loans, remains the MFI's main social mission (Reed, 2015). MFIs also accept deposits and offer various kinds of insurance. However, in this paper we restrict our attention to loans, since these remain the most common form of financial service, and this is where we have the best data resources.

Schreiner (2002) divides outreach into depth and width dimensions. The MFI's portfolio may be written:

(2) Loan portfolio = (Average loan)(Number of Credit clients)

The MFI's social mission can be fulfilled 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, that is, this is depth outreach. The other dimension is the number of credit clients served. Holding the average loan fixed, width outreach is increased when the number of credit clients increases. Salim (2013) uses the extension of MFIs' branch offices in Bangladesh in the study of MFIs' preference for outreach. In this paper, width outreach is the increase in the number of credit clients. Average loan is commonly used in studies of mission drift (Bhatt & Tang, 2001; Cull et al., 2007; Mersland & Strøm, 2010; Abeysekera, Oguzoglu, & Le, 2014). However, average loan and the growth in the number of credit clients have their own limitations, as we discuss below. Therefore, we include the interest rate on loans, the MFI's gender bias, and the lending to rural customers as complements to outreach. The lower the interest rate charged to the customer, the better able the poor household is to meet loan commitments, and the better the MFI is to reach the low-income households. Armendáriz & Morduch (2010) note that credit extended to the woman in the family has beneficial effect for all family members, while the effects of a loan to a man tend to stay with the man. The de Mel, McKenzie, & Woodruff (2009) randomized experiment on credit constraints in Sri Lanka underlines the importance of including female customers as an outreach measure. They find that male-led businesses grow faster following a capital injection.

Motivation

Why is the female leader better at creating outreach than male leaders? The leader's motivation is the key to understanding. We draw upon findings in the psychological literature that men and women have on average different personality traits to explain that women are more social mission motivated. For instance, John & Srivastava (1999) record how psychologists have studied personality traits since the 1930s, ending with five major categories (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism**),** the socalled "Big Five Inventory" (Benet-Martínez & John, 1998**).** In this paper, we underline three personality traits that have appeared in the corporate governance literature, namely altruism, competitiveness, and risk aversion.

In controlled laboratory experiments researchers generally find that women are more selfless or altruistic than men, thus more concerned with equality and a care for the less well off (Andreoni & Vesterlund, 2001; Eckel & Grossman, 1998). Women's motivations tend towards benevolence and universalism rather than self-enhancement. The experimental evidence finds support in studies using other data as well. Adams and Funk (2012) report the same pattern from survey data. Matsa and Miller (2013) uncover a female management style to more inclusive, stakeholder oriented policies in a natural experiment, the mandated quota of at least 40% of each gender in the board of directors in Norway. Thus, it is plausible that a female CEO has a stronger motivation to work for the poor than a male CEO. She has as stronger identification with the MFI's social mission. Such identification should translate into a greater weight on outreach goals in MFIs with a female leadership. We suppose that this disposition leads female leaders to favour outreach to not only female borrowers, but poor people in general.

We next consider risk aversion. The Eckel and Grossman (2008) overview of controlled laboratory experiments shows that women are generally more risk averse than men, but that the experiment's context matters considerably. The Charness & Gneezy (2012) meta-study confirms the risk aversion finding. 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. They reason that women need to overcompensate on accepted, male criteria for board membership to qualify as director, and therefore, show lower risk aversion than their male peers. If risk aversion is higher among female leaders than male, we expect that female-led MFIs favour female customers over male, because female borrowing clients are more likely to repay than male (D'Espallier, Guerin, and Mersland, 2013). Risk aversion can also be important for the choice of loan size. A customer has fewer problems with meeting loan obligations, the smaller these obligations are. Again, risk aversion induces women to favour outreach goals more than men.

The third personality trait is that women tend to avoid competition. In a controlled laboratory experiment Gneezy, Niederle, and Rustichini (2003) show that women do worse than men when competing against men, and Niederle and Vesterlund (2007) show that women tend to choose piece-rate payment rather than the more competitive winner-takes-all tournament system as a reward for fulfilling a task. They show that this applies to the women of highest ability as well. Flory, Leibbrandt, and List (2014) set up a field experiment of application for clerical jobs and find that women tend to shy away from the competitive posts, but that men do not. Competitiveness also follows gender lines in young persons' choice of academic tracks (Almås, Cappelen, Salvanes, Sørensen, & Tungodden, 2014; Buser, Niederle, & Oosterbeek, 2014), while Reuben, Sapienza, & Zingales (2015) find that gender differences in competitiveness are manifest among post-graduate candidates from the top-ranking Booth School of Business.

Competitiveness can induce female leaders to choose a career in social mission oriented MFIs instead of the profit oriented. The social mission oriented MFIs have in general a lower wage level than the profit oriented, and this makes these MFIs less able to compete for management talent using monetary rewards. Thus, if it is true that women shy away from competition, we should expect relatively more female hires in social mission oriented MFIs than in profit oriented MFIs. Therefore, competitiveness can imply that female leaders tend to cluster in NGOs and cooperatives rather than in stock companies. Furthermore, the female leader is likely to choose an MFI with a low level of product market competition than a high. In high competition markets the MFIs need to give higher priority to financial sustainability. Thus, if the female leader shies away from high product market competition, she will tend to choose outreach oriented MFIs.

In summary, we expect the personality traits of altruism, risk aversion, and competitiveness to imply that female leaders place a greater weight on outreach goals than their male peers.

