Are Women Better Bankers to the Poor? Evidence from Rural Microfinance Institutions

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Abstract
This article asks if women are better bankers to the poor, motivated by recent work showing differences in performance between male and female CEOs in financial firms and in NGOs. We adapt the banking approach to managerial efficiency to account for the outreach and sustainability goals of Microfinance Institutions. We then evaluate whether outreach efficiency differs by the CEO's gender using panel data from 250 MFIs worldwide. We find that in rural markets, MFIs with female CEOs have 12-14 point higher outreach efficiency suggesting that promoting gender diversity at the top is likely to have social and financial benefits.

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Keywords: microfinance, microfinance institutions, gender and finance, outreach, efficiency

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Introduction

Microfinance Institutions (MFIs) provide financial services to the poor and have two goals. Like non-profit organizations, MFIs have a mission to serve as many poor clients as possible (the outreach goal). Like banks, MFIs have to be financially self-sustainable and earn profits or at least cover their costs (the financial sustainability goal). Most MFIs explicitly target women because more women than men are poor, especially in rural areas where cultural norms make it harder for women to borrow and save (D'Espallier et al., 2013). The literature on non-government organizations (NGOs) suggests that female managers' style may be associated with better outreach, while recent work on gender and finance shows that female CEOs may deliver better results in some financial firms. Motivated by these findings, we ask if women are better bankers to the poor and explore the relationship between the CEO's gender and the outreach and the sustainability of MFIs serving rural areas. While gender diversity among top managers may be desirable because it is fair, we ask if there are efficiency gains from such diversity in rural microfinance.

On the client side, there are efficiency-based arguments for enhancing women' access to credit because household production efficiency decreases by as much as 10 percent when women are unable to meet their credit needs (Fletschner, 2008). The 2012 World Bank Development Report devoted to Gender Equality and Development points out that gender differences in income and well-being are especially pronounced in women engaged in agriculture and (micro-) entrepreneurship, which are two of the most likely MFI client activities in rural areas. Rural women also have secondary status to men, as well as more limited property rights and access to assets and credit (Deere, 2003; Meinzen-Dick, 1997; Amber, 2011).

While these differences are valid for clients, they may also affect the selection of MFI leadership and thus affect the performance of the institution if female CEOs are as good as, or better than, men at banking the poor. An evaluation of the effectiveness of female managers of rural microfinance institutions contributes arguments for expanding the pool of potential managers to include more women and for decreasing the bias against women in rural area. Evidence from rural India shows that exposure to effective actions of women in power changes, albeit slowly, people's bias against female leaders (Beaman et al., 2009). Since women in power tend to promote other female leaders, evaluating if female CEOs run their MFIs efficiently may lead to expanding the opportunities available to all women (Matsa and Miller, 2011)

In this article, we first adapt the banking approach to managerial efficiency to account for the outreach and sustainability goals of Microfinance Institutions. Next, using panel data with over 250 MFIs from across the world for the period 1998-2009, we evaluate whether our *outreach efficiency* differs by the CEOs gender. We find that in rural markets, MFIs with female CEOs have 12-14 point higher outreach efficiency suggesting that promoting diversity at the top is likely to have social and financial benefits.

Literature Review

Psychology and management studies find gender-based differences in behavior due to differences in risk taking, overconfidence, conservatism, ethical behavior, and diligence (Byrnes, et al., 1999; Nettle, 2007; Schmitt et al., 2008). Recent behavioral economics literature also shows that economic behavior differs by gender because women are more averse to risk and competition and because their preferences are more situation-specific (Barber and Odean, 2001; Croson and Gneezy, 2009; Niederle, and Vesterlund, 2007).

