
Staff gender composition and Microfinance Institutions' performance

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ABSTRACT

In this paper I study the relevance of staff gender composition for Microfinance Institutions financial performance using a dataset on European Microfinance Institutions. Results strongly suggest that females have a financial performance advantage in this sector and that the advantage is driven by differences in risk aversion between men and women. The relationship is estimated by ordinary least squares and instrumental variables, the second method is used to address with the endogeneity problem of the variable of interest (i.e. share of female in the MFIs).

Key words: Microfinance, microfinance institutions, gender, financial performance

JEL codes: G21, G32, J16

1. Introduction

When people think about microfinance, they think about giving small loans to poor people, entrepreneurs or small businesses, but microfinance is not only about giving loans, it is also about poverty reduction and gender empowerment. Microfinance, also known as microcredit, is a financial service that resembles traditional banking, but that focus on people and small businesses who do not have access to traditional forms of credit.

Microfinance is a tool that can help the poor to achieve their productive potential by giving a boost to their small business. Normally, poor people have difficulties when having access to credit, small loans do not generate many profits or directly, they do not generate profit at all. In addition, these small credits are risky for banks. Both, the low profitability and the risk of the operation keep poor people to be far from credit accessibility.

It is not new that capital does not flow to the poor. For traditional banks it is not easy to determine which clients are riskier than others, forcing them to set high interest rates and inhibiting many customers from entering the market. A problem of adverse selection exists, traditional banks have less information about the level of risk than clients and that causes a lack of efficiency in the price of loans. Moreover, traditional banks cannot be sure that clients are making full effort when working with their projects as they cannot observe the client full-time. There exist also a problem of moral hazard, traditional banks cannot be sure of the correct (financial) behavior of the client.

Microcredit is seen as a way of addressing these problems by reducing transaction costs and solving information problems as Microfinance Institutions have more contact with clients than traditional banks. According to Van den Berg, Lensink and Servin (2014), a unique characteristic of Microfinance Institutions is that they meet regularly with clients to increase the business and personal skills of the clients.

To give some numbers about the actual importance of microfinance around the world, in 1997, there were 655 institutions that provided service to 9 million of very poor clients, in 2007 there were 3,352 institutions with about 106 million clients. Therefore, it is obvious that microfinance institutions are becoming increasingly common phenomenon. Regarding Europe, according to the data from the 2014-2015 Survey of EMN-MFC Members, microfinance has never been so important and it is on the path to be consolidated. In 2015, surveyed institutions served 747,265 active borrowers and the gross microloan portfolio outstanding reached 2.5 billion euros. According to Bendig, Unterberg and Sarpong (2014), in 24 EU countries nearly 390,000 microcredits were disbursed in 2013.

When asking for credit, it is apparent that the relation between client and agent is important, in order to reach a positive contract and get access to credit. There is evidence that the gender of the agent who takes the decision over giving a loan or not is one of the main factors that influence the outcome of a

lending operation. For example, according to Hartarska, Nadolnyak and Mersland (2014) Microfinance Institutions with a female Chief Executive Officer are more efficient when treating with the poor. The authors found that female CEO was more efficient by estimating a stochastic frontier (cost) function and evaluating the impact of the CEO's gender.

It is important to highlight that most microfinance borrowers are women, in 2007 around 70% of the microfinance clients around the world were women and 83% among the poorest, as is shown in Armendáriz and Morduch (2003).

As was demonstrated by Belluci, Borisov and Zazzaro (2010), female entrepreneurs face tighter credit availability, thus, microfinance has been seen as a good solution in order to bring credit to women, especially among the poorest. As a result, microfinance institutions that seek social objectives will target women as objective in order to have a higher development impact. Therefore, it is not surprising that one of the goals of microfinance, aside from poverty reduction, is female empowerment.

Moving to the essence of this essay, this project consists of scrutinizing the relationship between the share of female on the staff of Microfinance Institutions, MFIs from now on, in Europe and their financial performance. The main goal is to study the effect of the women's percentage of the staff on the MFI's financial outcome.

The interest in analyzing the share of female that work in this type of firms is because there is evidence of gender-based differences between male and female when facing financial decisions. It is also important to highlight that there is a positive effect on the financial relationship between agents and clients when both have the same gender and, as I mentioned above, women are an important target of Microfinance.

Nowadays, gender equality policies or gender quotas are a cornerstone of politics and are discussed daily on parliaments or in the news. Therefore, with this paper besides contribute to microfinance literature I also contribute to economics of gender.

The first question we must answer when studying the effect of the staff composition on performance is: is this composition purely random? Or having a 40% or 60%, for example, of females on the staff is arbitrary?

The main empirical difficulty to estimate the causal effect of gender composition on performance is that the percentage of women on the staff is endogenous, this endogeneity and the way to control for it is the main difference between this paper and the previous ones as with the study of the percentage of women on the staff. Considering that men and women have different behavior when facing financial decision, it is supposed that the percentage of women on the staff will not be independent of the financial performance goal of a firm. Therefore, I defend this claim and that instrumental variable approximation

is maybe a good way to proceed when studying the effect of the staff gender on the financial performance of MFIs. Also, I present a set of instruments in order to be able to build this kind of estimation.

To deal with the mentioned study, I use a dataset from the survey realized by the European Microfinance Network and the Microfinance Centre that provides information of 149 MFIs from 22 European countries for the period 2014-2015.

The structure will be as follows: Section 2 the presents literature review, section 3 presents the data and variables, in section 4 the theoretical model is presented, while section 5 contains results. Section 6 concludes.

2. Theoretical hypothesis and literature review

To determine what results can be obtained in this study, some previous literature will help to shed some light. Hartarska, Nadolnyak and Mersland (2014) and Mersland and Øystein (2009) focused on the CEO's gender. The first one studied the impact of the CEO's gender on the MFI financial results by estimating the stochastic frontier cost function, to do so they used a dataset consisting of about 260 MFIs from over 50 countries between 1998 and 2009. They found that gender played a major role since MFIs with female CEO have significantly higher efficiency than those MFIs with male CEO, additionally they find that promoting gender diversity at the top levels of MFIs will lead to social and financial benefits. The second one also reach a similar outcome conclusion, that most corporate governance mechanisms have little impact on MFIs' financial and outreach performance, but when the CEO is a women, the performance improves. To do so that they used a dataset from third-party rating agencies composited of 278 MFIs from 60 countries between 1998 and 2007.