An objection to this conclusion can be that gender differences in personality traits are country specific, and that the differences uncovered are from experiments conducted on persons in rich, Western countries, not applicable to the realities of developing countries. However, evidence from cross-country studies indicate that differences exist across nations. Schmitt, Realo, Voracek, & Allik (2008) study several personality traits from the "Big Five Inventory" and other dimensions across 55 developing and developed countries. Their main findings are that gender differences on personality traits exist across countries, and that these differences become more pronounced the more developed the country is. They also find that this increasing difference is because men become more "male", while differences among women across countries are less pronounced. In a study of gender competitiveness differences among 15-year olds in Norway, Almås, Cappelen, Salvanes, Sørenson, & Tungodden (2014) confirm the finding that gender differences in competitiveness are larger the more advanced the socio-economic group is. The upshot for our study is that although gender differences in personality traits are smaller on average in developing countries, it should be safe to assume that the differences are significant in the socio-economic group where MFI leaders belong.

Competence

A female leader is likely to have better knowledge of poorer segments of credit clients. Strøm et al. (2014) argue that female managers and directors understand the MFI's customer base better than their male peers because most of the MFI's customers are themselves women. A female leader is able to identify the needs of their female customers, and thus, to design a product strategy that is better suited for their customers. Because of this, a female leader should be better at creating outreach than a male leader.

WOMEN IN MICROFINANCE: DATA AND VARIABLE DEFINITIONS

Our data set (downloaded at www.ratingfund2.org) is based on rating assessment reports gathered by specialized rating agencies. Information in the rating reports is collected during on-site visits to the MFI by specialized evaluators working in the rating agencies and further screened by the rating committee at the rating agency's main office. The ratings data are considered among the most representative available for the microfinance industry (Mersland & Strøm, 2009). We report on 329 MFIs operating in 73 different countries worldwide from in the years 2001-2008. The rating agencies are supported by the Rating Fund of the Consultative Group to Assist the Poor (CGAP), a microfinance branch of the World Bank. At each rating, the raters collect data for the rating year and years immediately preceding. In this way, up to six years of data for an MFI are available for the period 1998 to 2008. The amount of detail varies in the reports, resulting in different numbers of observations. No dataset is perfectly representative of the microfinance field. In particular, our dataset contains relatively few megasized MFIs, and does not cover the virtually endless numbers of small savings and credit cooperatives. The former are rated by such agencies as Moody's and Standard & Poor's, while the latter are not rated at all.

Rating of MFIs is one of the main transparency initiatives in the microfinance industry and has been actively supported by donors like Interamerican Development Bank and the EU (Beisland, Mersland and Randøy, forthcoming). The four rating agencies M-CRIL, Microfinanza, Planet Rating, and Microrate have come to dominate the market, and they are all approved agencies by CGAP. The MFI rating assessments are much wider than traditional credit ratings, as they aim to measure the MFIs' ability to reach their multiple sets of objectives (Beisland and Mersland, 2012). The purpose of rating reports is to present independent information that stakeholders can use to make informed decisions. Even if a rating agency argues that its methodology is different from that of other agencies, the core information used in this study consists of standard indicators that are calculated similarly across the industry and by all rating agencies.

Starting as experimental development schemes in Asia and Latin America in the 1970s, microfinance has become a major industry today. By December 31st 2010, more than 3,600 MFIs report their numbers to the Microcredit Summit (www.microcreditsummit.org), and they provide more than 205 million people with credit. 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, in fact, the median age is 8 years in our sample, 25% are under banking authorities regulation, and the incorporation ranges from shareholder ownership (25%) to cooperatives (15%) and non-governmental organizations (54%).

Variable definitions

We define variables used in the estimations in table 1 together with summary statistics. The table contains definitions of female leadership, social mission, and the set of MFI characteristics and country control variables.

Table 1

Social mission. The MFI's social mission is fairly straightforward to define, but difficulties arise in finding operational measures. The first depth variable we discuss is the average loan. In discussing relation (1) we have seen that this is an often used measure in microfinance. The interpretation is that the lower the average loan, the higher is the MFI's outreach. However, the average loan measure has its drawbacks stemming from the mechanics of microfinance lending. First, the MFI usually practices conditional renewal with amount escalation so that the MFI grants a higher loan amount if the borrower repays the first loan. Bolton & Scharfstein (1990) show that such a lending scheme gives the borrower an incentive to build a credit history as a reliable borrower. Also, MFI customers may experience rising incomes in common with a large proportion of citizens of developing countries, making them better able to repay a given loan amount. Both aspects can result in a drift towards a higher average loan with time. Higher average loans may also result from the MFI's internal allocations as it grows. It is possible that the MFI deliberately targets higher-income customer segments in order to diversify its loan portfolio and thus to reduce the overall portfolio risk, in particular, by avoiding the risks of servicing only one customer segment. Furthermore, by targeting higher-income customer segments the MFI may be able to cross-subsidise the poorest customers in its portfolio (*REF!!). Thus, the average loan is not a perfect measure of the MFI's outreach, and therefore, needs to be complemented with other measures. Table 1 reveals that the average loan is USD 734 and the

median is USD 351. On average, this means that the loans are small. The median average loan is less than one third of the domestic GDP per person in our sample, justifying the "micro" in microfinance.

We follow Mersland & Strøm (2010) in using the MFI's deliberate *gender bias*, and the extent of its lending to rural clients as measures of depth outreach. The reason for these measures are simply that women are generally poorer than men, and rural inhabitants are generally poorer than urban. Targeting women and rural areas have been main objectives of microfinance since its beginnings in the 1970s (Yunus, 1998). In 41% of cases in our sample, the rating agencies attest that MFIs have a female gender bias in their lending practices. Unfortunately, many MFIs do not report their percentage of female customers. Those who do, however, show a percentage in the 70–75% range, which is close to that reported in Cull, Demirgüç-Kunt, and Morduch (2009). Thus, the female fraction is high in MFIs on both the customer and the leadership sides. However, although a woman obtains a loan, it is not certain that the resources stay with the woman. Roy, Ara, Das, & Quisumbing (2015) point out that this depends on the intramarriage power distribution between husband and wife. The same reasoning goes for rural lending. We also employ the MFI's lending rate as a depth measure. Supposedly, the lower the rate on loans, the easier poor people will find it to service a given loan size. But this measure is problematic, since the fixed cost of setting up a loan is the same for a large loan and a small. Thus, the MFI may charge a fairly high rate on a small loan.

