



Financial Performance and Sustainability of Microfinance Institutions in Morocco: A Structural Equation Model

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ABSTRACT

The following contribution investigates the main determinants that impact the financial performance and sustainability of Moroccan microfinance institutions (MFIs) in terms of governance indicators, staff productivity variables, and loans portfolio quality. Using an unbalanced panel data extracted from the Mix Market database and using structural equation modelling, 10 Moroccan MFIs were analysed for the period between 1999 and 2017. Results indicate that there is no evidence of the impact of the regulatory environment and portfolio quality on these institutions' profitability, which is represented by the return on assets (ROA) and return on equity (ROE), and sustainability, which is represented by the operational self-sufficiency (OSS) and the number of active borrowers. However, results indicate that personnel productivity has a significant positive direct impact on both profitability and sustainability. This study provides guidance to policy makers in terms of enhancing the performance of personnel productivity of these institutions in the Moroccan context.

Keywords: Microfinance Institutions, Structural Equation Modelling, Sustainability, Morocco

JEL Classifications: E02, G21

1. INTRODUCTION

The microfinance sector offers credit services to poor populations and microenterprises that do not have access to traditional banking services in developing countries. While commercial banks offer loans to creditworthy institutions and individuals, microfinance institutions (MFIs) exist to cater to the needs of a lower-income population, as well as organizations with relatively high levels of risk. These MFIs are mainly funded by donations, fundraisings, and commercial investment along with their self-generated profits.

Since the creation of the first microfinance institution, the sector addressed its core mission to serve the low-income population. Therefore, with such a mission, the early literature on MFIs emphasized the importance of the profitability of these institutions and its determinants. Several works accordingly suggest profitability ratios as determinants of the financial performance of the MFIs (Janda and Turbat, 2013; El Kharti, 2014). However,

other authors suggest that a broader scope is needed given the specificity of MFIs, and other dimensions have been taken into consideration in the literature. This includes MFIs' sustainability and outreach (Schreiner, 2002; Gonzalez and Rosenberg, 2011; Ramírez Rocha et al., 2019).

Prior literature also sheds light on the concept of the 'mission drift' of MFIs that involves both profitability and sustainability of these institutions. Although there is no consensus on whether a mission drift exists or not, a solid part of literature argues that it actually exists. Morduch (2000), Gonzalez, and Rosenber (2011) explain the trade-off between enhancing the credit portfolio and decreasing poverty as two contradictory end goals of MFIs. Dichter and Harper (2007) claim that these institutions have abandoned their social mission to serve a population that is better off. Since financial sustainability is a major concern in the industry, MFIs are exposed to the risk of losing their social aspect at the expense of making a profit. On the other hand, Mersland and Strøm

(2010) claim that cost-effective MFIs do not experience a mission drift since they constantly seek new markets and reach the poor population while maintaining the same profitability levels.

While the emergence of MFIs aimed at providing financial services to the lower-income population, several trends evolved to reshape the sector through different aspects. The group lending and microcredit established a thrust to microenterprises, which helped them promote innovative entrepreneurship among the poor segment (Ashta et al., 2014). However, the literature also emphasizes on major problems facing the microfinance sector. This includes uncontrolled growth, high transaction costs, and the illiteracy of the poor population (Ashta, 2009). These issues are addressed by MFIs as to find the optimal solution throughout social innovations, digitalization, and the integration of new information systems (Ashta, 2009; Armendariz and Morduch, 2010). As for the geographical development of MFIs, Khalaf and Saqfalhait (2019) conducted a study that investigates the impact of MFIs on the economic growth of six Arab countries (Palestine, Tunisia, Jordan, Morocco, Lebanon, and Egypt) based on a panel data from 1999 to 2016. The study reflects no impact of MFIs on the economic growth of the studied countries. However, the same authors suggest findings that might be useful with regards to reinforcing MFIs policies and regulations to boost their sector's growth (Khalaf and Saqfalhait, 2019). For Chmeliková et al. (2019), the authors found evidence of the positive relationship between areas of MFIs' performance and the high intensity of social capital in the case of 302 European MFIs between 2008 and 2015. This suggests the implementation of MFIs in less or non-developed markets.