Previous papers affirm that, having a female CEO has a positive and significant effect on the financial performance of the MFI.

There is also more related literature to the topic of this paper, which do not study the CEO's gender but the loan officer's gender. Beck, Behr and Guettler (2013) provided insights into the reason for female performance advantage, female loan officers always perform better when the borrower is a women and also they are able to build up strong trust relationship. This is quite important, according to Belluci, Borisov and Zazzaro (2010) female entrepreneurs face tighter credit availability the majority of the microcredit borrowers are women, especially the poorest. Back to Beck et al (2013) in order to develop their work they used a loan-level dataset from commercial banks in Albania that covers the period between 1996 and 2006 to investigate if the loan's officer gender a is determinant at the time of having arrears on the provided loans or not. Another paper, Beck, Behr and Madestam (2017) has also use using data from a large Albanian lender to study the effects of gender interactions on the supply and demand

for credit. They found that borrowers matched with officers of the opposite gender ask for less second loans with the bank and received smaller and shorter-maturity loans.

Extrapolating these ideas, increasing the share of female is expected to have a positive effect on the MFIS financial performance. Taking into account that women is an important target for MFIs, the institution will benefit of the performance advantage and contract fidelity of sharing the same gender between agent and client.

In the same line of study Van den Berg, Lensink and Servin (2014) examined the impact of loan officer's characteristics on repayment rates of microfinance borrowers in Mexico. Using a survey data for 57 loan officers and 406 borrowers found that male officers are better able to induce borrowers to repay than female. The relevance of that study to this paper is that, there is a crucial difference between standard business banks, which seek commercial objectives, and MFIs. For MFIs, the one of interest, is not only about lending money, they meet regularly to increase the business and personal skills of the clients. This leads to reconsider the positive effect of increasing the share of female on the financial outcome as there is a constant meeting between both parts. This unique characteristic of the MFIs also supports that moving the unit of measure to the staff of the firm seems to be a good decision.

It is important the link between the performance advantage when agent and customer are both women. Thus, having a high percentage of female customers and an increase in the percentage of women on the staff it is expected to have a positive effect on financial performance.

Aside from the advantage of sharing the same gender, behavioral literature affirms that there are gender-based differences that are important when facing financial decisions and therefore, this individual differences will be reflected in the staff financial preferences and are supposed to have an impact on the financial performance.

Therefore, the main idea is that the existence of individual gender-based differences may have implications for financial behaviour. These individual differences are expected to be reflected on the financial results of the MFI.

The most important gender difference between genders, and the most well-known, is the difference in risk aversion between men and women. According to Sunden and Surette (1998) women are more risk averse than men, the authors used data from the 1992 and 1995 Survey of Consumer Finances and found that workers differed by gender in the location of assets in defined contributions. Thus, the previous difference in financial preferences will make that the financial performance of a MFI vary depending on the gender of the staff, reflecting the individual risk aversion heterogeneity. Therefore, if there are two workforces, one with more percentage of female than the other, it is supposed that the first workforce will be more risk averse than the other and will deal with risks in a safer way. Due to the previous fact, I expect having a higher share of females will have a positive effect in MFIs risk control.

Croson and Gneezy (2009) reviewed the literature on gender differences and by using lab and field studies were able to support the idea that women were more risk averse than men. In addition, by analyzing bargains, observed that women's inclination to competitive situations were lower than men's. In a sector like microfinance, where competition and profits seeking is of lower importance., having a staff with lower inclination to competition, will drive the staff to focus in other targets and no so much in competition and therefore, affect the financial performance of MFIs.

Another important aspect to consider when facing financial decisions is the overconfidence of the agent, Barber and Odean (2001) test the assumption done by psychological research that men are more overconfident than women in the area of finance and therefore men are supposed to trade more frequently. Using a data of over 35.000 households from 1991 to 1997 they corroborated the overconfident assumption and found that men trade a 45% more than women. Indeed, men had a lower net return. Comparing two different workforces, the first with a higher share of female than the second. The first one will be more conservative than the second, it is supposed that they will measure financial operations with a safer perspective. Leading MFIs to have a better risk control.

To complete the previous two ideas of gender divergence in financial location preferences and frequency of trade, Agnew, Balduzzi and Sunden (2003) studied nearly 7.000 retirement accounts from the 401(k) plan during the 1994-1998 period and found that men invest more in equities than women and also trade with more frequency. Furthermore, this paper found significant gender-based differences in financial preferences. When one workforce trades more than other, it should theoretically have a lower control over risks, due to the increase of the volume of trades. Thus, MFIs with more female share are supposed to have better risk control.

According to previous behavioural literature, if women are more risk averse than men, less overconfident in financial decision-making, have lower preference for competitively situation and present lower trade frequency, it is expected them to take less risky actions and this may affect the MFIs financial performance positively.

The main hypothesis to be tested in this paper is whether an increase in the share of female in the firm affects the financial performance of MFI. The effect is supposed to be positive because as supported by Sunden and Surette (1998), Croson and Gneezy (2009), Barber and Odean (2001), and Agnew, Balduzzi and Sunden (2003) there exist gender-based differences that will drive women to take safer financial decisions than men. This financial performance differences have been observed in Hartarska, Nadolnyak and Mersland (2014) and Mersland and Øystein (2009) when studying the CEO's gender and by Beck, Behr and Guettler (2013), Beck, Behr and Madestam (2017) and Van den Berg, Lensink and Servin (2014) when studying the loan officer's gender.

So that, in this paper is going to be tested whether an increase of the share of female on the MFIs staff will have a positive effect on it financial performance.

3. Dataset and variables

This section describes the dataset and provides information about the MFIs characteristics together with their financial ratios and their construction.

The goal of this work is to study the effect of the share of female on the MFI's financial performance. Therefore, the financial ratios of the firm will work as dependent variable of the model and the share of female will be the main explanatory variable.