The width dimension concerns how many customers the MFI is able to reach. The number of very poor families with a microloan has grown from 7.6 million in 1997 to 137.5 million in 2013 (Microcredit Summit Campaign, 2012; Labie & Mersland, 2011). Still, Chaia et al. (2013) report that half the world is still unbanked. For many years, the microfinance industry has experienced double-digit growth rates (Mersland and Strøm, 2012). Our measure is the MFI's growth rate of credit clients. The sign for the female leader is uncertain on this variable. For instance, de Mel et al. (2009) and Faccio, Marchica, & Mura (2015a) find that male CEOs expand their businesses faster than women, and with greater risks. Thus, a tendency for male leaders to pursue growth may counterbalance the female leader's desire for outreach in the width dimension.

Female leadership. The table shows the measures for the three female leadership categories, CEO, chair, and director. The female director is defined in two different ways, as the fraction of female directors to all directors, and an indicator for female director. We use different definitions because of variations in results when definitions change (Adams & Ferreira, 2009; Carter, D'Souza, Simkins, & Simpson, 2010). We use the indicator variable as the main female director definition, and try the other in robustness checks. In many cases it has been impossible to ascertain the fraction of female directors. When information on the number of female directors is missing, we often know the gender of the chair, in which case we are able to construct a binary variable showing whether women are on the board or not. Both the female director fraction and the binary for female director are used in our regressions.

Proxies for motivation and competence. For altruism the proxy variable is binary, telling whether the CEO is the founder of the MFI (*CEO founder*) or not. Fully 48.5% of the female CEOs are also the founder of their companies, compared to one third of the male CEOs in our sample. To found an MFI should be a good indicator of motivation to assist the poor to financial inclusion.

For the competitiveness we have a direct measure in the local product market competition for each MFI. The competition variable is the rater's assessment of the MFIs' competitive challenge

in its area (*competition*). We also assume that ownership type is among the competition avoidance group of variables. MFIs are diversely incorporated, covering ordinary shareholder-owned firms, mutually held institutions (COOP), non-governmental organizations[1] (NGOs), and state banks. We use a binary variable indicating whether the MFI is a stock company or not (*SHF*). The ownership variable is potentially important, since women may more easily enter leadership positions in the often more mission-driven NGOs and COOPs. For risk aversion we employ the MFI's leverage defined as the total debt on total equity and the "Portfolio at Risk (30 days)" (*PaR30*). A high leverage is indicative of a firm that is in financial trouble, or is in a phase of rapid expansion. In either case the firm is in a risky state, a situation that most women tend to avoid. A high *PaR30* means that the MFI's customers have difficulties in repaying their loans. This measure is especially suitable in microfinance, since loans are predominantly short-term.

The leader's education and experience in business can indicate whether the leader is capable to meet customers' expectations or not. The female CEO has about the same business experience as the male, about 11 years, but the male CEO is more likely to have a formal business education. We use the leader's formal business education as an indication of competence, and assume that a leader without formal business education has a higher competence at identifying the poor client needs than a person with such an education, because such a leader has probably risen from the experiences encountered as a microfinance practitioner.

MFI and country controls. We include a number of MFI variables for the governance and performance regressions in order to account for MFI heterogeneity. The firm level controls are the return on assets (*ROA*), the *MFI's age*, *PaR30*, and the *MFI's size*. Furthermore, we include two institutional variables, namely the indicator variable if the MFI is initialised by an international organisation (*International founder*) and another indicator variable telling if the MFI is under local banking regulation (*Regulated*).

The two MFI goals of social mission and financial sustainability (Morduch, 1999) indicate a relation, or tradeoff, between the two. Hermes, Lensink, and Meesters (2011) find that the relation is negative in an investigation utilizing the stochastic frontier approach (Coelli, Rao, O'Donnell, & Battese, 2005). Here we simply insert a variable for financial sustainability as one of the control variables in the base case regression, and then employ simultaneous equations in robustness checks. For financial sustainability we use *ROA*. Market performance measures are impossible since no MFI in our sample is listed. *ROA* numbers are taken directly from the raters' reports. Table 2 shows that, on the whole, microfinance is not a lucrative business. As in Hermes et al. (2011), we expect the relation between the two goals is negative.

The specification of size is the natural logarithm of total assets, which reduces outlier bias. We expect that the larger the MFI is, the more complex it becomes, and the more it will adopt formal governance mechanisms, that is, monitoring becomes more important and advising less (Adams & Ferreira, 2007). 36% of the MFIs in our sample have an international founder. The MFIs with such a background were probably founded out of a concern for the MFI's social mission. We expect this variable to be positively related to outreach.

Aguilera and Jackson (2003) point out that country specific traditions and institutions can be important in corporate governance studies. We employ two procedures for adjusting for country

[1] MFIs incorporated as Non-Governmental Organizations (NGOs) are not-for-profit firms where no particular group or person can legally claim ownership of it or receive residual earnings from it (Mersland, 2009).

differences. First, every monetary variable is adjusted with the respective country's GDP per person. Thus, we consider the size of the average loan relative to the average income per person. The second procedure is to include the UN Human Development Index (*HDI*) in regressions. The *HDI* is a summary welfare measure covering income level, education and health levels. Statistics on *HDI* for each country are readily available for all the years in our sample.

Table 2

The table 2 reveals that fully 29.3% of all MFIs have a female CEO. Likewise, the female director fraction is on average 25.5%. These numbers mean that women take an active role in the development of MFIs. The number of credit clients together with MFI size show that the dispersion of the MFI size is substantial. We also note the change in the number of credit clients at 42.2% in the period. This annual growth rate implies that microfinance is fast becoming a major force for change in the developing world. The average loan is small, when conditioning on the country's GDP per person level, the number is 0.57. Thus, the average loan is a little more than half the average income level in the country. The table also uncovers the variation in the MFI's background variables. 33.1% of MFIs are incorporated as a shareholder firm, 28.6% are regulated by a local banking authority, and 38.9% have an international founder. This variation means that we are able to filter out much background noise in the interesting relationship of female leader and the MFI's outreach.