In the Moroccan context, the microcredit sector experienced a rapid growth after the financial crisis of 2008. The International Finance Corporation (IFC) (2014) suggests several factors that contributed to the rise of the sector. This includes the implementation of a new exchange data policy that eliminated multiple borrowing, the enforcement of liquidity control mechanisms, and the increase of staff salaries and government support. As a result of these dynamics, four Moroccan MFIs have been listed in the Forbes ranking of top 50 MFIs, making the sector of MFIs in Morocco one of the most consistent and vibrant microfinance sectors in the MENA region (El Kharti, 2014).

This paper is an extension of the earlier work of Aguentaou et al. (2019), and explores the limitations encountered in the previous tested OLS regression model. This is throughout using structural equation modelling (SEM) to build models that could further explain the determinants of financial performance and sustainability of Moroccan MFIs. The relative strengths of SEM versus OLS regression are well known and documented (Ramírez Rocha et al., 2019). The originality of this research lays in the fact that it explores the effect of the aggregate indicators of governance in Morocco based on the Worldwide Governance Indicators (WGI) dataset. The provided indicators (e.g. Voice and accountability, political stability, and absence of violence/terrorism) are gathered under one latent variable called 'Regulatory environment', which enables a better understanding of the effect of political governance on the microfinance sector in Morocco.

The rest of the paper is organized as follows: Section 2 presents the literature related to the determinants of profitability and sustainability of MFIs. Section 3 describes the data, the methodology, the pre-modelling tests, and assumptions. While Section 4 provides the results of the models, Section 5 ends the paper with a discussion and conclusion.

2. LITERATURE REVIEW

Many scholars and academics defined microfinance and the microfinance institutions (MFIs). Hartarska (2005) defines microfinance as offering small-scale financial services to low-income or to the segment that does not have access to traditional banking systems. For Mwenda and Muuka (2004), the authors define it as providing various financial services that includes customers' deposit, loans, money transfer, insurance, and others. Furthermore, the Asian Development Bank (2014) characterizes microfinance as the arrangement of a wide scope of financial services for poor individuals, low-income families, and micro-ventures.

Among the topics that gained massive interest in the microfinance literature during the most recent decades is sustainability. For Meyer (2002), MFIs' sustainability can best be described using operational self-sustainability (OSS) and financial self-sustainability (FSS). For operational self-sustainability, it is defined as operating revenues divided by operating expenses. This is to measure whether if MFIs have enough operating income to cover their corresponding operational costs (Hartarska, 2005; Bassem, 2009). But for financial self-sustainability, it measures the extent at which MFIs can finance the costs of funds and other forms of subsidies received valued at market prices (Abrar and Javaid, 2016; Afrifa et al., 2019). Meyer (2002) indicates that measuring financial sustainability consists MFIs of maintaining good financial records. In addition to that, the same author indicates that financial sustainability requires following accounting best practices and provide full transparency.

Concerning MFIs' performance, it is proxied by various variables in the existing literature. A first group uses return on equity (ROE) and/or return on assets (ROA) (El Kharti, 2014; Patil and Gopal, 2015). Among the most recent contributions in the field, Ramírez Rocha et al. (2019) suggest that there is a correlation between the size of MFIs and their corresponding financial performance. For Kinde (2012), the authors assessed MFIs' performance using the financial self-sufficiency, which is a ratio of adjusted revenue to adjusted expenses. In this last contribution, an FSS higher than 1 demonstrates a high level of MFI's self-sufficiency. In the contribution of Janda and Turbat (2013), MFIs' performance is measured using a yield, proxied by returns from loans granted to customers. Finally, Assefa et al. (2013) use the Lerner Index, a price cost index (Aguenaou et al., 2019).

In the contribution of Abdi and Bacha (2021), the authors analyzed the main determinants that impact Ethiopian financial performance microfinance institutions. Findings indicate that the portfolio at risk has no significant impact on the return on assets. This does not align with the contribution of Tehulu (2013), who found a

significant negative impact between financial sustainability and portfolio quality. But in the case of Kenya, Bitok et al. (2020), Ayayi and Sene (2010) found that portfolio quality has a positive significant impact on MFIs' sustainability. In the Moroccan context, El Kharti (2014) analyzed Moroccan MFIs between 2003 and 2010. Findings indicate that the portfolio quality, represented by the portfolio at risk, has a negative impact on both MFIs' profitability and sustainability within this economy. In addition to that, the same contribution indicates that staff productivity has no impact on these financial institutions (El Kharti, 2014). In the most recent contribution of Aguenau et al. (2019), results found evidence that personnel productivity variables significantly impact MFIs' performance and sustainability. However, the portfolio at risk impacts the dependent variables only at a 10% significance level (Aguenaou et al., 2019).