The dataset that I use in order to test my hypothesis consist of information about 149 FMIs from 22 European countries observed for the years 2014 and 2015, the information is obtained through a survey realized by the European Microfinance Network and the Microfinance Centre.

The panel data is structured such that the financial variables can be observed annually so that 298 observations are available; in contrast, some MFIs characteristics are reported only once, and they are taken as constant for both years. Also, as the dataset comes from a survey some answers from individuals were missing.

There are many ratios than can explain different financial aspects of a MFI, but with the following four ratios one can have a good perspective about the financial performance of the company. Table 1 shows the summary statistics of the financial ratios used as dependent variables.

Table 1. Summary Statistics. Dependent variables.

Variable	N	Mean	Sd	Min	Max
Return on Equity	182	4.22	22.36	-168.2	76.33
Write-off ratio	240	2.68	5.21	0	43
Provision Expense ratio	231	5.12	8.40	-5.7	50.1
Financial Expense ratio	202	4.49	9	0	69

First, as a measure of the MFI's profitability, the Return on Equity (ROE) is a measure of profitability that calculates how many dollars of profit a company generates with each dollar of equity. For the years 2014 and 2015 the average is 2.77% and 5.66% respectively.

$$\text{Return on Equity} = \frac{\text{Net Operating Income} - \text{taxes}}{\text{Average Total Equity}} \times 100$$

A rising ROE suggests that a company is increasing its ability to generate profit without needing as much capital.

The Write-off ratio (WO) represents the loans that the institution has removed from its books because of a substantial doubt that they will be recovered, in other words is a measure of the portfolio quality the Write-off ratio is 2.78% for 2014 and 2.58% for 2015.

$$\text{Write-off ratio} = \frac{\text{Value of loans written off}}{\text{Average Gross Loan Portfolio}} \times 100$$

As a measure of the portfolio quality, I also present the Provision Expense Ratio (PE), it represents the charge to income that is taken to take into account for future loan losses and it is a good tool to study the portfolio quality along with the previous one. The value is 5.22% for the year 2014 and 5.03% for the year 2015.

$$\text{Provision Expense ratio} = \frac{\text{Loan Loss Provision Expense}}{\text{Average Gross Loan Portfolio}} \times 100$$

What we observe is a slight improvement of the portfolio quality according to the decrease of both ratios.

Finally, the Financial Expense ratio (FE) measures the total interest expense incurred by the institution to fund its loan portfolio. This ratio is very important because it helps to determine the minimum lending rate an MFI must charge in order to cover its funding expenses. The value of this ratio is 4.66% for 2014 and 4.31% for 2015 which means that as long as other costs remain constant, the MFI will have more flexibility when fixing the interest rate.

$$\text{Financial Expense ratio} = \frac{\text{Financial Expense}}{\text{Average Gross Loan Portfolio}} \times 100$$

With the previous 4 ratios we can have a clear overall idea about the MFIs financial performance.

After presenting the financial ratios that will be the dependent variables of the model, I proceed to introduce the explanatory variables. These variables explain characteristics of the MFIs as size, final goal of the firm or been an EU member or not, for example. Summary statistics about the MFIs characteristics can be consulted in table 2.

The main explanatory variable is the share of female on the MFIs staff. Analyzing the composition of the staff by gender, around 62.7% for the year 2015 and 63% for 2014 are female workers. So, the percentage is quite high if we compare it with others sectors. Most of the FMIs are non-bank financial institutions (60%) and NGOs (31%), it also includes other forms as commercial banks or cooperatives/credit unions. According to the final mission of the MFI, most of them follow financial inclusion (72%) and job creation (70%) as main objectives, also important are objectives as micro enterprise promotion (60%) and poverty reduction (59%). Many of the MFIs seek not only one goal.

It is also important to highlight that around the 82% of the FMIs are UE member as the regulatory framework faced by members and no members is different.

Table 2. Summary Statistics. Independent variables.

Variable	N	Mean	S.d.	Min	Max
Women	283	0.62	0.24	0	1
Staff	291	48.09	96.76	0	703
Clients	291	6.12	23.45	0	292.41
Assets	227	32,249.61	13,5668.5	7.675	1.219,000
Specialization	272	0.57	0.57	0	1
Experience	297	16.34	13	0	83
Microloan term	273	38.30	20.27	2.5	96
APR	271	12.88	11.21	0	77.5

Notes: the variables clients and assets are expressed in thousands.

The average size of the firms in 2015 is 48.5 employees which corresponds to paid staff employed (full-time equivalent) at the end of the year, for the previous year that value is 47.7 which mean a slightly increase of the average size.

Also important, is the quantity of clients reached, the average is 5854 for 2014 and 6391 for 2015, which means an important increase of clients reached by MFIs, both individual clients and small companies are taken into account. This increase in the staff and the quantity of clients involves an increase of the MFIs total assets. Moreover, in terms of microloans disbursed there exist an increase of 367 between both years.

In addition to the dimension of the MFIs, it is also important to reflect the maturity and degree of specialization. For measuring those aspects the variable experience measures from how many years the company has been operating, the mean value is 16.78 years for the year 2015. As we see, the companies are not very old and most of them are quite new.

The variable specialization is a dummy variable taking the value 1 if the MFIs are specialized in micro lending activities, which mean that more than the 75% of the turnover comes from micro lending activities, zero otherwise. Around a 57% of the companies are specialized in this sector according to the previous condition.

The average microloan term is about 38 months for both years with an interest rate applied of 12.8%, the interest rate is constructed as the average between the one applied for individuals and business.

In the appendix information about the summary statistics by country together with the ones studied can be found in appendix table 1. Correlations between variables are available in appendix table 4 and 5.

4. Theoretical model and identification strategy

The model I purpose for estimating the impact of the percentage of women on the staff on the financial performance is a linear relationship where a financial ratio is regressed on a set of explanatory variables. Then we have that:

$$y_{it} = \alpha + \delta_i + \beta W_{it} + \gamma X_{it} + u_{it} \quad [1]$$

Where y_{it} is a financial ratio for firm i at time t ; W_{it} is the percentage of women on the MFI staff; X_{it} is a set of control variables that account for some firm characteristics; δ_i represent time fixed effect and u_{it} is a random term that varies across firms and periods.