Empirical evidence supports gender-based differences in financial and business decision making (Sunden, and Surette, 1998; Hoppe and Korb, 2013). According to recent work, some of the differences may persist as the focus shifts from an average woman to financial experts like female CEOs of financial institutions. For example, female mutual fund managers are found to be as overconfident as men but maintain the gender specific higher aversion to risk and competition (Beckmann and Menkhoff, 2008). While performance of mutual funds with female CEOs may not differ from that of male managed funds, female CEOs have more consistent performance over time suggesting that female managers' past performance is a better indicator of future performance (Lofton, 2011). According to the Hedge Fund Research Inc., female hedge fund managers' return outperforms that for the industry as a whole.[1]

In the food and agribusiness industry in the U.S. and abroad, the success of high-profile female executives such as Patricia Woertz of ADM and Indra Nooyi of PepsiCo makes female leaders more visible. Few agricultural economics studies have focused on evaluating possible

[1] Specifically, for the period 2000-2009 female hedge fund managers' return was 9.06 percent relative to the 5.28 percent average for the industry and the latest available data for 2012 confirm similar pattern of 8.95 percent return by female managers versus a net return for all hedge fund of 2.69 percent.

gender differences among financial experts in agriculture. We are aware of one study by Cunningham, et al. (2008) who evaluate whether women are better at marketing grain due to less overconfidence, which is measured by fewer trades. The results are that women trade less, but also store more, and therefore get lower prices. The authors conclude that men's greater number of trades is likely explained by men enjoying the trade more than women rather than by differences in overconfidence.

More broadly, female participation in leadership roles is advocated as a significant driver of firm performance (Oakley, 2000; Krishnan et al., 2005; Smith et al., 2006). An earlier meta-analysis by Eagley and Johnson (1990) shows differences in management style with women adopting a more democratic or participative style and less of an autocratic or directive style relative to their male counterparts. Similar characteristics are observed in leaders in non-profit institutions (Meinhard and Foster, 2003). We do not know yet if such management styles and gender specific managerial characteristics affect the ability of MFIs to serve marginalized clients in rural areas and maintain financial sustainability of MFIs.

The bulk of the literature on leadership, gender and performance, especially in microfinance, focuses on women's presence on the board (of directors) and finds positive association between board gender diversity and performance in financial institutions serving marginalized clients (Adams and Ferreira, 2009; Hartarska, 2005; Hartarska and Mersland, 2012; Hartarska and Nadolnyak, 2012; Strøm et al., forthcoming).

The literature on CEOs' gender and MFI performance is scarcer. Unlike other financial institutions where women are leaders in at most 10% of the companies, in MFIs the proportion of women CEOs is relatively high and is 27% in our sample. There is some evidence, similar to evidence from other financial institutions, of a positive link between performance and female CEO, female Chair of the Board, and female directors (Carter et al., 2003; Mersland and Strom, 2009; Strøm et al, forthcoming). The results are most often explained by a female CEOs' ability to better understand the needs of the customers the vast majority of whom are women.

Anticipating and meeting clients' needs seems important and evidence suggests that, in Eastern Europe and Central Asia, MFIs targeting more women have lower costs (Caudill et al., 2012). Female loan officers have better capacity to build trustworthy relationship with borrowers and the loans they extend have lower probability to turn problematic (Beck et al., 2013). In addition, relative to male clients, female clients are better at managing the money they borrow and save (D'Espallier et al., 2011).

Targeting women to capture better repayment rates, however, may not translate into better profitability if better repayment rates are offset by the higher costs of female customers' smaller loans and savings size (D'Espallier et al., 2013). This may be especially the case with deposit-mobilizing MFIs because those with (positive) scope economies from jointly lending and mobilizing deposits have fewer women on the board and are less likely to have a female Chair (Hartarska et al., 2013). However, Hartarska (2005) reports a positive link between female CEOs and MFIs' ability to reach poorer borrowers (depth of outreach) in Eastern Europe.

The evidence seems to suggest that the double bottom line may be behind reported advantages (or their lack) for female managers and MFI performance. Therefore, an evaluation of the effectiveness of female managers in running their institutions must fully account for the double bottom line of reaching as many poor clients as possible while maintaining financial self-sustainability. We do exactly that by using a productivity method that accounts for the two objectives.

Method

The banking efficiency literature argues that, after directly accounting for input prices, output quantity, technology-specific factors and country characteristics, the remaining inefficiency is managerial (Berger and Mester, 1997; Bos and Kool, 2006; DeYoung et al., 2001). To test if women are better bankers for the poor, we follow this literature and first estimate a stochastic frontier (cost) function and, in a second step, evaluate if in rural areas the individual technical efficiency coefficients differ by the CEO's gender.