Within the literature, many debates related to the existence of a trade-off between outreach and sustainability of MFIs exist. Christen et al. (1995) argue that improving MFIs' outreach and sustainability are two complementary objectives. This is because a larger pool of clients can help MFIs reduce their costs through economies of scale. This does not align with the contribution of Meyer (2002). This author found a negative relationship between financial sustainability and outreach which aligns with the contribution of Hulme and Mosley (1996). Among the many reasons of the discussed trade-off, there are the high transaction costs that are usually required to evaluate the creditworthiness of the less affluent client (Navajas et al., 2000). Yet, the current literature suggests that MFIs can achieve sustainability by serving the poorest segment with the condition of charging high interest rates (Frank et al., 2008; Quayes, 2012).

An examination of the different aspects of outreach (e.g. depth, breadth, length, and scope) are found in the study by Schreiner (2002). Other outreach proxy variables account for MFIs' social impact and include the different categories or segments of underserved individuals by traditional banks (Kneiding and Tracey, 2009).

The literature review also shows the impact of contribution of corporate governance practices with relation to the enhancement of MFIs' performance (Bogan, 2012; Sun, 2012). van Damme et al. (2016) use four corporate governance variables to assess MFIs performance in Sri Lanka that are the number of board members, the number of women on board, the CEO/chair duality, and the presence of a women CEO. Findings indicate that that the smaller the board and the higher the proportion of women in it, the more financially efficient is the MFI. The study also confirms that CEO/Chair duality as well as the presence of a woman CEO is negatively influencing the outreach efficiency. Gohar and Batool (2015) investigate the impact of corporate governance on the financial performance of 25 MFIs in Pakistan for the period 2005-09. Contradicting van Damme et al. (2016), Gohar and Batool (2015) show evidence that the presence of a woman CEO influences positively the outreach efficiency.

The effect of the environmental, social, and governance dimensions (ESG) has also been pointed out in recent studies

due to the social dimension that MFIs have to fulfil (Tanin et al., 2019). For instance, Allet (2014) finds that the environmental impact is indirect, less visible, and therefore more difficult to track through regulations. Besides, the author establishes that generic greenwashing strategies are not well-suited for MFIs and can have counterproductive effects.

Several methodologies were used to assess the determinants of MFIs financial profitability and sustainability using panel data. These methods include ordinary least squares (OLS) regression, pooled OLS, and random and fixed effect models (Paxton, 2007). As many independent variables are needed to investigate for the main determinants of MFIs' performance, Ramírez Rocha et al. (2019) suggest that the SEM approach is the most suitable model to use to obtain reliable results.

3. METHODOLOGY AND DATA

Unbalanced panel data of 10 Moroccan MFIs is collected from the MIX Market database with time frames that vary between 7 and 19 years (Table 1). The data is analysed using the SPSS AMOS software, and as previously mentioned, correlated variables are not eliminated as the used SEM technique solves for multicollinearity.

3.1. Method and Variables

As mentioned previously, this study aims to explore the factors affecting the profitability and sustainability of Moroccan MFI's using a structural equation model (SEM). Similar to regression analyses, this technique enables measuring as well as analysing the relationships between observed and latent variable in a more powerful way while including the error measurement (Beran and Violato, 2010). In the context of this study, an SEM model better fits the analysis compared to the ordinary least square (OLS) regression. The literature suggests that using SEM is preferred to the OLS method since it prevents the model from any possible multicollinearity between the variables (Wang and Sun, 2017). This is because multicollinearity, which occurs when two or more independent variables are correlated, increases the coefficients' standard error that leads to rejecting some statistically significant variables and vice versa (Daoud, 2017). Besides, Ramírez Rocha et al. (2019) claim that SEM controls measurement errors and allows the use of multiple dependent variables under one construct. This constitutes a strong advantage of the method over OLS in financial studies. In addition to that, SEM is a more solid technique compared to OLS when it comes to testing the relationships

Table 1: Moroccan MFIs data summary

MFI Name	Number of observations (years)	Time frame
Al Amana	19	1999-2017
Al Karama	15	2003-2017
Attadamoune	18	2000-2017
Fondation Al Baraka	17	2001-2017
INMAA	15	2003-2017
AMOS	11	2002-2012
ARDI Attawfiq MF	8	2003-2010
Attawfiq MF	15	2002-2016
Izdihar MF	7	2003-2009
Zakoura	12	1999-2010

between macroeconomic factors measured by proxies and financial ratios (Ramírez Rocha et al., 2019).