The set of controls X_{it} includes variables for controlling the dimension of the firm such as total paid staff, number of clients reached and quantity of assets. Other characteristics of the firms are also controlled with the number of years that the firms has being opened, the average microloan length, the annual percentage rate (APR) applied for each firm control for the market power and the interest rate. Moreover, three groups of dummy variables: being member of the European Union or not; receive more than the 75% of the turnover from the micro-lending activity as measure of specialization or not and finally controlling for the kind of institution: commercial bank, credit union, NGO, other and non-bank Financial Institution which is the omitted one for being the one with more observations.

In equation (1), there may be the concern that the main explanatory variable (i.e. share of women in the firm) is endogenous. It is likely that firms with more women in the staff have different characteristics than firms with more men in the staff.

With respect to the case of study of this essay, when a firm set the financial performance goals it is supposed that the firm staff will reflect those goals. Then, firm's composition plays a major role and it is related to the financial MFI's goal. A workforce that consist with a high percentage of female will have different characteristics than staff that counts with a male majority, for example the previous two staffs will differ in the degree of risk aversion or in the altruistic behavior, as was shown in Andreoni and Vesterlund (2001).

A paper from Bagues and Esteve-Volart (2010) analyze how the chances of success of 150,000 female and male candidates for positions in the four main Corps of the Spanish Judiciary from 1987 to 2007 were affected by the gender composition of their evaluation committee. They found that, for example, committees with majority of female tend to hire fewer women. This paper argues that the gender composition may not be random and therefore is important to account for endogeneity.

So what we have is that:

$$Cov(W, u) \neq 0 \quad [2]$$

Thus, applying OLS will lead to a biased estimation. The bias will be a function of the correlation between W and u and the impact of the omitted variable on Y . In order to solve the previous problem, I propose a set of instruments to carry out an IV estimation.

Gender quotas are an instrument that has been previously employed to analyze the impact of gender composition, Bertrand, Jensen, Black and Lleras-Muney (2014). The quotas are used to equalize the representation among genders within legislation and contribute to the promotion of gender equality. As the quotas are imposed by law in a country, they are not correlated with the error term in equation (1). That is, they are uncorrelated to firms' unobservable decisions or characteristics. First because they are purely exogenous and second because they work at the national level. The main problem when facing this method was that using gender quotas provided a weak instrument and therefore, the bias with IV was higher than the OLS. I propose alternative instruments to try to improve the identification strategy:

The first one is the number of payed maternity leave days in each country, this instrument maintains the exogeneity condition of gender quotas as it is also a national law. The number of maternity paid days will be correlated with the percentage of in the workforce but will not have an impact on the financial performance. I expect that the number of maternity days will have a negative impact on the number of women in the workforce as the more days a women is out of the labour market, the more issues they might have when returning to the labour market. So, the previous instrument is a good proxy of the work-life balance, the number of payed maternity leave days is around 145 in both years.

The second instrument is the percentage of women that work in service sector in each country. The percentage of women on the financial sector works as proxy of the economic and social development. An increase of the share of the service sector is a sign of development and increasing the share of women in that sector is due to an improvement of tertiary education for women together with the accessibility to the financial sector and the comparative advantage of women in service sector, as was pointed out by Ngai and Petrolongo (2017). Thus, as the percentage of women working in services increases, it is supposed that more women will work in MFIs. Due to the previous hypothesis I expect a positive relation between the share of female in services and the share of women in MFIs. The percentage of women that work in the service sector is in mean 74.3 for the year 2014 and it increases to 74.8 for the year 2015.

The third and last instrument is fertility rate, average number of children that would be born to a woman over her lifetime, this variable is obviously not correlated with the financial result of MFIs but it is with the share of female that works in the economy. It is supposed that the higher is the fertility rate in a country, the more women will be out of the labour market for a determined period. If the number of payed maternity leave days reflect the time out of the market, fertility rate reflects the quantity. The mean fertility rate is 1.55 for the analyzed countries.

Descriptive statistics about the instruments for each country can be consulted in appendix table 2.

The main problem with this approach is that the instruments are defined for the whole country so, the IV estimation will only reproduce the variation at a national level and not individually but there is a lack of an individual instruments.

Table 3. Variation source.

Variable		Mean	Std. Dev.	Observations
Return on Equity	overall	4.22	22.36	182
	between		20.53	91
	within		8.97	2
Write-off ratio	overall	2.68	5.21	240
	between		5.03	121
	within		1.30	2
Provision Expense ratio	overall	5.12	8.40	231
	between		8.36	116
	within		0.91	2
Financial Expense ratio	overall	4.49	9	202
	between		8.93	102
	within		1	2
Women percentage	overall	0.62	0.24	283
	between		0.23	142
	within		0.04	2

Another method used to solve the endogeneity problem could be to estimate a model in differences but as table 3 shows the main source of variation is between observations and not between years.

If we look at the standard deviation we can easily see that the between value (change between firms) is much higher than the within value (change from one year to the other) and that the within value can be almost taken as irrelevant. Therefore, exploiting cross section is the best option for this case and also the absence of database that covers more years makes this method not to be effective with the current database.

5. Results

Table 4 shows the estimates by OLS with year fixed effects. The results show that the share of female is significant for the four ratios. According to the OLS estimates, an increase of 1% in the share of female have a positive effect on profitability as the Return on Equity increases in 0.2 percentage points. This assumes an improvement of 4.77% with respect to the mean.

The positive effect on profitability can be seen as the result of the performance advantage that females have in MFIs, and probably due to the fact that most of the clients are women. This confirm the results showed in previous studies when observing the CEO or loan officer gender.

Increasing the size of the MFI seems to have positive and negative effect on profits depending on whether there is an increase the size in workers, clients reached or assets terms. Increasing the size on the MFI in one worker increases the Return on Equity ratio in 0.06 percentage points and an increase of 1 thousand the number of clients increases the previous ratio in 0.1 percentage points. On the other hand, increasing the volume of assets of the MFI present a negative effect. The size of the MFIs is quite heterogeneous across the sample, therefore is important to take the effect of these two variables as informative of the mean effect.