A structured approach to efficiency involves estimating either a profit or a cost function. For the microfinance industry, the cost function is preferable because, while some MFIs are not-for-profit, all strive to minimize cost. Furthermore, the cost function is more appropriate for the cases when firms are price takers in the input markets (labor and capital) and have some market power in the output (financial services) market (Varian, 1984). MFIs have market power in serving the poor because there are limited alternative sources of funds. At the same time, markets for MFIs' inputs such as physical assets, financial capital, and salaries for skilled labor are, by and large, competitive.

We adapt the production approach to efficiency in banking which is appropriate for non-traditional financial institutions and accommodate the dual objective of MFIs (Van Cayseele and Wuyts, 2007; Hartarska et al., 2013). Microfinance studies have shown that, when outputs are measured as the number of clients served (borrowers and savers), the resulting individual technical efficiency coefficients capture the efficiency in serving as many poor clients as possible (Hartarska et al., 2010, Hartarska et al., 2012a&b).

We first estimate a stochastic translog cost frontier of the form:

$$\ln(C) = \alpha_0 + \sum_j \alpha_j \ln(p_j) + \sum_k \beta_k \ln(y_k) + \frac{1}{2}\sum_j \sum_i \gamma_{ji} \ln(p_j)\ln(p_i) + \frac{1}{2}\sum_k \sum_l \delta_{kl} \ln(y_k)\ln(y_l) + \sum_j \sum_k \rho_{jk} \ln(p_j)\ln(y_k) + \ln u + \ln v \quad (1)$$

where C is total cost, y_k are outputs, p_j are input prices, $\alpha, \beta, \gamma, \delta, and\ \rho$ are parameters to be estimated, $\ln u$ is the inefficiency term assumed to be one-sided (half-normally distributed), and $\ln v$ is $N(0, \sigma^2)$. Standard restrictions are imposed by dividing all prices and quantities by the price of physical capital. Individual coefficients of technical efficiency are derived from this

equation and are used as the dependent variable to estimate if there are differences in efficiency by the CEO's gender in MFIs serving rural and in MFIs serving both rural and urban clients.[2]

In equation (1), output is measured as the number of active clients (borrowers and savers) to account for the outreach goal of serving as many clients as possible. The inputs are labour, physical capital, and financial capital. The price of labour is the average annual salary per employee calculated as personnel expense divided by the number of employees. The price of physical capital is the operating expenses minus personnel expenses divided by fixed assets. The price of financial capital is the weighted cost of capital. The total costs (C) are defined as the sum of the products of input prices and quantities.

In cross-country banking efficiency studies, country-specific factors are typically accounted for and we include country controls (Wu et al., 2012). Estimation of financial institutions must also account for the credit risk typically measured by non-performing loan ratios (Hartarska et al., 2013).[3] We control for the level of risk using a variable measuring the ratio of loans overdue more than 30 days to total portfolio, which is a standard ratio used by MFIs to measure credit risk. Further, following Caudill *et al.*, (2009) who show that learning may occur over time, we also include the age of an MFI directly in the cost function.

Data

The dataset covers the period 1998-2009 and consists of about 250 MFIs from over 50 countries with an average of 3.2 observations per MFI. It has been constructed from rating reports by four major MFI rating agencies which at the time of data collection were available at various websites and in financial reports (e.g., www.ratingfund2.org, www.mixmarket.org, individual MFI's websites).

The summary characteristics of the dataset used in this analysis are presented in table 1, Panel A. In addition to the variables used in the efficiency and gender analysis, we summarize variables typically used in analysis of MFI performance by the gender of the CEO. Statistically significant difference in the means of the two groups of MFIs is indicated by asterisks.

[TABLE 1. PANEL A APPROXIMATELY HERE]

The results show that there is no statistically significant difference by the CEO gender in performance measures typically employed in MFI performance analysis. The only exception is that women CEOs are more likely to lead organizations that have more women clients (76 percent versus 70 percent of MFIs with male CEOs). Comparing the variables directly entering the cost function we do not find statistically significant difference in any variable other than the

[2] An alternative one-stage method developed by Battese and Coelli (1995) has gained some popularity. However, Greene (2002) argues that, in cross-country studies, this alternative would not represent a substantial improvement over the more traditional technique, which is what we use in this article.

