The determinants of outreach and profitability in MFI´s: a structural equation approach

Introduction

There is a robust body of literature that explains the benefits of Microfinance Institutions (MFIs), highlighting the fact that when a person who has not previously had access to an established banking institution is able to become part of the formal financial system, the benefits include an improved income and increase in family well-being.[1] However, since their creation, MFIs have been faced with the dilemma of how to serve more people while remaining financially self-sufficient. In order to support themselves, some MFIs have set restrictive credit policies which are in fact prejudicial to the population they aim to serve: in the literature this is what is referred to as Mission Drift. The original mission of MFIs was to help the economically disadvantaged and reduce poverty while remaining self-sustaining and profitable. However, a change of mission began to occur as MFI strategies became increasingly focused on profitability over helping the poor and lowering the incidence of poverty. As a result, the literature shows that almost half of MFIs are more profitable than commercial banks (González and Rosenberg, 2006).

Mission drift has become an important issue in literature. In particular, the debate has centered on the statistical evidence of mission drift and how to correct it, as well as on the way some variables can affect profitability and outreach. The debate is still ongoing and is exemplified by cases such as the IPO of *Compartamos Banco*, the biggest MFI in Latin-America. Mission drift has also been addressed in literature from at least two perspectives: i) by analyzing the relationship between profitability and variables that measure coverage of the scheme for those on low incomes, outreach for example.[2] There are studies that have analyzed the relationship between these two variables (González y Rosenberg, 2006; Cull, Demirgüc-Kunt y Morduch, 2007; Cotler and Rodríguez-Oreggia, 2008 and 2013; Alinsunurin, 2014 and, Pop, 2015, among others). The results have been mixed: some studies have found weak evidence of mission drift, while others have found strong evidence for it. There are also studies that ii) address factors which have an effect on profitability and outreach, and which in turn give rise to recommendations about how to improve these two indicators which are important for MFIs: Cull, Demirgüç-Kunt, and Morduch, 2009, 2011 and 2014; Bogan, 2012; Kar, 2012; Nwachukwu, 2014; and Pati, 2014 and 2015).

Given that still there is no consensus about how these dependent variables have an effect on profitability (financial performance) and outreach, in this paper we address the following questions: Are there some other ways in which independent variables have an effect on dependent variables? Is there a chance that the findings of lack of significance

[1] For further reference about this subject See: The Poverty Action Lab (2015) and Microcredit Summit Campaign (2016).

[2] Usually a measure of outreach is the average loan size: lower average loan size is an indicator that the MFI is serving more low-income people.

in the relationship between the profitability and outreach determinants result from the fact that the relationship is not direct, but indirect? In this paper we take some of the most relevant determinants of financial performance and outreach from literature (see Appendix 2), and test whether there is a direct or indirect link between these determinants and the dependent variables.

In particular, we use Structural Equation Modeling (SEM) to test whether capital structure, environment (corruption, rule of law and government inefficiency), operating efficiency and size of the MFI have a direct or indirect effect on outreach and financial performance. We therefore believe that this paper contributes in the following way: i) we use a methodology, SEM, that allows us to show not only direct but indirect effects, and also to measure reciprocal effects; ii) we built some measures of the dependent and independent variables (constructs) by using more than one variable and taking into account the literature about MFIs in order to create a variable environment showing profitability, operating efficiency and capital structure.

The paper is structured thus: in the following section we discuss the literature that addresses MFI mission drift and the literature that outlines the explanatory variables of financial performance and outreach. We subsequently give an overview of the structural equation modeling, and present the data and results. In the final section we offer some conclusions.

2. Literature review

In this section we review the literature related to two of the important aspects of MFIs: mission drift and factors that have an effect on two of the important variables in microfinance: profitability and outreach.

In 2000 Morduch argued that higher interest rates do not necessarily imply a reduction in credit allocation. He found that financial sustainability allowed MFIs to have a wider reach. Since1999 he noted the debate studied by Woller, Dunford and Woodworth between institutionists and welfarists, as an example of mission drift. He documented that while the objective of the former group was to increase financial sustainability and develop the credit portfolio, the objective of the latter group was to eliminate extreme poverty.

In 2006, González and Rosenberg found results strengthening the arguments for mission drift in MFIs, with 44% being more profitable than commercial banks. In addition, they found more evidence of mission drift when relating profitability with outreach and average loan size. Gonzalez and Rosenberg believed that it was possible for MFIs to be either profitable or wide-ranging, but not both. Cull et al. (2007) also found the relationship between profitability and outreach to be weak: their results showed that although MFIs granting small loans were not less profitable, the larger the size of the

loan, the lower the average cost and resulting profit for the organization, which could be viewed as a disincentive for serving the low-income market.

Other studies, such as that undertaken by Cotler et al. (2008), have also found evidence of a significant relationship between profitability and outreach. Their study found that in 2002 there was a positive correlation for Mexican MFIs between profitability and average loan size. They suggested two alternatives for reducing this conflict: an increase in productivity or a reduction in funding costs.