Being an EU member is of major importance in the European microfinance environment. MFIs that are from a country member present higher Return on Equity value, this difference is about 10 percentage points. This difference is so important taking into account that the mean for all the sample is 4.22. So, it seems that the European Union offers a very positive environment and regulation for these institutions.

The set of dummy that control for the kind of company, non-bank financial institution for example, are not significant when explaining profitability, by Return on Equity, in MFIs.

With respect to the quality of the portfolio, it is a good idea to analyse both the Write-off ratio and Provision Expense ratio together.

According to the results, increasing the percentage of female workers has a positive effect on the portfolio quality, as the lower the value of the ratio the better quality.

An increase of the share of female in 1% implies a decrease of 0.06 percentage points in the Write-off ratio and 0.14 percentage points in the Provision Expense ratio. This implies a decrease of 2.23% and 2.73% respectively with respect to the mean. Therefore, an increase of the share of female in MFIs suppose a better control of risks. This positive effect in the portfolio quality can be due to the gender-based differences in financial decisions that will end in less risky loan portfolio. The differences in financial decision are driven by differences in risk aversion, overconfidence and trade frequency and make female to take less risky operations than men. The fact mentioned in Van den Berg, Lensink and Servin (2014) about continuous contact between agent and clients can be also a crucial aspect to have this increase in the portfolio quality and the individual control of the risks.

As the results show, increasing the number of total assets have a negative effect on the previous ratios and thus, an increase in the portfolio quality.

Unlike the profitability, in the case of portfolio quality ratios, being member of the EU decreases both the Write-off ratio and the Provision Expense ratio in 2.2 and 5.5 percentage points respectively. A stronger regulation from the EU can make the MFIs that are from a country member to become less flexible when accounting for future losses than MFIs from countries that are not members.

Table 4. Return on Equity(ROE), Write-off ratio(WO), Provision Expense ratio(PE) and Financial Expense ratio(FE) explained by MFI'S characteristics. OLS estimation.

Independent variables	Performance measure			
	ROE	WO	PE	FE
Women	20.5799** (9.908)	-6.8414*** (2.247)	-14.5241*** (3.752)	-4.9617* (2.604)
Staff	0.0682*** (0.022)	0.0002 (0.004)	-0.0053 (0.004)	-0.0023 (0.006)
Clients	0.1097*** (0.028)	-0.0040 (0.005)	-0.0105 (0.007)	-0.0260*** (0.010)
Assets	-1.828e-05** (0.0001)	-5.234e-06*** (0.0001)	-9.266e-06*** (0.0001)	8.796e-06** (0.0001)
Experience	-0.1776 (0.188)	0.0005 (0.051)	0.0920* (0.054)	-0.0250 (0.038)
APR	0.0588 (0.209)	0.0520 (0.042)	0.0489 (0.048)	0.7094*** (0.202)
EU member	10.1147** (4.788)	2.2794** (0.913)	5.5271*** (1.621)	6.0579** (2.475)
Other	-0.4576 (7.221)	-3.1255 (2.401)		1.0888 (2.443)
Commercial bank	1.1114 (6.395)	0.2863 (1.243)	1.7575 (1.770)	-2.4514 (1.965)
Credit Union	-9.4506 (11.147)	1.3850 (2.823)	-1.6072 (2.886)	3.7973 (2.365)
NGO	-0.9550 (3.805)	-1.6695* (0.919)	-1.5309 (1.414)	2.9993** (1.429)
Constant	-10.1544 (6.137)	6.4680*** (1.645)	9.4940*** (3.002)	-8.3959 (5.188)
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	167	194	187	183

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Omitted variables that are not significant, specialization, microloan term and fixed effect for year 2015.

For the Write-off ratio one of the dummy variables that account for the type of firm is significant. MFIs that are a Non-governmental Organization present a lower Write-off ratio and therefore a better portfolio quality. This fact is likely due to the regulation faced by this kind of organizations.

Moving to the Financial Expense ratio, an increase of the share of female have negative effect on the mentioned ratio and therefore, a positive effect on efficiency. This confirms the findings by Hartarska, Nadolnyak and Mersland (2014) when studying the CEO gender.

An increase of 1% the share of female will decrease the Financial Expense ratio in 0.05 percentage points that is a decrease of 1.11% with respect to the mean.

Increasing the size of the MFI by the quantity of total assets and the number of clients increases the efficiency of the MFI. Being member of the EU and being a NGO as in the case of the portfolio quality suppose a significant difference. Having a different regulation have a negative effect on the Financial Expense ratio of about 6.05 and 3 percentage points respectively.

As the Financial Expense Ratio is constructed with the financial expenses, an increase of the mean interest rate applied by the MFI (APR), which is highly correlated with the interest rate of the market, suppose that the firm will also have to face a higher interest and therefore an increase in their financial expenses.

An improvement of the financial results can be due to a better control of the MFIs risks by female which reflect gender-based differences, there is also the positive effect on profits result of female performance advantage, female loan officers have always a performance advantage when the borrower is a women and also strong trust relationship of contract loyalty are built between female agent and female client, and as I said before for most of the MFI's try to give women access to credit.

These results coincide with what I was expecting according to the literature that studied the CEO and loan officer gender, that an increase on the share of women on the MFIs staff will have a positive effect on the financial results. Also, the fact that many explanatory variables were not significant is not new, as also in the study of MFIs made by Mersland and Øystein (2009) we can observe the same fact.

But, what is an important aspect of this paper is that applying OLS is not the best option when analyzing the effect of the composition of the staff on a financial ratio due to the endogeneity of the variable of interest. Even though, OLS results give useful insights about the effect of staff gender composition on MFIs financial performance.

The main cause of the OLS bias is that, there might be an omitted variable that determines the share of women on the staff and at the same time firm's performance. For example, there may be a variable that accounts for the share of women on the client portfolio, as I have explained that there is a positive effect on the financial performance if agent and client share same gender. Alternatively, there may be a variable that account for the female advantage in risk controlling as, this advantage will lead to a better financial performance.