[3] This is needed because lower asset quality (or higher nonperforming loan ratio) requires more resources to manage the higher risk and, if asset quality is not accounted for, estimated scale economies will be reduced. Thus, results may show that there are economies of scale while, in fact, when risk is incorporated financial institutions have constant returns to scale, i. e., operate at the minimum costs (Hughes and Mester, 1998).

number of clients showing that MFIs with female CEOs serve 10,000 fewer clients than MFIs with male CEOs while there is no statistically significant difference in the number of borrowers served. This result is likely related to the fact that only 19 percent of MFIs led by women are regulated and collect deposits (thus serve both borrowers and savers), while 31 percent of MFIs with a male CEO collect deposits.

We observe statistically significant differences in MFIs-specific characteristics between MFIs lead by women and by men. For example, MFIs with female CEOs have larger boards (7.6) than those with male CEOs (7), have almost twice the share of women in the board (0.44 versus 0.23) and are three times more likely to have a female Chair of the board (share of 0.43 versus 0.16), consistent with Matsa and Miller (2011). The female-led MFIs are smaller with average assets of $5.8 million and loan portfolio of $4.5 million than male-led MFIs with average assets of $8.8 million and loan portfolios of $6.2 million.

Table 1 further reveals that female managed MFIs target somewhat different markets compared to MFIs with male CEOs. Among the MFIs serving exclusively rural markets, only 19 percent are led by women and among those serving both rural and urban areas 29 percent are led by women. Relatively fewer female-led MFIs offer agricultural loans (58 versus 68 percent offered by male-led MFIs), MFIs with female managers are more likely to have an explicit social orientation (85 percent versus 64 percent in MFIs led by men) and are more likely to explicitly target women clients (59 percent versus 43 percent for MFIs led by men). No statistically significant difference in the main loan methodology is found except for the surprising finding that 10 percent fewer female led MFIs use solidarity lending as their main lending methodology relative to male-led MFIs.

We present summary statistics of the external environment in which MFIs operate in table 1, Panel B. This panel reveals that female-led MFI are more likely to be located in countries where the percentage of female labor force with tertiary education is higher (34 percent versus 28 in male led MFIs) and where higher percentage of women are representatives in the parliament although the magnitude of this difference is small (15 versus 14 percent in male-led MFIs). These differences suggest that availability of qualified women matters.[4]

[TABLE 1. PANEL B APPROXIMATELY HERE]

Results

Results from the stochastic frontier efficiency analysis are presented in table 2. We observe that the data fit well the cost function with 8 out or 12 variables statistically significant with low p and high Chi2 values. Consistent with previous research, the results show that there are increasing returns to scale in MFIs (Hartarska et al., 2012a&b; Hartarksa et al., 2013). Also

[4] Unfortunately, values of these variables are not available for many of the observations and we cannot use them in the analysis.

consistent with previous work, we find that how we measure the outreach aspects of MFIs' output matters. The coefficient on the output is about 0.8 when output is measured by the number of active clients and about 0.7 when output is measured as the number of active borrowers. MFIs would be operating at minimum cost or at constant return to scales (optimal scale) if the estimated coefficient on the output was one. The lower this coefficient, the further away from the minimum cost the industry is. Thus, the results indicate that measuring only the lending output by the number of borrowers would suggest that MFIs must grow to achieve minimum per unit costs. If we account for the fact that some MFIs also provide savings services and use the number of clients as the output measure, we would conclude that MFIs must also grow to achieve optimal scale but to a smaller extent. Thus, MFIs may be more efficient when providing both loans and deposits and perhaps that to achieve optimal scale lending only MFIs have to grow more than lending and savings MFIs. This result is consistent with findings of scope economies in microfinance (Hartarska et al., 2010; Hartarska et al., 2011).

[TABLE 2 APPROXIMATELY HERE]

All control factors included in addition to those implied by the traditional cost function are also statistically significant with one percent higher portfolio at risk associated with 35 percent higher costs and one additional year of MFI's age associated with one percent higher costs. Thus, for this sample we find that costs do not fall but increase slightly over time. This is likely due to the higher costs associated with reaching more marginal (pooper) clients as the MFIs expand with age.