The Alinsunurin study carried out in the Philippines in 2014 found that MFIs have not yet been able to fully integrate the dual objectives of profitability and social impact. Specifically, they found that non-profit MFIs were more efficient in social impact, but less profitable that for-profit MFIs. This correlates with the findings of the Pop study carried out in Romania in 2015, which also found mission drift in Romanian MFIs. Pop also found that MFIs are concentrated in more developed cities, as opposed to communities where there is a greater need for microcredit.

Not all studies however have found evidence of mission drift. Kar (2013) uses data on MFIs from 71 countries and find no evidence that for-profit organizations have moved away from their main objective, although the study does acknowledge that there is a lack of reliable information.

Regarding the literature addressing variables affecting profitability and outreach, Cull et al. (2009) found that the legal status of MFIs has a significant impact. In general, for-profit banks grant larger individual loans, with non-profit institutions such as NGOs giving more loans to women, although the latter organizations have higher costs and lower profitability levels when compared to their for-profit counterparts. In 2011, the same authors found that when for-profit MFIs are regulated they show significant profitability margins. Regulation however has the effect of lowering access to credit for both women and the hard-to-reach population.

Regarding the effect of capital structure or leverage, Bogan (2012) finds that total assets as a measure of capital are relevant for both profitability and outreach. He also found that donations have a negative effect on sustainability because they reduce operating efficiency. In like manner Kar (2012) found that the larger the leverage, the better the financial performance. However, he did not find that leverage had a significant effect on outreach. Pati (2014) found that profitability has an impact on capital structure in the sense that the more profitable MFIs enjoy greater access to a variety of financial sources.

When looking for variables that stimulate the core mission of MFIs, Cull et al. (2014) found that those with the most branches and ATMs have a greater outreach among the low-income population, and this in turn is reflected in the greater amount of loans made in general, as well as more loans being made to women. Pati (2015) analyzes the variables governing financial performance and outreach in MFIs, finding that the main variables are capital structure, operating expenses, and asset quality. Nwachukwu (2014) analyses the impact of interest rates and sustainability, finding a U-shaped relationship between these two variables which is indicative of an optimal interest rate. In addition, she did not

find any evidence that small loans imply a higher risk of lower sustainability. Balammal, et al. (2016) found that legal status, regulatory environment, the age of the IMF, size, number of employees, capital structure and cost per client all have a significant impact on MFI performance measures.

3. Data and methodology

We use the most recent (2015) information from the Mix Market Intelligence database, and a sample size of 545 MFIs which voluntarily report their information. It is important to mention that some gaps in the data were apparent, although an important requirement of the methodology we use is a full data sample. For this reason we decided to filter the database in such a way that the 545 MFIs used are those that have complete information. The following Table 1 shows distribution by region, profit status and age:

Tabla 1. Sample distribution according to various indicators

By region		Profit or non profit		By age	
	# IMF		# IMF		# IMF
Eastern Europe and Central Asia	70	For profit	264	New: 1-4 years	21
South Asia	123	Non profit	281	Young: 5-8 years	71
Africa	70			Mature: > 8 years	435
Latin America and the Caribbean	179				
East Asia and the Pacific	89				
Middle East and North Africa	14				

By legal status		By size	
	# IMF		# IMF
Non-Bank Financial Institution	223	Small	103
Credit Union / Cooperative	68	Medium	111
NGO	161	Large	331
Bank	65		
Other	15		
Rural bank	8		

Source: author's own using data from Mix Market

An important feature of the sample is that there is a balance between for profit and non-profit MFIs. In addition, a significant number of the sample IMFs are over 8 years old, and this could be because larger and more established MFIs have the operating infrastructure necessary to generate more complete financial reports. Other descriptive

statistics are shown in Appendix 1. As previously stated, the purpose of this paper is to analyze the factors that have a direct or indirect effect on the financial performance and outreach of MFIs by using structural equation modeling (SEM).

SEM involves the evaluation of two models: the measurement model and the path model. These two models are based on the confirmatory factor analysis, which estimates several simultaneous equations in order to prove how the independent variables have an effect on the dependent variable (Lei and Wu, 2007). As previously stated, the independent variables are taken from literature, and in Appendix 2 we show a summary of the variables used in literature about financial performance and MFI outreach. In this scenario path analysis is slightly more useful than regression analysis as it has the capacity to explain both direct and indirect effects. In addition, path analysis allows two dependent variables to be related, something not possible in regression analysis due to the assumption of multicollinearity.

A prerequisite of the MES models is that it requires large samples. According to Suhr (2006) the number of observations must be at least five times the number of variables, and never less than one hundred. Our sample fits this requirement well because we use 10 independent variables, 3 dependent, and have 545 observations. In the following Table 2 we show the variables we use for our analysis:

Table 2. Definitions of variables

Variable	Short name	Definition
Return on assets	ROA	$ROA = \frac{Net\ operating\ profits}{Average\ of\ \ book\ value\ of\ assets}$
Return on equity	ROE	$ROE = \frac{Net\ operating\ profits}{verage\ of\ \ book\ value\ of\ equity}$
Financial sustainability	OSS	$OSS = \frac{total\ financial\ revenues}{financial\ expenses + operating\ expenses + Preserves\ for\ losses}$
Government effectiveness	KKM3	Indicator published by The World Bank that captures the perception of population about quality of public services and central public institutions. Indicator that captures the perception of the population about quality of public services and public institutions and which also covers the credibility of policymakers.
Rule of law	KKM5	Indicator published by The World Bank about social norms, their applicability and the general justice system. Also covers perceptions about levels of violence and criminality.
Control of corruption	KKM6	Indicator published by The World Bank about perceptions of corruption in the public and private spheres.
Interest expense	COST_FUNDING	Expenses incurred by MFIs as part of servicing debts.
Equity	EQUITY	Book value of equity
Staff employed	LogPERSONNEL	Number of MFI employees.
Active borrowers	LogACTIVEBORR	Number of people that have received at least one credit from an MFI.
Administrative expenses	ADMEXP_PORT	Administrative expenses for total credit portfolio
Operating expenses	OPEXP_PORT	Operating expenses for the total credit portfolio
Personal expenses	PERSEXP_PORT	Personal expenses for on the total credit portfolio

Source: author's own using data from Mix Market

Sometimes we wish to measure economic or social phenomena that are not observable: econometric analysis uses what are referred to as proxy variables to approximate these values. For example, outreach is the capacity of the MFI to reach more people, which can be proxied as the size of the average loan, while for profitability ROE can be used. In structural equation modeling, phenomena that cannot be measured directly but are indicated or inferred by other observable variables are referred to as latent constructs. They are also known as indicators of other variables or latent construct variables.

In order to build the constructs we use the methodology of latent variables proposed by Jarvis, Mackenzie and Podsakoff (2003). These authors give 3 conditions for the construct to be reflective: i) indicators are a real reflection of measure of the construct; ii) variables of each construct must be consistent with the construct (we use the Cronbach alpha to verify the concordance of each construct); and iii) covariance between variables and constructs must to be significant (Aldás-Manzano, Lassala-Navarré, Ruíz-Mafé, y Sanz-Blas, 2011).

3.1 Effect of environment, capital structure and operating efficiency and size on profitability

The constructs that we built are the following: i) profitability, This is comprised of variables ROE, ROA and OSS. This mix was proposed by Gutiérrez-Goiria and Unceta in (2015); ii) Environment. The reason why we included this variable is that according to Cull, Demirgüç-Kunt and Morduch (2011), both regulatory environment and institutional development have an important impact on MFIs. As variables of this measure, we use the KKM indicators (Kaufmann, Kraay, and Mastruzzi, see Table 2), which includes control of corruption, rule of law and government effectiveness; iii) capital structure. This construct includes equity and interest expenses. Even when it is a common practice to use the debt to equity ratio, Pati (2014) justifies the use of these indicators as capital structure measures as they include interest expenses and equity book value; iv) Size. This is comprised of staff employed and active borrowers. These variables were used by Cotler and Rodríguez (2008) and Cull et al. (2011), while Pati (2015) uses these variables as indicators of outreach. v) operating efficiency. This variable is made up of operating expenses, personal expenses and administrative expenses as a proportion of the credit portfolio.

We particularly wanted to analyze how the environment, capital structure operating efficiency and size impact financial performance. We want to know if it is a direct effect or an indirect effect? Before proceeding with the analysis further, we first need to prove whether the variables or indicators that form the constructs meet the Jarvis, et al. (2003) criteria previously mentioned.

To prove the consistency of the construct, we use exploratory factor analysis. According to Nunnally (1978) when we use the Cronbanch alpha, we need to verify that the factor

loading is more than 0.3. In this case all alphas were bigger than 0.7. In order to verify the relationship among variables or indicators, we ran the Kaiser-Meyer-Olin (KMO) test and the Bartlett sphericity test. The KMO is a reliability test which allows us to measure whether the construct components have common variance. The authors suggest that the factor must be between 0.5 and 0.8. In this case our results are over 0.5, except for operating efficiency. Therefore, the Bartlett sphericity test, which measures whether the factorial construction is appropriate (see Table 3), can also be applied in this case.

Table 3. Cronbach alphas and exploratory factor analysis model, financial performance model

Items	**Financial performance**	**Environment**	**Capital structure**	**Size**	**Operating efficiency**
ROA	*.944*				
OSS	*.897*				
ROE	*.882*				
KKM5		*.946*			
KKM6		*.893*			
KKM3		*.891*			
EQUITY			*.964*		
COST_FUNDING			*.964*		
LogPERSONNEL				*.977*	
LogACTIVEBORR				*.977*	
OPEXP_PORT					*.994*
PERSEXP_PORT					*.928*
ADMEXP_PORT					*.902*
Cronbach alpha	.739	.890	.705	.949	.885
KMO	.704	.703	.500	.500	.476
Bartlett chi square	1029.919***	1058.583***	718.542***	951.178***	2371.754***
% explained variance	82.43%	82.90%	92.84%	95.46%	88.77%
FULL MODEL					
KMO	.626				
Bartlett chi square	6742.348***				
% of explained variance accumulated	88.31%				
Contribution of each factor to the total variance	19.20%	19.22%	14.40%	14.81%	20.69%

*** $p < 0.01$

Note: the values of the factorial loads are shown in cursive script

Source: author's own

We verified the factor loadings of each construct, as well as the percentage of variance that we explained in each of the constructs. To this end, we use the principal component analysis and we apply a varimax rotation method. Applying a varimax rotation is suggested in samples that imply few variables in each factor, with the aim of keeping a large proportion of variance in each factor (Abdi, 2003).