We investigate the association between the *female CEO* and the various measures of the MFI's social mission in table 3. In Panel A we look at the continuous variables *average loan* and *credit client change*, and in B the binary variables of *rural* and *gender bias*. Notice that we use the definition of *average loan* from table 1, that is, the *average loan* is scaled with the GDP per person.

Table 3

We find that the *female CEO* allocates a lower *average loan* than men, this difference in means is significant at the 3.1% level. We find no significant difference in *credit client change*. Male and female CEOs pursue an equally expansionary policy of attracting new credit clients. The differences in lending rates are small, yet significant at the 10% level for the rating agencies' lending rate, but not for the rate calculated from fundamentals. The rate is higher in female led MFIs. Probably, this is due to the relatively high establishment costs for a small loan in *female CEO* MFIs. The male and female CEOs differ significantly for *rural* and *gender bias*, but the male CEOs give greater priority to rural clients than the female. In fact, the male-led MFI have a rural bias in 72.0% of the cases, but the female-led MFIs 66.3%. On the other hand, the gender bias is stronger in female-led MFIs, at 57.0% versus 41.2% for the male-led MFI. Thus, table 3 gives a first indication that the CEO's gender matters for the MFI's choice of social mission, but it also shows that the relationships are not unequivocal. The *female CEO* is not better than the male for all social mission measures.

We run simple bivariate correlations among the variables we use as a first investigation into the relationships among the outreach and covarying variables, and also to check for potential multicollinearity issues, see table 4.

Table 4

We see that the correlations between the various female leader categories are relatively high and significant. This suggests a clustering of female leadership to certain MFIs. A number of the correlations are significant at the 5% significance level, suggesting both significant relationships in a multivariable panel data setting, but also signs of multicollinearity among right-hand side variables. Concerning multicollinearity, Kennedy (2008) says that partial correlations above 0.70 to 0.80 are in the danger zone of multicollinearity. None of the correlations are close to this level, the highest being 0.49 between *regulated* and *SHF*. The relatively high correlation is both as expected and also surprising. It is as expected because shareholder MFIs need to be regulated in many jurisdictions. But it is surprising that the percentage is low, indicating that there is not a one-to-one correspondence between shareholder MFIs and regulated. The upshot is that we carry out regressions in the faith that multicollinearity will not disturb our results.

METHODOLOGY

The discussion so far indicates that a female leader is endogenous to the MFI. We follow Strøm et al. (2014) in using the Heckman (1979) endogenous dummy variable model to account for the endogeneity, employing the two-step procedure laid out by Wooldridge (2010, p. 937-945). This requires that we first estimate the probability that a woman is a leader. We use the proxies for the altruism, competitiveness, and risk aversion (RA) to estimate

(3) Pr(FM) = A + bAltruism + cCompetitiveness + dRA + e(Controls) + Error term

with the probit model. In this step, an instrument for each female leadership indicator variable is generated from (2). This is the probability that a given MFI has a female manager. The extracted probability is then used in the second step random effects model as an instrument for the endogenous indicator variable female manager. The extracted instrument is supposed to be related to the female manager, but not to outreach variables. The two-step methodology has the advantage that the specification of the relationship (3) does not need to be perfect, a credible relationship will do. We then estimate the main relationship of outreach in (1) using the Balestra and Varadharajan-Krishnakumar (1987) two-stage least-squares random effects estimator (G2SLS).

The methodology means that we control for altruism, competitiveness, and risk aversion for the leader. Conditioned on these controls, the effect of being a female or male leader should be negligible. If the *female CEO* variable is still significant, we can conclude that a gender trait does exist for the MFI's social mission. This methodology compares well to the Andreoni and Vesterlund (2007) procedure, where the female effect remains in regressions, even after controlling for personality traits.

In robustness analyses we first check our results against other econometric methodologies. First, we perform an inverse Mills ratio (IMR) analysis (Wooldridge, 2010:809-8012). The idea is to first calculate the IMR defined as the ratio of the probability density function and the cumulative density function of the normal distribution evaluated at 'predicted' outcomes, and then add the new variable in a second stage regression. This is seen as a bias-correction term because it takes into account the probability that a female CEO was initially selected into the observed sample.

Second, we undertake system analysis with the seemingly unrelated regression (SUR) framework (Zellner, 1962). Outreach variables may be interdependent, for instance, the average loan and the

lending rate are obvious candidates. The lower the lending rate, the more poor people can afford to take a loan, and the more willing the MFI is to lend small amounts to the poorest. Consequently, we run SUR regressions for the lending rate and average loan together, and also for the lending rate and the change in the number of credit clients.

Another robustness analysis is to see if the female CEO findings generalize to female directors and the female chair.

ECONOMETRIC EVIDENCE

We perform rigorous testing of the relationships we have set out above. First, we establish relationships between the *female CEO,* the *female chair* and the *female director* on the one hand and altruism, competition avoidance, and risk aversion variables on the other. Second, we turn to estimations of different forms of outreach and female leadership. The main objective of the first regressions is to generate an instrument for use in the final estimations, but the relationships have interest in their own right. We generate an instrument that is the probability that the MFI has a female leader in the specific year.

The female leader

Table 5 shows results from the probit regressions of the female leader and variables that are linked to the existence of a female leader.

Table 5

The regressions have rather low R^2, but the Wald chi^2 tests are everywhere strongly significant. We take this to indicate that the regressions yield valid results for our discussions. In the following, we concentrate our comments on the female CEO.