Next, we look at the regressions that test for differences in outreach efficiency by the CEO's gender to evaluate whether female-led MFIs are more efficient in reaching active clients relative to male-led MFIs. These results are presented in table 3. We are interested in the results for MFIs serving rural financial markets.[5] The results show that outreach efficiency in female-led MFIs serving rural markets is higher by 14 percent points when output is measured by the number of active clients and by 12 percent points when output is measured by the number of active borrowers. We also find that the CEO's gender seems to explain a very large part of the variation in efficiency, in particular in rural areas (R-square is 0.67 & 0.62).

[TABLE 3 APPROXIMATELY HERE]

In MFIs serving both rural and urban markets, when outreach is measured by the number of active clients, there is no statistically significant difference in technical efficiency by the CEOs' gender (although the standard errors are relatively small). However, we find 5 percent significant difference in the efficiency coefficients when output is measured by the number of active borrowers in the stochastic frontier function. It is possible that these results reflect the fact that much fewer MFIs offering savings products have female CEOs. Alternatively the results may suggest that gender related advantages are valid for MFIs specializing in serving rural markets only. We also test the difference in efficiency by gender of the CEO in MFIs serving only urban market and find 13 to 14 percent point higher efficiency for female-led MFIs serving urban markets only.

[5] The overall difference in efficiency by CEO gender is about 7 percent points.

Conclusion

The financial literature has shown that in some financial industries, female managers can deliver better results than male managers while the microfinance literature argues that women may manage money better because female clients repay their loans better than male clients, and female loan officers generate better repayment rates. With this work, we draw attention to the potential for advantages related to the CEOs' gender and organizational performance in microfinance.

We focus on the simple task: can we find a relation between female leaders of MFIs and these institutions' performance measured along two dimensions – financial sustainability and outreach in rural markets. Thus, we evaluate if the outreach efficiency of an MFI is affected by the gender of their CEO using panel data from over 250 rated MFIs worldwide for the period 1998 -2009 and the methodology used in the analysis of banking efficiency.

The empirical results show that, in rural markets, female CEOs run MFIs that have 14 points higher technical efficiency at reaching poor clients and have 12 percent higher technical efficiency at reaching poor borrowers. The CEO's gender seems to explain significant portion of the variation in computed efficiency. We also find that female CEOs produce results similar to those of male CEOs when their organizations serve both rural and urban markets. There is statistically significant difference of 5 percent points when output is measured by active borrowers, but there is no difference by CEO gender when output is measured by borrowers and savers (clients). Possible gender related advantages are smaller in MFIs serving both rural and urban markets. The advantages seem to be related to specialization in a market (rural only or urban only but not mixed) because in MFIs serving urban markets only, female CEOs also run more efficient MFIs.

Overall, we find that, in rural microfinance institutions, outreach efficiency is positively associated with female CEOs. Female managers are more efficient than male managers when their institutions specialize in one type of market served - rural (or urban). Future research will have to pinpoint the reasons for such difference. One reason may be that female managers better understand the needs of their clients the majority of whom are women, and thus are more efficient. Other reasons may be those described in the behavioral finance literature, such as female managers' lower overconfidence and higher risk aversion when initiating new projects and introducing new products. Encouraging gender diversity in the pool of potential CEOs of MFIs may increase cost efficiency and improve the status of women in rural areas. More importantly, the results provide efficiency arguments for promoting gender diversity at the level of top MFI management.

Table 1. Panel A. Summary of MFIs' Performance, Efficiency and Internal Governance