The measurement model in SEM is evaluated through confirmatory factor analysis (CFA). In this case, the 5 constructs have significant factorial loads, which in turn indicate the correlation between each variable and the construct. In each case the correlation is bigger than 0.8 and the variance percentage that each factor captures is bigger than 80%.

This means that the factors are a good representation of the variables. As we can see in Table 4, the correlations are significant, allowing us to conclude that there is multicollinearity between the indicators of each construct. As previously mentioned, this is not an assumption that needs modification, as is the case with the ordinary least square model, and this is in fact a virtue of the model.

Table 4. Correlations by construct

Financial performance

	OSS	ROA
OSS	1	.799**
ROA	.799**	1
ROE	.644**	.764**

**. Correlation is significant at the 0.01 level (2-tailed).

Environment

	KKM3	KKM5
KKM3	1	.786**
KKM5	.786**	1
KKM6	.650**	.791**

**. Correlation is significant at the 0.01 level (2-tailed).

Operating efficiency

	ADMEXP_PORT	OPEXP_PORT
ADMEXP_PORT	1	.874**
OPEXP_PORT	.874**	1
PERSEXP_PORT	.681**	.933**

**. Correlation is significant at the 0.01 level (2-tailed).

Size

	LogPERSONNEL	LogACTIVEBORR
LogPERSONNEL	1	.909**
LogACTIVEBORR	.909**	1

**. Correlation is significant at the 0.01 level (2-tailed).

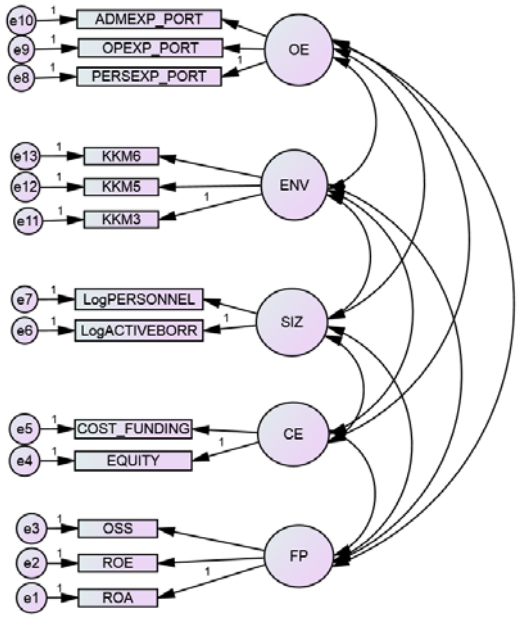
Capital structure

	COST_FUNDING	EQUITY
COST_FUNDING	1	.857**
EQUITY	.857**	1

**. Correlation is significant at the 0.01 level (2-tailed).
Source: author's own.

Figure 1 shows the confirmatory factor analysis (measurement model) we constructed in order to validate the factors used.

Figure 1. Measurement model, financial performance



Source: author's own using AMOS software

The goodness-of-fit model was based on the fit indices chi Square and chi square over degree of freedom. The chi square was significant and even when divided by the degree of freedom is greater than 2, which, according to Hu y Bentler (1995) is statistical evidence that the structural equation model is not valid. However, Lei and Wu (2007) show that even when the model is well specified and valid, if the sample is big enough, the chi square will show negative results. Because of this, they suggest the use of the normed fit index (NFI; Bentler y Bonett, 1980) and comparative fit index (CFI; Bentler, 1989). This index must be over 0.9 in order to present goodness-of-fit. As we can see in Table 5, in this case both indicators are above 0.9.

Table 5. Goodness of fit, financial performance

Ítems	**AVE**	**CR**
Financial performance	*.746*	*.898*
Capital structure	*.858*	*.923*
Size	*.931*	*.964*
Environment	*.753*	*.901*
Operating efficiency	*.861*	*.948*
Chi square (CMIN)	*374.382****	
CMIN / DF	*6.807*	
CFI	*.953*	
GFI	*.912*	
NFI	*.945*	
RMSEA	*.103*	

*** p < 0.01

Source: author's own.

We also prove other goodness-of-fit indicators, including the goodness-of-fit index GFI (Joreskog and Sorborn, 1986), and the RMSEA (Steiger and Lind, 1980). The former must be over 0.9 and the latter under 0.8. Our model fits with the GFI, but not with the RMSEA. Although Feinian, Curran and Bollen (2008) conclude that using a single goodness-of-fit measure of a model is not appropriate and other supporting goodness-of-fit measures must be provided, we believe that our model does in fact have an adequate goodness-of-fit.