This study suggests two models (Figure 1) to investigate for some firm specific and macroeconomic variables that are theoretically expected to impact the profitability and sustainability of Moroccan MFI's. Concerning profitability, it measures the financial health of these institutions and their ability to generate profit from their investments in assets or equity. Thus, the profitability is considered as a latent variable and is proxied by both the return on assets and return on equity. But for sustainability, it is measured in the literature by the operational self-sufficiency (OSS) (Afrifa et al., 2019). In addition to that, MFIs sustainability is also proxied using the breadth variable represented by the number of active borrowers (Khan et al., 2017). This last variable measures the extent to which an MFI fulfils its social duties towards reaching the poor population excluded from the use of traditional banking services.

Concerning the independent variables, they account for firm specific variables and macroeconomic determinants that are summarized such as:

3.1.1. Personnel productivity

Previous literature investigates the effect of productivity on either the performance or the sustainability of MFIs such as Kinde (2012) and El Kharti (2014). It is approximated by the following proxies:

- Borrowers per loan officer = Number of active borrowers/ Number of loan officers
- Loans per staff member = Number of loans outstanding/ Number of personnel
- Loans per loan officer = Number of loans outstanding/Number of loan officers.

3.1.2. Portfolio quality

Pati (2015) argues that one of the primary drivers of financial performance and outreach of MFI's is their asset quality. This study suggests investigating a similar relationship in the Moroccan context using the portfolio at risk (PAR) as a proxy.

- Portfolio at risk = Outstanding balance of unpaid loans/Total outstanding loan balance.

3.1.3. Regulatory environment

Regulatory environment indexes are measured by the level of corruption, government efficiency, rule of law, accountability, and political stability according to the World Bank. The extent to which corruption, government regulations, and efficiency affect MFIs was investigated in prior literature and was proven to have a significant effect on the MFIs operations (Ramírez Rocha et al., 2019).

Concerning the first proposed model (Model A), it assesses the impact of the regulatory environment and personnel productivity on the financial profitability of Moroccan MFIs. But for model B, it investigates the impact of regulatory environment, personnel productivity, and portfolio quality on the financial sustainability of the same institutions. These models are summarized in Figure 1.

3.2. Assumptions and Pre-modelling Tests

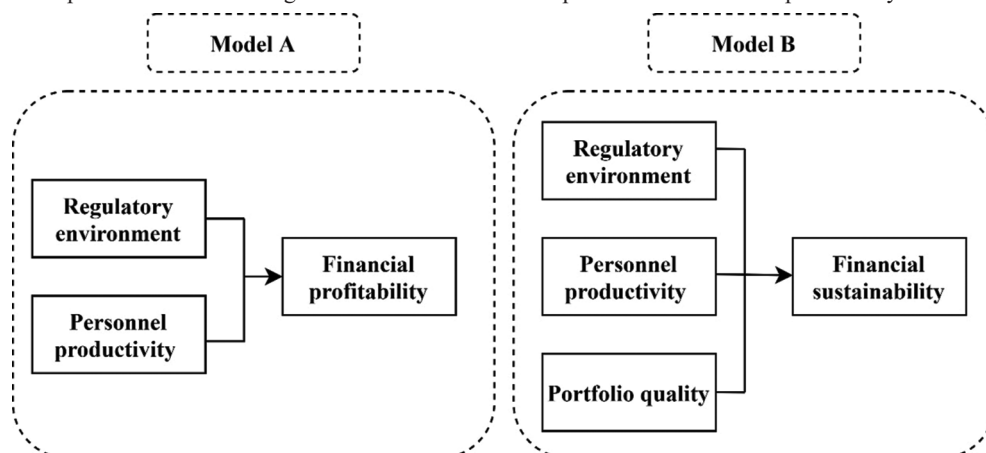
The model suggested in this study overcomes the multicollinearity issue between ROA and ROE and allows the use of correlated variables such as the case between borrowers per loan officer and loans per loan officer. This study follows the model suggested by Jarvis et al. (2003) and Ramírez Rocha et al. (2019). This is to ensure that the used panel data satisfies the following fundamental conditions:

- Independent variables must predict the dimensions previously mentioned, hence the importance of the exploratory factor analysis
- Covariance between variables and dimensions must be consistent.