Table 5. First Stage Estimation.

Independent Variables	I Women	II Women	III Women	IV Women
Share females in service sector	-0.0064*** (0.001)	-0.0055*** (0.001)	-0.0063*** (0.001)	-0.0056*** (0.001)
Fertility rate	-0.0838 (0.119)	-0.1429 (0.113)	-0.1192 (0.102)	-0.0940 (0.096)
Payed maternity days	-0.0002 (0.000)	-0.0003** (0.000)	-0.0003** (0.000)	-0.0003** (0.000)
Staff	-0.0006*** (0.000)	-0.0002 (0.000)	-0.0002 (0.000)	-0.0003 (0.000)
Clients	-0.0027*** (0.001)	-0.0018* (0.001)	-0.0019* (0.001)	-0.0024** (0.001)
Specialization	0.1325*** (0.034)	0.1232*** (0.034)	0.1156*** (0.033)	0.1252*** (0.034)
APR	-0.0058*** (0.002)	0.0005 (0.001)	0.0010 (0.001)	-0.0001 (0.002)
EU member	0.1639*** (0.035)	0.2363*** (0.037)	0.2456*** (0.038)	0.2390*** (0.036)
Other	-0.3213* (0.186)	-0.1253 (0.174)		-0.2773 (0.188)
Commercial bank	0.1047* (0.055)	-0.0002 (0.058)	-0.0422 (0.057)	0.0007 (0.056)
Credit Union	-0.1138* (0.068)	-0.0721 (0.079)	-0.0229 (0.083)	-0.0816 (0.077)
NGO	-0.0053 (0.041)	0.0677* (0.041)	0.0530 (0.040)	0.0417 (0.040)
Constant	1.1639*** (0.194)	1.0659*** (0.179)	1.0743*** (0.167)	0.9852*** (0.166)
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	155	182	175	171

Note: Being I first stage from ROA, II from WO, III from PE and IV from FE.

Omitted variables that are not significant: time fixed effect, assets, experience and microloan term

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The first aspect I would like to show is why IV estimation is a good approximation, better than OLS, and that the instruments are valid to carry out the estimation, for that I present several tests to defend my theoretical premise.

As starting point, it is needed to test if there is statistical evidence that the variable is endogenous. Secondly I will test if the instruments meet the requirements to be valid.

IV estimation is presents in table 6 and first stage can be consulted in table 5.

IV will produce larger standard errors than OLS if the explanatory variable is exogenous. It is useful to test for endogeneity of the explanatory variable. According to the p-value of the Hausman endogeneity

test, the null hypothesis of exogeneity of share of female is rejected. Therefore, there seems to be evidence that applying IV is a good alternative to OLS and support the intuition about the endogeneity of the percentage of women on the staff of a company.

Once the endogeneity problem is tested and confirmed, the validity of the instrument is also needed to be tested. For that I will support the validity of the instruments with economics reasoning and several statistical tools.

First, the instruments have to be correlated with the endogenous explanatory variable and second, the instruments have to be uncorrelated with the error term.

The number of payed maternity leave days is as Gender Quotas, are uncorrelated with the error term because they are established by law and work for the entire country. The number of maternity paid days will be correlated with the percentage of women on the staff, as is a proxy of the work-life balance, but will not have an impact on the financial performance. I expect that the number of maternity days will have a negative impact on the number of women in the staff as the more days a women is out of the labour market, the more issues can have when returning to the labour market.

Similar to the previous instrument, fertility rate (number of children per women) represents not a national law but a social norm, Because of that I defend that fertility rate is uncorrelated with the error term but correlated with share of females on MFIs. In the case of fertility rate it is not about time out of the labor market but about the quantity of women that are out.

Different is the case of the share of female that work in services. The percentage of women on the financial sector works as proxy of the economic and social development. An increase of the share of the service sector is a sign of development and increasing the share of women in that sector is due to an improvement of tertiary education for women together with the accessibility to the financial sector. Thus, as the percentage of women working in services increases, it is supposed that more women will work in MFIs. Due to the previous hypothesis I expect a positive relation between the share of female in services and the share of women in MFIs.

Analysing the first stage regression from the IV estimation, table 5. We observe that the instruments fertility rate and payed maternity leave days have the expected effect sign, negative, on the share of female in the MFIs. But, surprisingly the share of female in services presents a negative impact, this finding can may show that as the share of female in services increases and therefore the country development together with female inclusion, fewer female may need MFIs and the staff may correct for the new gender composition of the clients. The percentage of women in services is significant in the four equations at 1%. The payed maternity leave days is significant at 5% but for the Return on Equity. Fertility rate seems to be no significant.

Second, to test if the instrument is uncorrelated with the error term I carry out the over-identification test. The validity of this test is subject to the validity of the instrument, so the results of this test should be interpreted with caution. According to Hansen J p-value, the null hypothesis is not rejected and therefore believe that the instruments are uncorrelated with the structural error and the restrictions implied by the existence of more instruments than endogenous regressors are valid.

After defending that the instruments fulfil the requirements, the model can still suffer weak identification. It is important to know whether an instrument is irrelevant, for that I carry out the under-identification test and according to the p-value I can confirm that there is not a problem of irrelevant instrument.

Although under-identification is rejected, the model can still suffer o weak identification. To check if the instruments are weak, Cragg-Donald Wald F is presented. According to its value I can finally say that the instruments seems to be strong.

Once I have check that the IV method is an alternative given the potential endogeneity of the main explanatory variable and that the instruments pass the previous tests I can finally go to comment the estimation results.

The four of them continue to be significant and in this case at 1%. It is important to acknowledge the large difference between the OLS and the IV, this fact points towards the existence of some problem with the IV estimation. Also, the possibility that OLS cannot capture the entire effect of the variable of interest or because this estimation only allows to reflect the variation at the national level.

Therefore, it is useful to observe the variation of the coefficients applying the instruments individually. In appendix table 6, IV estimation applying the instruments individually is available.