Variable	Female CEO	male CEO
MFI Performance		
ROA (percent)	3.9	2.9
ROE (percent)	10.6	13.0
Women clients (percent)	76.1*	70.0
Portfolio at Risk (>30days, percent)	6.0	6.1
Average loan size ($)	957	1,215
Cost function variables		
Number of Clients	15,269 *	24,452
Number of Borrowers	13,031	17,625
Number of Depositors	3,924	6,649
Average Wage (annual in $)	6,731	6,721
Cost of Physical Capital (admin. expense /net fixed assets)	3	3
Cost of Capital	0.08	0.08
Total Cost ($)	1,057,494	1,311,118
MFI Specific Variables		
Board size (number of members)	7.61*	6.97
Percentage of women on the board	44.04***	23.45
Female Board Chair	0.42***	0.16
Assets ($)	5,814,740**	8,802,469
Loan Portfolio (percent)	4.523,937**	6,233,859
Age (in years)	9.2	8.5
MFIs serving rural markets (percent)	21***	79
MFIs serving rural & urban markets (percent)	29***	71
MFIs with Social Orientation (share)	0.85**	0.64
MFIs offer agricultural loans (share)	0.58*	0.68
MFIs targeting women (share)	0.59***	0.43
Collect voluntary savings (share)	0.33	0.34
MFI offer financial service only	0.78	0.81
MFIs offer solidarity group loans (share)	0.51**	0.62
MFIs offer village banking loans (share)	0.29	0.25
MFIs offer individual loans (share)	0.78	0.83
MFIs offer consumption loans (share)	0.31	0.37
MFIs offer housing loans (share)	0.29	0.30
Debt-to-equity ratio	3.16	4.25
Regulated MFIs (share)	0.19***	0.32

Note: *** mean difference statistically significant at 1%, ** mean difference statistically significant at 5%, * mean difference statistically significant at 10%.

Table 1. Panel B. Country-Specific Characteristics of MFIs by CEO Gender

Country Specific Variables	Female CEO	Male CEO
Rural population (percent of total)	48	51
Women as percentage of the labor force	42	41
Percent of female labor force with secondary education	37	36
Percent of female labor force with tertiary education	34*	28
Percent of female in government (parliament)	15*	14
GDP per capita	2,339	2,097
Bank lending as percentage of GDP	0.01	0.01
Banks branches per 100,000 adults	11	10

Note: *** mean difference statistically significant at 1%, ** mean difference statistically significant at 5%, * mean difference statistically significant at 10%.

Table 2. Stochastic Frontier Cost Function Estimation

VARIABLES	Total Cost	Total Cost
Constant	-1.267***	-123.4***
	(0.120)	(15.90)
Active Clients	0.801***	
	-0.025	
Active Borrowers		0.701***
		(0.025)
wL	0.748***	0.732***
	-0.026	(0.022)
wFC	0.182***	0.182***
	-0.022	(0.019)
Y*Y	0.054***	0.057***
	-0.014	(0.013)
wL*wL	0.013	0.014
	-0.017	(0.015)
wFC*wFC	0.042***	0.053***
	-0.014	(0.012)
wLw*FC	-0.024*	-0.029**
	-0.014	(0.013)
Y*wL	0.004	-0.016
	-0.012	(0.011)
Y*wFC	-0.002	0.003
	-0.009	(0.009)
Risk (PAR30)	0.355**	0.364**
	(0.169)	(0.170)
Age	0.013***	
	(0.004)	
Year		0.062***
		(0.007)
Country Controls	yes	Yes
Observations	727	857
Number of case	237	266
Chi 2	8677	13325
P value	0.001	0.001

Notes: Robust standard errors are in parentheses, *** significant at 1%, ** significant at the 5%, * significant at 10%.

Table 3. Technical Efficiency (TE) Differences by CEO's Gender and Market Served

VARIABLES	TE (y is # clients)	TE (y is # borrowers)	TE (y is # clients)	TE (y is # borrowers)	TE (y is # clients)	TE (y is # borrowers)
	Rural Markets	Rural Markets	Rural & Urban Markets	Rural & Urban Markets	Urban Markets Only	Urban Markets
Female CEO	0.141***	0.123***	0.032	0.050**	0.130***	0.143***
	(0.033)	(0.036)	(0.019)	(0.022)	(0.029)	(0.034)
Controls	yes	yes	yes	yes	yes	yes
Constant	0.416***	0.744***	0.525***	0.817***	0.377***	0.501***
	(0.076)	(0.0854)	(0.092)	(0.105)	(0.089)	(0.107)
Observations	158	163	557	608	254	268
R-squared	0.668	0.620	0.264	0.283	0.317	0.427

Notes: The dependent variable is technical efficiency computed from cost function estimation. The technical efficiency is computed from models where the output is measured by the number of clients or the number of borrowers. Robust standard errors are in parentheses, *** significant at 1%, ** significant at the 5%, * significant at 10%.

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