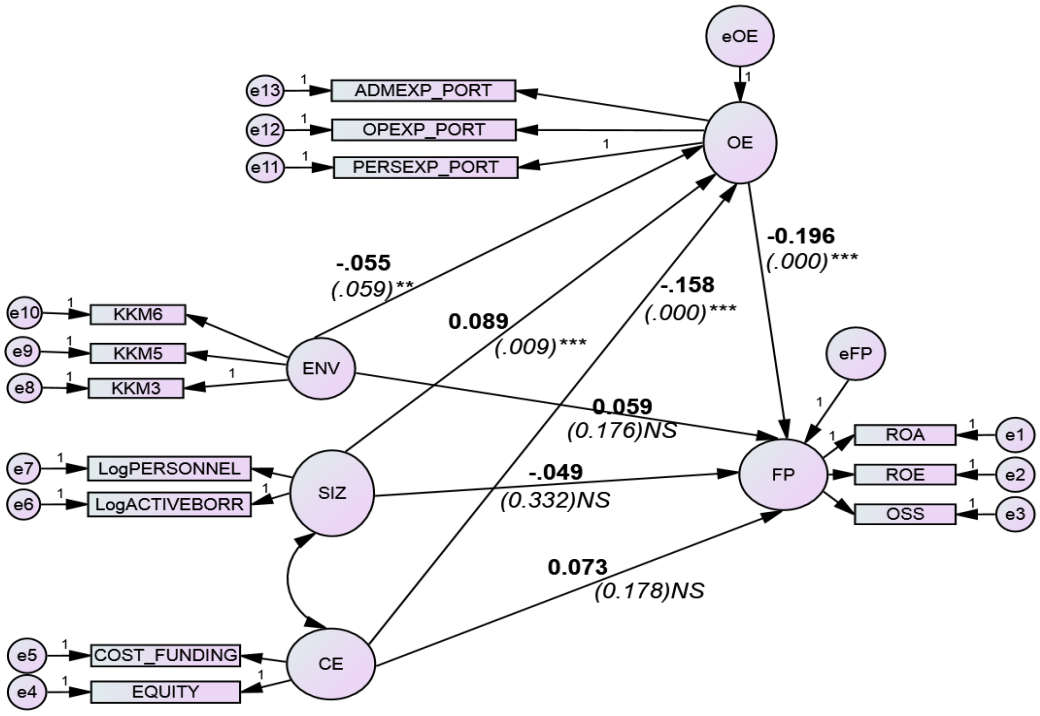
Now we proceed to verify the convergent and discriminant validity of the structural equation model following Orozco-Gómez (2016) methodology. To this end, we extracted the average variance (AVE) of each element of the construct. According to Carr (2002) and Fornell & Larcker (1981) this average must be over 0.5, which in turn is shown in our model. In other words, our model shows convergent validity with regard to discriminant validity. We employed the Campbell and Fiske (1959) model, which estimates the square of the correlations of each pair of factors, and then compared it with the variance average extracted from each factor. This square of correlations must be less than each AVE, in order to demonstrate the existence of discriminant validity. In Table 6 we show the AVE in the diagonal and the square correlations, which enables us to conclude that our model is in line with the discriminant validity criteria.

Table 6. Discriminant validity

	FP	CE	SIZ	OE	ENV
Financial performance (FP)	**0.746**				
Capital structure (CE)	0.004	**0.858**			
Size (SIZ)	0.002	0.275	**0.931**		
Environment (ENV)	0.044	0.011	0.000	**0.753**	
Operating efficiency (OE)	0.005	0.001	0.013	0.003	**0.861**

For this analysis, we use the financial performance construct as a dependent or hexogen variable, while the other variables are independent or endogen. We also establish a causality relationship and a maximum verisimilitude criterion. The results are shown in figure 2.

Figure 2. Structural model, financial performance



Source: author's own using AMOS software

Figure 2 shows that the constructs of capital structure, size, and environment do not have a significant effect on the financial performance of the construct. However, an important feature of the model is that when we add the construct operating performance as a mediator variable, all coefficients become significant at 99% (see Table 7).

Table 7. Structural model estimators, financial performance

	OP	DF
Operating efficiency (OE)		**-0.196**
		(.000)***
Capital structure (CE)	**-0.158**	0.073
	(0.000)***	*(0.178)NS*
Size (Siz)	**0.089**	-0.049
	(0.009)***	*(0.332)NS*
Environment (ENV)	**-0.055**	0.059
	(0.059)*	*(0.176)NS*

NS: not significant

: significance at 95%, * 99%

Correlation between CE and SIZ = 0.566

Source: author's own

It is important to mention that the significant negative relationship between financial performance and operating efficiency is consistent with the results of Cull, Demirgüç-Kunt and Morduch (2011 and 2014), Nwachukwu (2014) and Pati (2015). However, this result differs from the findings of Bogan (2012) and Kar (2012), as our result shows an indirect relationship between capital structure and financial performance through operating efficiency, and their result shows a direct link between these two variables. In the case of Kar (2012), he also proves the relationship between financial performance and operating efficiency although the result was not significant.

In terms of size, Cull et al., (2011), Bogan (2012), Pati (2014 and 2015), Kar (2012) and Gutiérrez-Goiria and Unceta (2015) find a positive but not significant relationship between size and financial performance. In this case, Kar (2012) analyses the relationship between operating performance and size of the MFI, and their result shows a significant link. However, unlike in our case, he did not relate it indirectly with financial performance.