The table shows that motivation, measured as *CEO founder*, is positively linked to *female CEO*. We also find that the competition avoidance is important, since the ownership type variable *SHF* is negative and significant for all leadership positions. The direct measure *competition* is, however, only significant in the director regression. Thus, women shy away from competing for the CEO positions especially when the MFI is organized as a shareholder owned company. On the other hand, risk aversion seems to play only a minor role, as only *PaR30* is significant for the chair and the director, both negatively, as hypothesized. The risk aversion result is in fact in line with the survey findings in (Adams & Funk, 2012), who find that female Swedish directors are less risk averse than men, but that they score higher on altruism (what Adams and Funk name universalism). Thus, all in all, women self-select into the non-competitive parts of the microfinance industry, while men to a larger extent are competitive and shareholder MFIs. Strøm et al. (2014) find that the female leader is linked to social mission variables such as the *average loan* and the MFI's *gender bias*. Naturally, we cannot use these variables in the present regressions.

We save the probability of being a female CEO for each regression, and use this probability as an instrument for the *female leader* in regressions on outreach.

The MFI's social mission

Table 6 gives an overview of the relationship between the MFI's outreach to its credit clients, measured as the change in the number of credit clients, *average loan*, the MFI's *gender bias*, and its *rural bias*.

Table 6

The table contains regressions both without and with the generated instrument for *female CEO* from table 5. In both cases, the explanatory power is satisfactory for *average loan,* but somewhat low for the *credit client change*. In all regressions the Wald Chi^2 is highly significant. We note that R^2 is higher in the regressions with instruments, and also that more results are significant, e.g. *international founder*. The price of using instruments is that the sample size decreases. We perform the analysis without instruments on same-sample basis (not reported) and find that coefficients' signs and statistical properties are close to the ones in table 6.

We find that the *female CEO* generates larger depth outreach in terms of *average loan* and *gender bias*, but that the *female CEO* has no relation to *rural bias* and to the *credit clients change*. A *female CEO* will give priority to poorer credit clients and to women. The conclusion from table 6 is that the *female CEO* has a superior record in reaching out to the poorest customer segments, and is on par with male peers in reaching more clients. With the instrument for the *female CEO* in place we are able to identify the relation as a causal one, that is, with a *female CEO* the MFI reaches poorer segments of customers more than with a male CEO.

We also note that *ROA* is only related to the *gender bias* outreach. Thus, the two MFI objectives of outreach and financial sustainability are largely set independently of each other, and the simple specification we employ is sufficient to bring out the significant relationships. Furthermore, the relationship between *ROA* and *gender bias* is positive, unlike the main findings in Hermes et al. (2011), indicating that the tradeoff between outreach and financial sustainability does not apply to all forms of outreach.

The control variables have signs comparable to Mersland and Strøm (2010) findings, lending further credibility to the *female CEO* results. Let us look closer at the *average loan* results. *Average loan* increases with *MFI size* and with *regulation*, but decreases with the *MFI's age*, the *international founder*, and the *HDI*. In particular, the result for the *MFI age* confirms their main finding. Higher *average loan* with larger *MFI size* means that scale pulls the MFI towards less poor customer segments. This could also be due to a portfolio effect on the part of the large MFI, that is, the tendency to diversify its customer base as scale increases. At the same time, the negative sign for *HDI* indicates that the MFI concentrates more of its lending to poor people as the country develops. This confirms the findings in Ahlin et al. (2011) that microfinance specializes more to the poorer segments of credit clients the deeper the financial sector, especially banking, is in a country. Thus, the question of mission drift is multifaceted, depending upon the outreach variable one studies, and also on what independent variable is in question.

Next, we consider another outreach variable, the lending rate, specified as one that the rating bureaus publish and the other from our own calculations.

Table 7

It turns out that the *female CEO* is positively related to the lending rate in the rating bureau regressions, but this significance disappears in the 2SLS regression where the calculated lending rate enters. Therefore, we can only state that some evidence exists for a significant and positive relationship. A positive sign is probably not surprising, given the attention to low average loans in table 6. Small loans are relatively costlier to service, and therefore, require a higher lending rate.

The results for the control variables give some interesting insights for the mission drift debate. The *MFI size* and *MFI age* are both negative and significant at the 5% level. This indicates that as the MFI grows, and as it ages, lending rate comes down. This is contrary to the Bateman (2010) claim that MFIs are becoming ever more greedy profit-seekers.

ROBUSTNESS CHECKS

We run two robustness checks for the *female CEO* results that both deal with the methodology in use. The first is to apply the Inverse Mills Ratio (IMR) to the regression. The IMR statistic uncovers endogeneity in the relationships if it is significant in regressions. The regressions with IMR included are in table 8.

Table 8

The IMR statistic is only significant at the 10% level in the *lending rate* regression, but not in the *lending rate constructed*. We conclude that IMR does not reveal endogeneity, and thus, that a *female CEO* increases the MFI's depth outreach. We also note that the coefficient signs and sizes are about as in table 6. Thus, inclusion of the IMR hardly perturbs the original relationships, confirming the absence of endogeneity in the relationships.

The second robustness check is a simultaneous equations estimations where *average loan, lending rate,* and *change credit clients* enter. We specify two estimations, and employ the SUR framework.

Table 9

We can establish dependence between two variables in the regression from the Breusch-Pagan statistic at the bottom of the table. The statistic has a chi^2 distribution. In the first SUR estimation with *average loan* and *lending rate* as dependent variables, the Breusch-Pagan statistic shows strong significance, signifying that the two are related. This does not happen for the second SUR estimation containing *change credit clients* and the *lending rate.* The effect of running a SUR estimation for the *average loan* is that the R^2 increases by about eight percentage points over the singular estimation and that all explanatory variables are now significant. Thus, we can conclude that SUR estimations have improved the estimations of the *female CEO* impact.

The *female CEO* is significant in the *average loan* estimation, as before. The conclusion that the *female CEO* creates more outreach finds confirmation. But we also note that the sign on the *lending rate* is now negative, but no longer significant. The negative sign implies that the *lending rate* is lower in MFIs with a *female CEO* at the *average loan* level that the MFI operates. We underline that the relationship is not significant, but it is noteworthy that the positive significance is now gone.