According to the results, it seems that the IV estimation with the three instruments reflect the effect of IV estimation applying share of female in services as instrument. Moreover, the variable of interest is significant in the four cases whereas when applying fertility rate it is not significant for Return on Equity. When applying paid maternity leave days, the variable of interest is only significant for the portfolio quality ratios, Write-off ratio and Provision Expense ratio.

As in the OLS, there is a positive effect of increasing the share of female on profitability. If there is an increase of 1% in the share of female, the Return on Equity increases in 0.7 percentage points that represents an increase of 16.5% respect to the average.

Assets are no more significant nor does being member of the EU. But being specialized in microcredit have a negative effect in profitability of about 19.7 percentage points. This effect can be because microcredit it is not as profitable as traditional baking. Also, seeking for profits is not the main goal of specialized MFIs.

Table 6. Return on Equity(ROE), Write-off ratio(WO), Provision Expense ratio(PE) and Financial Expense ratio(PE) explained by MFI'S characteristics by 2SLS. Second Stage estimation.

Independent variables	Performance measure			
	ROE	WO	PE	FE
Women	72.9751*** (18.041)	-31.0596*** (8.454)	-40.8888*** (7.860)	-49.8630*** (14.245)
Staff	0.0810*** (0.025)	-0.0044 (0.006)	-0.0109* (0.006)	-0.0100 (0.009)
Clients	0.1830*** (0.0407)	-0.03199** (0.0135)	-0.0423*** (0.0123)	-0.076*** (0.0223)
Assets	-8.2e-06 (0.000)	-8.2e-06*** (0.000)	-11.5 e-05*** (0.000)	2.930e-06 (0.000)
Specialization	-19.7539*** (7.396)	2.9658 (2.139)	2.9334 (2.043)	8.3870** (3.481)
Experience	-0.2506 (0.187)	0.0139 (0.063)	0.0802 (0.063)	0.0481 (0.072)
Microloan term	-0.0384 (0.170)	-0.0189 (0.026)	0.0117 (0.035)	-0.0089 (0.046)
APR	0.3937* (0.219)	0.0206 (0.059)	0.0316 (0.056)	0.7088*** (0.212)
EU member	-0.7509 (5.179)	7.9423*** (2.380)	10.8788*** (2.462)	16.8307*** (4.807)
Other	22.5879 (15.233)	-8.7935 (6.407)		-16.8126 (10.459)
Commercial bank	-2.9768 (6.770)	1.3701 (1.724)	1.6808 (2.201)	-0.9246 (2.712)
Credit Union	9.3743 (12.149)	-4.9258 (4.481)	-7.7687* (4.238)	-8.5355 (5.541)
NGO	0.9816 (4.623)	-1.2968 (1.327)	-1.3079 (2.029)	3.5842 (2.628)
Year 2015	1.5269 (3.491)	-0.2417 (0.996)	-0.0475 (1.238)	0.0695 (1.529)
Constant	-37.0923*** (9.112)	16.9036*** (4.139)	21.5846*** (4.666)	8.9812 (6.468)
Time Fixed Effects	Yes	Yes	Yes	Yes
Endogeneity test P-value	0.00383	0.000137	3.13e-05	7.23e-07
Hansen J P-value	0.587	0.375	0.437	0.964
Under-identification test P-value	7.54e-06	2.26e-05	4.67e-06	6.36e-05
Cragg-Donald Wald F	12.78	14.74	19.70	12.92

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Under-identification test refers to Kleibergen-Paap rk LM statistic test.

Endogeneity test refers to Hausman Endogeneity test.

Increasing the portfolio of clients in 1 thousand will lead to an increase of the Return on Equity in 0.18 percentage points. Having 1 more person in the staff seems to increase profitability in 0.8 percentage points. As it is quite obvious, increasing the applied interest rate have a positive effect in profitability. Adding a load of 1% increases the Return on Equity in 0.4%.

Moving to the portfolio quality, increasing in 1% the share of females decreases the Write-off ratio in 0.3 percentage point and in 0.4 for the Provision Expense ratio. This suppose a variation from the mean of 11, 2% and 7.9% respectively.

Increasing the number of total assets and the clients reached, the size of the firm, have a negative effect on the previous ratios and thus, an increase in the portfolio quality. With thousand more clients, decreases the Write-off ratio and the Provision Expense ratio in 0.03 and 0.04 percentage points respectively. In addition to the previous explanatory variables total staff shows significant and negative for the Provision Expense ratio.

Opposite to the case of the Return on Equity, being member of the EU continues as in the OLS to be an important determinant of the ratios. The difference is about 8 percentage points in the case of the Write-off ratio and about 10.8 percentage points for the Provision Expense ratio.

Finally, increasing the share of female in 1% decreases the Financial Expense ratio in almost 0.5 percentage points, which means an increase in the efficiency of the MFIs. The previous decrease suppose a variation of 9.1 % with respect to the mean.

An increase of the total number of clients in one thousand have a negative effect on the Financial Expense of about 0.07 percentage points. This show that as the volume of clients increases, the efficiency increases as well.

Surprisingly, MFIs that are specialized in microfinance present a higher value of the Financial Expense ratio. If we take into account the effect that being specialized have in profitability and efficiency, it seems that for these institutions the financial performance it is not a main issue as can be the poverty reduction or women empowerment.

APR do not change significantly with respect to the OLS estimation but being member of the EU increases it effect on the Financial Expense ratio in about 10 percentage points.

To conclude the empirical part of this work, all the test suggest that IV estimation is a better option than OLS in order to obtain a consistent estimator of the share of female on the MFI's financial performance.

The results obtained by the estimations confirm the hypothesis that the gender composition of the staff matters for the financial performance of MFIs and that women have a performance advantage in this sector.

5. Concluding remarks

This paper studies the effect of the share of female that works in MFIs with the financial performance of the institution. There is evidence about the existence of gender-based differences that are important when facing financial decisions and that there is a positive effect when client and agent share the same gender. These previous hypothesis lead to think that the gender composition of MFIs can have a significant effect in the financial performance.