Finally, with regard to the environment construct, Cull, Demirgüç-Kunt and Morduch (2011 y 2014) found a positive but not significant relationship with financial performance, while our result is positive and significant. Our result shows that the effect of these three variables on financial performance is observable in operating efficiency.

The intuition behind this result is as follows: in a complicated environment where corruption, lack of Rule of Law and government inefficiency are featured, MFIs require a bigger investment in security and infrastructure in order to provide financial services. In addition, a larger institution implies larger operating costs. This has a knock-on effect on operating performance, and negatively affects financial performance. The intuition about the negative relationship of capital structure on financial performance is as follows: the lower the leverage, the lower the interest expense, with consequent restrictions on the funds available for investment in expansion.

3.2 Effect of environment, capital structure and operating efficiency and size on outreach

In this section we develop the same analysis as in the former section, but with outreach as a dependent or hexogen variable. As measure of outreach we use average loan size, because according to VanRoose and D´Espallier (2013), this is an indicator of the segment that the MFI serves. For example, when the loan size is small it means that the MFI works primarily with low income people. For this analysis we use the variable Average Loan (LOANBORR). In particular, what we want to test in this section is whether environment has an effect on outreach, capital structure and operating efficiency and size, and whether this relationship is direct or indirect through other variables like operating efficiency. As we have already explained the methodology in the previous section, the current section will only show the results.

First, in the exploratory factor analysis, we found that the factorial construct is appropriate and the individual variance of each factor is reflected in the main variance of the model (see Table 8).

Table 8. Cronbach alphas and exploratory factor analysis model, outreach model

Ítems	**Outreach**	**Environment**	**Capital structure**	**Size**	**Operating eficiency**
LOANBORR	*.966*				
KKM5		*.937*			
KKM6		*.897*			
KKM3		*.892*			
EQUITY			*.915*		
COST_FUNDING			*.905*		
LogPERSONNEL				*.933*	
LogACTIVEBORR				*.932*	
OPEXP_PORT					*.988*
PERSEXP_PORT					*.920*
ADMEXP_PORT					*.897*
Cronbach alpha		.890	.705	.949	.885
KMO		.703	.500	.500	.476
Bartlett chi square		1058.583***	718.542***	951.178***	2371.754***
% explained variance		82.90%	92.84%	95.46%	88.77%
FULL MODEL					
KMO	.704				
Bartlett chi square	5797.013***				
% of explained variance accumulated	90.86%				
Contribution of each factor to the total variance	9.30%	22.72%	16.96%	17.36%	24.52%

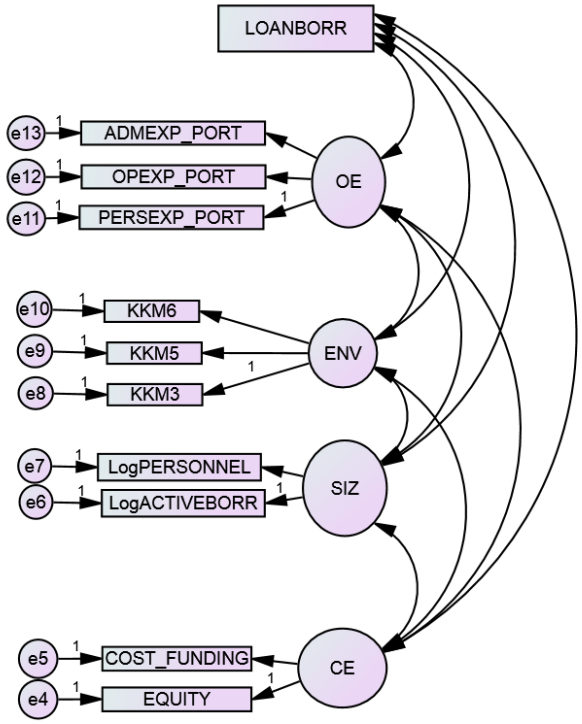
*** $p < 0.01$

Note: values of the factorial loads are written in cursive script.

Source: author's own

In order to prove the fit model (see figure 3), we have indicators that prove that the factorial model for the outreach model is also adequate (see Table 9).

Figure 3. Measurement model, outreach



Source:author's own

Table 9. Goodness of fit, outreach

Items	**AVE**	**CR**
Capital structure	*.857*	*.923*
Size	*.913*	*.955*
Environment	*.748*	*.898*
Operating efficiency	*.858*	*.947*
Chi square (CMIN)	*418.157***	
CMIN / DF	*11.947*	
CFI	*.934*	
GFI	*.900*	
NFI	*.928*	
RMSEA	*.142*	