In the last robustness check we investigate if the *female CEO* results carry over to the *female chair* and the *female director*. We use the same set of explanatory variables as before, and carry out single equation regressions with instruments for *average loan* and *credit client change*.

Table 10

We find that the *female chair* has no significant relationship with *average loan*, but is positively and significantly related to *gender bias*. The *female director* is related to *average loan* and *gender bias* in the same way as *female CEO*. In line with earlier results, the new leadership categories are not related to the MFI's rural bias or its change in the number of credit clients. Thus, the findings for better outreach is not limited to special circumstances surrounding the *female CEO*, but extends to other leadership categories as well.

Furthermore, the regressions confirm earlier results in table 6 for the control variables. In the *female director* regressions fewer significant results appear. This is probably due to the limited number of observations that we have for this leadership category.

CONCLUSION

We investigate if a microfinance institution (MFI) with a female leader is better able than male managed MFIs to supply the poorest families with microfinance loans. We find that the female leader has such an ability when we approximate the poorest families with the average loan size and with gender. However, we are not able to confirm that female leaders favour lending to rural areas more than male leaders, nor do we find that female leaders are better able to grow the MFI's credit client base better than male leaders. Thus, we confirm that female leaders are better in depth outreach (reaching the poorest), but not in width outreach (Schreiner, 2002). The results parallel the Strøm et al. (2014) finding that female leaders generate better financial performance for their MFIs, adding to the insight on governance in the microfinance sector, and also to the general literature on "managerial traits" (Bertrand & Schoar, 2003; Graham et al., 2013; Malmendier & Tate, 2005, 2008; Malmendier et al., 2011), in particular the impact of gender on firm outcomes (Adams & Ferreira, 2009). A female CEO is better at achieving both the MFI's social mission and its financial sustainability.

We control for the possibility that the female leaders seek employment in MFIs with a stronger social mission orientation, so that the female leader variable is endogenous. To control for this, we conduct a G2SLS estimation with an instrument for the female leader. The instrument is the probability of being a female leader, given that women tend to choose altruism (Andreoni & Vesterlund, 2001), shy away from competition (Niederle & Vesterlund, 2007), and show higher risk aversion (Charness & Gneezy, 2012; Eckel & Grossman, 2002). In the process, we confirm greater competition avoidance, but cannot confirm greater altruism or greater risk aversion among female leaders.

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TABLES

Table 1: Definitions of variables used in the analysis

Variable name	Definition
Social mission	
Credit client change	The number of credit clients in period t divided by the number of credit clients in period t-1 with 1 subtracted
Average loan	Total loan portfolio divided by credit clients and divided by the country's GDP per person
Rural	Binary: 1 if emphasized area is rural
Urban	Binary: 1 if emphasized area is urban
Gender bias	Binary: 1 if emphasized focus on women clients
Lending rate	The "portfolio yield" the rating agency imputes
Lending rate constructed	Financial revenues from portfolio divided by total loan portfolio (outliers winsorized at 0.86 = 2% top percentile)
Female leadership	
Female CEO	Binary: 1 if female CEO
Female chair	Binary: 1 if female chair
Female director	Binary: 1 if one or more female directors
Female dir. fraction	Female directors as fraction of all directors
General characteristics	
CEO founder	Binary: 1 if the CEO founded the MFI
CEO education	Binary: 1 if the CEO has a formal business education
MFI size	Total assets (USD 1,000) divided by the country's GDP per person
ROA	Return on assets
PaR30	Fraction of loan portfolio 30 days overdue
MFI Age	Number of years in operation as a MFI
Regulated	Binary: 1 if regulated by banking authority
International founder	Binary: 1 if internationally initiated
SHF	Binary: 1 if type is shareholder company
Competition index	Index from no (1) to high competition (7)
HDI	Human Development Index

Table 2: Descriptive statistics of variables in the analysis.

Variable	Mean	Std. Dev.	Min	Max	Obs
Female CEO	0.293	0.455	0	1	1422
Female chair	1.797	1.972	0	16	745
Female director	0.255	0.436	0	1	1107
Credit clients	12728	26644	0	394462	1524
Credit client change	0.422	0.901	-0.894	17.850	1110
Average loan	681.523	845.897	20.000	8776.000	1474
Gender bias	0.460	0.499	0	1	1572
Rural lending	0.697	0.459	0	1	1580
Lending rate	0.388	0.198	0.023	1.825	1509
Lending rate constructed	0.324	0.176	0.001	0.860	1501
Competition	4.377	1.522	1	7	1543
Shareholder MFI	0.331	0.471	0	1	1612
Leverage	4.045	45.725	-880.408	1340.563	1575
Return on Assets	0.008	0.126	-0.990	0.342	1514
Wage	16283	15800	13.28	264912.4	1318
Wagegdp	14.41	16.16	0.021	177.78	1318
MFI size (1,000)	6375	13300	19	248000	1578
Portfolio at Risk (30 days)	0.064	0.097	-0.271	0.973	1461
MFI age	9.301	6.765	0	79	1604
International founder	0.389	0.488	0	1	1600
Regulated	0.286	0.452	0	1	1583
Human Development Index	0.608	0.135	0.270	0.807	1606