The results obtained provide support for a positive relation between the increase of women in the staff of the MFI and its financial performance. This effect is due to two aspects. First the positive effect when client and agent share the same gender and the over-representation of women among clients. Second, the positive effect on MFIs financial performance of a less risky female behavior when facing financial decisions. Such relation seems to be stronger in MFIs that focus women empowerment as a main goal and therefore, female are over-represented among the clients.

Instrumental variables seems to be a useful tool in order to carry out studies that want to test the effect of gender composition of the staff on a financial, or non-financial performance. In the presence of endogenous regressors OLS are biased and do not capture the effect on the variable of interest.

Moreover, exploring the effect of the staff composition in other aspects of firms can provide a better understanding of the optimal staff composition according to the firm environment and goals.

This study can be improved with a more time extend database in order to capture variations across time and not only between individuals so that, supplementary methods can be applied to support the instrumental variable estimation or to improve it. In addition, studying a possible individual instrument despite being difficult, can make all the difference in this kind of studies.

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Appendix

Appendix Table 1. Summary statistics by country.

Country	Firms	N	Women	ROE	WO	PE	FE
Albania	4	8	0,46	10,68	0,5	0,75	2,5
Belgium	3	6	0,52	-7,5	0,55	1,45	2,5
Bosnia-Herzegovina	6	12	0,75	5,05	0,95	0	0,49
Bulgaria	4	8	0,91	12,9	0	1,25	3,23
Finland	1	2	0,47	6,95	1,73	1,94	2,69
France	4	8	0,9	9,6	0,06	0,69	0,52
Germany	5	10	0,77	11,2	3,8	4,3	1,34
Hungary	13	26	0,64	7,91	2,5	3,01	2,4
Ireland	1	2	0,5	-2	5,1	2,5	0,75
Italy	13	26	0,57	7,55	2,33	5,41	4,53
Kosovo	8	16	0,7	-9,06	1,7	8,6	3,15
Macedonia	2	4	0,95	14,33	0	0	0,425
Moldova	1	2	0,66	14,15	0	0	8,25
Montenegro	2	4	0,8			12	0,54
Netherlands	1	2	0,4				
Poland	13	26	0,62	10,36	2,31	7,55	2,6
Portugal	2	4	0,8	3,75	0,01	1,37	0
Romania	28	56	0,61	-1,8	2,66	4,32	5,8
Serbia	3	6	0,45	1,36	0,1	11,35	11,7
Spain	8	16	0,6	5,34	3,36	6,07	3,79
Switzerland	1	2			4,25	0	2,8
United Kingdom	26	52	0,53	2,35	5,68	8,45	9,46

The previous table shows the summary statistics by country and the number of firms from each country. As the data shows, there is an important divergence between countries and also between members of the EU and no members.

Appendix Table 2. Instruments.

Country	Fertility rate	Female Services	Maternity days
Albania	1,47	0,718	162
Belgium	1,33	0,8254	150
Bosnia-Herzegovina	1,56	0,7414	111
Bulgaria	1,43	0,627	154
Finland	1,33	0,599	364
France	1,55	0,5218	126
Germany	1,56	0,674	145
Hungary	1,6	0,685	170
Ireland	1,68	0,925	112
Italy	1,6	0,802	162
Kosovo	1,66	0,7425	147
Macedonia	1,55	0,5217	126
Moldova	1,55	0,5218	126
Montenegro	1,62	0,849	105
Netherlands	2,11	0,801	270
Poland	1,32	0,7317	172
Portugal	1,32	0,7317	182
Romania	1,62	0,746	171
Serbia	1,774	0,737	150
Spain	1,5	0,8426	131
Switzerland	1,36	0,843	150
United Kingdom	1,66	0,791	125

Note: The values are the mean of 2014 and 2015, as there is not much variation and in many cases there is no variation.

Information about the instruments is collected from World Bank database.

Appendix Table 3. OLS regression, share of female against instruments.

Independent Variables	Women
Payed maternity leave days	-0.0006*** (0.0001)
Fertility rate	-0.19*** (0.66)
Share female in services	-0.006*** (0.001)
Constant	1.4870*** (0.140)
Observations	263
F	16.87
P-value F	0

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 4. Correlation between dependent variables and share of female in the staff.

	Women	ROE	WO	PE	FE
Women	1				
ROE	0.1427	1			
WO	-0.2567	-0.1033	1		
PE	-0.1929	-0.3081	0.5805	1	
FE	-0.2119	-0.0578	0.1646	0.0426	1

Appendix Table 5. Correlations between explanatory variables.

	Staff	Client	Assets	Specialization	Experience	Microloan term	APR
Staff	1						
Client	0.2287	1					
Assets	0.3323	0.6488	1				
Specialization	0.1070	0.1322	-0.0728	1			
Experience	0.1296	-0.0502	-0.0162	0.1126	1		
Microloan term	-0.1912	-0.0646	0.0330	-0.2460	-0.0100	1	
APR	0.2012	0.0379	-0.0857	0.3193	0.1958	-0.4068	1

Appendix Table 6. IV regression with individual instruments.

Independent variables	Performance measure			
	ROE	WO	PE	FE
Share female service sector				
Women	73.50*** (20.17)	-33.43*** (9.65)	-42.33*** (8.78)	-49.93*** (15.61)
Time Fixed Effects	Yes	Yes	Yes	Yes
Cragg-Donald Wald F	35.50	38.31	52.99	34.32
Under-identification test P-value	0	0	0	0
Observations	155	182	175	171
Fertility rate				
Women	22.34 (20.15)	-20.98*** (6.53)	-29.13*** (8.74)	-25.04*** (9.64)
Time Fixed Effects	Yes	Yes	Yes	Yes
Cragg-Donald Wald F	16.12	24.73	22.98	17.73
Under-identification test P-value	0.001	0	0	0.002
Observations	167	194	187	183
Paid maternity leave days				
Women	26.84 (110.69)	-55.36* (34.18)	-70.53** (37.29)	-39.26 (58.61)
Time Fixed Effects	Yes	Yes	Yes	Yes
Cragg-Donald Wald F	0.65	2.32	2.339	1.02
Under-identification test P-value	0.25	0.08	0.09	0.31
Observations	167	167	187	193

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Control variables are omitted.