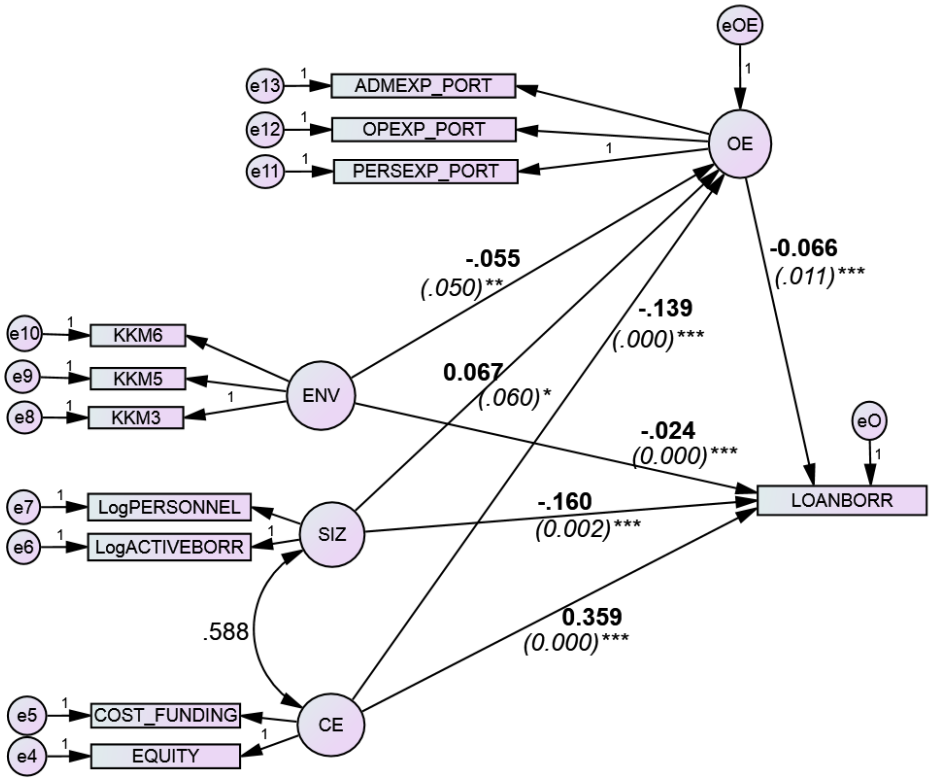
*** $p < 0.01$

Note: values of factorial loads are shown in cursive

Source: author's own

As both convergent and discriminant validity are positive, we decided to develop the structural equation model. As shown in Figure 4, we found both a direct and indirect significant relationship between outreach and the constructs.

Figure 4. Structural model, outreach



Source: author's own using AMOS software

We also tested the model by removing operating efficiency as a mediating variable, but coefficients and significance were very similar, as we can see in Table 10.

Table 10. Structural model estimators: outreach

	OP	LOANBORR
Operating efficiency (OE)		**-0.066**
		(.011)***
Capital structure (CE)	-0.139	**0.359**
	*(0.000)****	***(0.000)******
Size (Siz)	0.067	**-0.160**
	*(0.060)**	***(0.002)******
Environment (ENV)	-0.055	**-0.024**
	*(0.050)***	***(0.000)******

NS: not significant
: significance at 95%, * 99%
NS: not significant
Correlation between CE and SIZ 0.588
Source: author's own

On analyzing the results, we find a particularly significant relationship between the four factors and the average size of the loan. When we compare our results with what has been found in literature, we find the following: our results show statistical evidence of a negative effect of operating efficiency and outreach, which is consistent with the results of Cull et al (2009 y 2014), Nwachukwu (2014) and Pati (2015). In addition, our result for capital structure is both positive and significant, and echoes the results of Cotler y Rodríguez (2008) and Kar (2012) which show that the bigger the leverage, the more possibilities the MFI has to award loans.

Regarding the size of the MFI, we did not find a significant relationship with outreach, unlike the works of Cull et al. (2011), Kar (2012) and Gutiérrez-Goiria et al. (2016). Finally, our results suggest that the environment has a significant negative effect on outreach, which differs from the findings of Cull et al. (2011) and (2014). This result suggests that the more understanding there is about the stability of a country, the more willing MFIs are to give small loans.

The intuition behind these results suggests that in a negative environment exemplified by corruption, lack of the rule of law and government inefficiency, loans are smaller. This could be explained by the fact that in countries with security and corruption problems, the economically-disadvantaged population is generally larger in size and as a result the services offered by MFIs are wider in scope. Regarding the significance of size, the bigger the MFI, the smaller the size of the loan, which implies that operating costs are larger. As a consequence, financial performance is poor.

4. Conclusions

There is still no consensus regarding how some variables have an effect on elements related to the performance and social mission of MFIs, nor how these variables impact the reach of services which can be provided to the economically disadvantage and their sustainability: this study addresses these areas in a different way. Specifically, we took some variables from literature which relate to the core mission of MFIs and constructed some measures of these variables. These included measures for profitability and outreach, as these are two of the most significant dependent variables related to the core mission of MFIs. In addition, for independent variables we constructed measures of environment (corruption, rule of law and government inefficiency), size, capital structure and operating efficiency. The impact these variables have was measured by using structural equation modeling, a technique which allows variables to be related to each other either directly or indirectly.

After proving our model's goodness-of-fit and verifying other necessary proofs of validity, we carried out two analyses. The first of these used ROE and ROA to measure the effect of the aforementioned independent variables on financial performance. We did not find a direct relationship between these variables. However, we did discover that if we used a mediating variable such as operating efficiency (i.e. personal and administrative expenses), a significant link emerged. In other words, environment

(corruption, rule of law and government inefficiency), size and capital structure have a significant effect on operating efficiency, which in turn affects financial performance. This is evidence that in a country with a negative environment, high levels of corruption, lack of the rule of law and government inefficiency implies high levels of investment in security and infrastructure related to the provision of microfinance services. In addition, countries with the abovementioned social issues commonly also have high levels of country risk, which in turn implies higher funding or capital structure costs.