Table 3: The female CEO and the MFI's social mission

Panel A: Differences between female and male CEOs with respect to Average Loan and Credit Client Change

	mean	std	min	Median	max	N
			Average Loan			
Male CEO	0.600	1.020	0.014	0.324	12.847	925
Female CEO	0.483	0.844	0.009	0.255	6.434	390
Total	0.565	0.972	0.009	0.298	12.847	1315
t-test p value	**0.031**					
			Credit Client Change			
Male CEO	0.444	0.972	-0.894	0.241	17.85	701
Female CEO	0.425	0.859	-0.672	0.240	9.615	294
Total	0.439	0.939	-0.894	0.241	17.85	995
t-test p value	0.758					
			Lending rate			
Male CEO	0.381	0.199	0.023	0.331	1.251	932
Female CEO	0.402	0.190	0.040	0.376	1.277	395
Total	0.387	0.197	0.023	0.344	1.277	1327
t-test p value	*0.074*					
			Lending rate constructed			
Male CEO	0.319	0.181	0.001	0.278	0.86	939
Female CEO	0.335	0.168	0.014	0.306	0.86	385
Total	0.324	0.177	0.001	0.285	0.86	1324
t-test p value	*0.124*					

Panel B: The Female CEO and outreach measured as Rural and Gender bias

	CEO		
Rural bias?	Male	Female	Total
No	28.0%	33.7%	414
Yes	72.0%	66.3%	980
Total	982	412	1394
Pearson chi2(1)	**0.033**		
Gender bias?			
No	58.6%	42.2%	749
Yes	41.2%	57.0%	640
Total	980	409	1389
Pearson chi2(1)	**0.000**		

Table 4: Correlations among variables in the analysis. The variables are the transformed variables used in regressions. Numbers in bold means that the correlation is significant at the 5% level.

		1	2	3	4	5	6	7	8	9	10
1	Female CEO										
2	Female chair	**0.34**									
3	Female director	**0.30**	**0.39**								
4	Credit client ch.	-0.02	-0.03	-0.03							
5	Average loan	**-0.09**	-0.06	-0.03	-0.08						
6	Gender bias	**0.15**	0.26	**0.23**	0.00	**-0.37**					
7	Rural lending	**-0.06**	**-0.12**	**-0.06**	0.00	0.01	-0.04				
8	Competition	**-0.06**	**-0.15**	**-0.09**	-0.08	**0.14**	**-0.11**	0.05			
9	Shareholder	**-0.14**	**-0.26**	-0.04	0.06	**0.20**	**-0.25**	**0.08**	-0.04		
10	Leverage	-0.03	-0.01	0.00	**0.20**	-0.02	0.01	0.03	0.05	0.00	
11	ROA	0.01	-0.01	0.04	0.00	**0.09**	-0.02	**-0.07**	0.03	-0.03	-0.02
12	MFI size	**-0.11**	0.03	-0.02	**-0.07**	**0.49**	**-0.06**	**0.11**	**0.14**	**0.25**	**0.05**
13	PaR30	-0.04	0.00	-0.03	**-0.14**	**0.19**	**-0.11**	-0.04	**0.06**	-0.05	-0.01
14	MFI age	-0.04	0.04	-0.03	**-0.17**	**0.06**	-0.02	0.05	**0.07**	**-0.11**	-0.01
15	Int. founder	**-0.06**	-0.03	0.01	**-0.10**	-0.02	**0.18**	0.03	**-0.10**	**0.06**	-0.04
16	Regulated	**-0.10**	0.00	0.00	-0.02	**0.32**	**-0.23**	**0.09**	-0.05	**0.49**	-0.02
17	HDI	0.07	0.01	-0.01	0.03	**-0.32**	**-0.11**	**-0.12**	**0.07**	**-0.16**	-0.03

		11	12	13	14	15	16
12	MFI size	**0.13**					
13	PaR30	**-0.25**	0.00				
14	MFI age	**0.08**	**0.23**	**0.20**			
15	Int. founder	-0.03	**0.12**	**-0.17**	**-0.15**		
16	Regulated	0.00	**0.31**	0.01	0.03	-0.03	
17	HDI	**0.20**	**-0.46**	**-0.08**	0.00	**-0.10**	**-0.26**

Table 5: The female leader and the MFI's, competition avoidance, and risk aversion. Probit regressions for the female CEO, chair, and director.

	CEO			Chair	Dir.
CEO founder	0.243**	0.209*	0.212*	0.132	-
CEO business education	-0.469***	-0.523***	-0.509***	0.049	-
Competition	0.031	0.035	0.051	-0.039	-0.260***
Shareholder MFI	-0.682***	-0.841***	-0.801***	-0.388***	-0.948***
Leverage	-0.005	-0.004	-0.003	-0.003	-0.002
ln(Par30)	-0.117	0.390	0.291	-1.149*	-2.429***
MFI and country controls					
MFI age	-0.008	0.004	0.009	-0.009	-0.031
International founder	-0.156	-0.379***	-0.409***	0.068	0.245*
ln(MFI size)	-0.089*	-0.112**	-0.136***	-0.061*	0.059
ln(HDI)	-0.234	1.221**	1.231**	-0.252	-1.408**
Constant	0.436	1.703	1.847	0.524	2.463***
Regional dummies	*no*	*yes*	*yes*	*yes*	*yes*
Time dummies	*no*	*no*	*yes*	*yes*	*yes*
Observations	635	628	627	759	627
Wald chi²	52.19***	76.55***	77.11***	54.64***	100.56***
R^2	0.078	0.121	0.131	0.061	0.175
method	probit	probit	probit	probit	probit

Wald χ^2 is calculated by the (Balestra & Varadharajan-Krishnakumar, 1987) procedure.

Table 6: Depth and width outreach and the female CEO.