When we analyzed the effect of the independent variables on outreach, we found both direct and indirect significant effects on outreach. Specifically we found a negative effect on operating efficiency, a positive effect on capital structure, no effect on size, and a negative effect on environment. In other words, a negative environment featuring corruption, lack of rule of law and government inefficiency has a larger low-income population. The needs of this population are satisfied by MFIs, regardless of whether or not credit conditions for this group are beneficial. In addition, there is also the implication that MFIs are struggling to provide services to this particular segment of the population due to higher operating expenses.

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Annex 1. Descriptive statistics

	N	Min	Max	Mean	Std. Dev.	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ROA	545	-0.370	0.290	0.021	0.055	0.003	-1.212	0.105	10.546	0.209
ROE	545	-1.420	0.730	0.084	0.214	0.046	-2.125	0.105	12.133	0.209
OSS	545	0.000	2.770	1.154	0.254	0.064	0.513	0.105	5.861	0.209
ADMEXP_PORT	545	0.001	0.552	0.079	0.073	0.005	2.391	0.105	7.799	0.209
OPEXP_PORT	545	0.020	1.230	0.217	0.171	0.029	2.184	0.105	6.229	0.209
PERSEXP_PORT	545	0.010	0.810	0.125	0.104	0.011	2.402	0.105	7.890	0.209
KKM3	545	-2.002	0.800	-0.317	0.452	0.204	-0.712	0.105	0.347	0.209
KKM5	545	-1.593	0.797	-0.515	0.409	0.167	0.005	0.105	-0.442	0.209
KKM6	545	-1.502	1.298	-0.578	0.340	0.116	1.213	0.105	4.548	0.209
LogPERSONNEL	545	0.477	4.007	2.318	0.714	0.510	-0.156	0.105	-0.563	0.209
LogACTIVEBORR	545	2.017	6.665	4.354	0.809	0.655	-0.162	0.105	-0.024	0.209
COST_FUNDING	545	5.00E+01	1.15E+08	5.31E+06	1.24E+07	1.53E+14	4.924	0.105	31.574	0.209
EQUITY	545	2.48E+04	3.83E+08	1.68E+07	3.45E+07	1.19E+15	4.992	0.105	36.430	0.209

Source: Author´s own.

Annex 2. Variables used in previous studies

	Cull et al (2007)	Cotler and Rodríguez (2008)	Cull et al (2009)	Cull et al (2011)	Bogan (2012)	Kar (2012)	Kar (2013)	Cull et al (2014)	Nwachukwu (2014)	Alinsunurin (2014)	Pati (2014)	Pop (2015)	Pati (2015)	Gutiérrez-Goiria et al (2015)	Balammal et al (2016)
LOANBORR		•	•	•		•		•					•	•	
ROA	•	•	•	•	•	•	•	•			•		•	•	
ROE			•			•						•	•	•	
OSS	•		•	•	•		•	•	•	•	•		•	•	•
ADMEXP_PORT	•			•				•		•					
OPEXP_PORT		•	•			•			•	•	•		•		
PERSEXP_PORT	•							•					•		
KKM3				•				•							
KKM5				•				•							
KKM6				•				•							
LogPERSONNEL				•						•	•		•		
LogACTIVEBORR			•		•	•				•	•		•	•	
COST_FUNDING		•													
EQUITY					•	•			•			•			•

Source: Author´s own

	Cull et al (2007)	Cotler and Rodríguez (2008)	Cull et al (2009)	Cull et al (2011)	Bogan (2012)
Sample size	124 MFI	20 MFI	346 MFI	346 MFI	185 MFI
Years in the study	2002	2003 to 2005	2002 to 2004	2004	2003 to 2006
Database source	MIX	PRONAFIM	MIX and BM	MIX	MIX

Analysis	OLS	Panel Data	Statistical Analysis	OLS	Panel Data
	Kar (2012)	Kar (2013)	Cull et al (2014)	Nwachukwu (2014)	Alinsunurin (2014)
Sample size	782 MFI	409 MFI	238 MFI	426 MFI	41 MFI
Years in the study	2000 to 2007	2003 to 2008	1995 to 2005	2004 to 2008	2011
Database source	MIX	MIX	MIX and IMF	MIX	MIX
Analysis	Panel Data, GMM	Panel Data	Panel Data	Panel Data	Data envelopment analysis (DEA) for efficiency scores
	Pati (2014)	Pop (2015)	Pati (2015)	Gutiérrez-Goiria et al (2015)	Balammal et al (2016)
Sample size	40 MFI	14 MFI	40 MFI	1022 MFI	75 MFI
Years in the study	2008 to 2012	2008 to 2013	2008 tol 2013	2008	2010
Database source	MIX	MIX	MIX	MIX	MIX
Analysis	Panel Data	OLS	Panel Data	Principal Component Analysis	Panel Data

Source: Author´s own