	Depth outreach				Width outreach	
	Avgl	Avgl	Gender	Rural	ΔCC	ΔCC
Female CEO	-0.256***	-0.219**	2.974***	0.014	-0.035	-0.020
Return on Assets	-0.021	-0.194	2.294**	-0.102	-0.240	-0.247
ln(MFI size)	0.183***	0.223***	0.505**	0.328	0.003	-0.019
ln(PaR30)	0.262	0.069	0.033	-2.528	-0.665***	-0.883***
MFI age	-0.033***	-0.034***	0.133***	0.041	-0.013***	-0.009***
International founder	-0.172	-0.306**	1.557**	-0.442	-0.108***	-0.084*
Regulated	0.405***	0.245***	-4.108***	0.901	0.009	0.065
ln(HDI)	-0.797***	-1.072***	-4.973***	-3.218	-0.021	-0.025
Constant	-2.696***	-3.093***	-8.095***	0.867	0.503***	0.568***
Observations	1186	593	1203	1210	923	473
MFIs	325	146	324	323	302	143
Wald Chi^2	120.64***	112.00***	27.62***	34.60***	33.65***	30.19***
R^2	0.238	0.300			0.061	0.078
Instrument?	*no*	*yes*	*no*	*No*	*no*	*yes*
Estimation method	RE	RE	Probit	Probit	RE	RE

Avgl is Average Loan, and ΔCC Credit Client Change. RE means random effects model. The instrument for Average Loan is the probability that the CEO is female, derived from the Credit Client Change regression in table 4. The instrument for the Credit Client Change is derived from the Average Loan regression in table 4.

Table 7: Female CEO and the lending rate: without and with instruments

	Lending rate		Lending rate constructed	
Female CEO	0.041**	0.037**	0.031*	0.026
Return on Assets	0.242**	0.242***	0.286***	0.298***
ln(MFI size)	-0.017**	-0.018***	-0.013**	-0.014***
ln(PaR30)	0.017	0.018	0.171*	0.167***
MFI age	-0.003**	-0.003**	0.001	-0.001
International founder	0.034*	0.021	0.042**	0.031*
Regulated	-0.039	-0.047**	-0.041**	-0.048***
ln(HDI)	0.034	0.005	0.067	0.035
Constant	0.537***	0.551***	0.423***	0.438***
Instrument?	*no*	*yes*	*no*	*yes*
Observations	1217	1182	1193	1152
MFIs	329	312	331	312
Wald chi²	42.87***	100.59***	61.84***	89.99***
R^2	0.082	0.091	0.066	0.068
Estimation method	RE	RE	RE	RE

Table 8: Female CEO and social performance: modeling self-selection with the inverse Mills ratio.

	Avgl	**Change CC**	**lending rate**	**lending rate constructed**
Female CEO	-0.282***	-0.014	0.039**	0.028(*)
Return on Assets	-0.088	-0.207	0.245**	0.298***
ln(MFI size)	0.202***	-0.001	-0.020***	-0.016**
ln(PaR30)	0.231	-0.623***	0.021	0.167
MFI age	-0.032***	-0.012***	-0.004***	-0.001
International founder	-0.231***	-0.084**	0.023	0.031*
Regulated	0.384***	0.027	-0.061**	-0.056***
ln(HDI)	-0.958***	0.08	0.038	0.053
Constant	-2.695***	0.445***	0.531***	0.428***
IMR	**-0.053**	**0.017**	**0.021***	**0.012**
Observations	1142	896	1183	1152
MFIs	304	289	312	312
Wald chi²	133.02***	30.65***	52.09***	66.59***
R^2	0.251	0.057	0.093	0.072
Estimation method	RE	RE	RE	RE

(*) means very close to 10% sign.

Table 9: Simultaneous equations estimations of average loan and the lending rate, and of the credit client change and the lending rate using the seemingly unrelated regression framework.

	Average loans system		**change in credit clients system**	
	Avgl	*lending rate*	*change credit clients*	*lending rate*
Female CEO	-0.106**	-0.004	-0.062	-0.007
Return on Assets	0.740***	0.136**	-0.961***	0.305***
ln(MFI size)	0.298***	-0.032***	-0.033	-0.038***
ln(PaR30)	2.787***	-0.309***	-1.538***	-0.271***
MFI age	-0.013***	-0.003***	-0.019***	-0.003***
International founder	-0.136**	0.016	-0.207***	0.021
Regulated	0.492***	-0.042***	0.072	-0.037**
ln(HDI)	-0.311**	-0.043	-0.076	-0.093***
Constant	-4.377***	0.654	1.235***	0.726***
time-dummies	*yes*	*yes*	*yes*	*yes*
Observations	1171	1171	914	914
Wald chi²	590.77***	169.87***	67.21***	164.82***
R^2	0.330	0.126	0.068	0.152
Breusch-Pagan chi²	245.30***		0.457	
Estimation method	*SUR*		*SUR*	

Table 10: Female chair/directors and social performance

	Female chair				**Female director**			
	depth		*Width*		*depth*		*width*	
	Avgl	Gender	Rural	ΔCC	Avgl	Gender	Rural	ΔCC
Female leader	-0.051	3.307***	-0.621	-0.018	-0.289***	8.617**	1.157	-0.020
Return on Assets	-0.067	1.167	0.407	-0.394**	-0.289*	5.871**	0.875	0.062
ln(MFI size)	0.195***	0.466**	0.234	0.012	0.229***	1.053	0.202	0.025*
ln(PaR30)	0.189	-0.177	-1.193	-0.559**	-0.256	4.586	-1.945	-0.424*
MFI age	-0.043***	0.092*	0.014	-0.009***	-0.038***	0.033	0.024	-0.009**
International founder	-0.156	0.781	0.357	-0.098**	-0.096	-1.327	1.298	-0.061
Regulated	0.496***	-3.078***	1.109	0.038	0.513***	-4.044*	1.541	0.008
ln(HDI)	-1.261***	-3.915**	-0.723	0.151	-1.431***	0.599	2.275	0.234*
Constant	-2.817***	-6.359***	3.844	0.454***	-2.882***	-12.339**	2.845	0.301***
Observations	722	951	953	565	591	648	655	476
MFIs	199	265	264	193	160	173	174	161
Wald Chi^2	121.24***	54.33***	11.56	34.59***	138.59***	388.05***	19.54**	17.28**
R^2	0.239	-	-	0.071	0.294	-	-	0.041
Instrument?	*yes*	*no*	*no*	*yes*	*yes*	*no*	*no*	*yes*
Estimation method	RE	Probit	Probit	RE	RE	Probit	Probit	RE