Before proceeding to the analysis using SEM, Ramírez Rocha et al. (2019) suggest conducting an exploratory factor analysis to explore the reliability of the constructs using the Kaiser-Meyer-Olkin (KMO) test in order to test for the conditions above. However, there is no need to assess the model measurement using Cronbach's alpha, composite reliability, and other tests since they are only adequate for scale or categorical variables (Biemer et al., 2009; Barbaranelli et al., 2015), which is not the case of this study.

AMOS software is used to run the SEM. The importance of using this software relies on the fact that it gives a detailed path analysis. While SEM accounts for measurement errors, path

Figure 1: Proposed model to investigate the determinants that impacts Moroccan MFIs' profitability and sustainability



analysis identifies the relationships between variables assuming no measurement errors.

3.3. Missing Data and Non-normality

Before executing the model, some data manipulation was judged necessary. This is to handle missing values in some of the used variables, and to solve for non-normality issues. In the contribution of Schumacker and Lomax (2016), the authors suggest three possible alternatives to handle missing data: deleting the variables carrying missing values, substituting the missing values, or conducting robust statistical tests. Our approach relies on the last alternative as we conducted a t-test for the variables that contained missing values to determine their type, as these values were missing completely at random, which means that these values do not depend on any variable in the data set, therefore we solve this issue by substituting missing values using their corresponding means. This will not have any impact on our data set or the results of our path models. Concerning the non-normality issue, many alternatives are possible to transform the data. In the case of this study, the log transformation was used.

4. RESULTS

4.1. Goodness of Fit and Adequacy

To assess the models' goodness-of-fit, many indicators are used in this study that are: the Chi-square (CMIN), the Chi-square/df (CMIN/DF), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the adjusted Goodness of fit (GFI). For the SEM models used in this contribution to be valid, some standards have to be met (Lei and Wu, 2007).

For the data to be considered as a good fit, the Chi-square should have a corresponding value of less than 5% (McHugh, 2012).

Table 2: Goodness of fit results of Model A and Model B

Index	Model A	Model B
Chi-square (CMIN)	81.615***	149.426***
RMSEA	0.104	0.139
CFI	0.963	0.921
GFI	0.900	0.810

***Significant under 1%

Table 3: KMO and Bartlett's test results

	Model A	Model B
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.688	0.707
Bartlett's Test of Sphericity		
Approx. Chi-square	1511.087	1588.255
df	55.000	66.000
Sig.	0.000	0.000

Table 4: Regression results for Model A and B

Model	Hypothesis	Relationship	Beta	P-value
Model A	H1	Regulatory environment→Financial profitability	0.144	0.348
	H2	Personnel productivity→Financial profitability	0.001	0.002***
Model B	H3	Regulatory environment→Financial sustainability	-17.318	0.865
	H4	Personnel productivity→Financial sustainability	0.273	0.001***
	H5	Portfolio quality→Financial sustainability	0.897	0.635

In addition to that, the contribution of Cangur and Ercan (2015) indicates that the model fit when the RMSEA results in values higher than 0.05. For the CFI test, a value close to 0.9 considers the data to be a good fit (Kim et al., 2016). Finally, the GFI test result in values between 0 and 1, and the higher this value indicates a better goodness of fit (Hooper et al., 2008). In the case of our contribution, all the resulted values for both models provides evidence they have an adequate goodness of fit (Table 2).

With regards to the KMO test, it always results in values between 0 and 1, where higher values indicate a high data adequacy (Ho et al., 2017). In the context of the models used in this study, the KMO is high enough to be considered adequate. But for Bartlett's test, adequate and suitable data is resulted when its p-value is significant (Nagarsenker, 1984). This is the case of both models (Table 3). This ensures the validity of the models and the results summarized in Table 4.

4.2. Structural Model Results

Results indicate that the regulatory environment has no impact on Moroccan MFI's financial profitability and financial sustainability. This is because the resulted p-values are greater than the significance level (5%) (Table 4). With regards to the personnel productivity, empirical findings show that they impact both the financial profitability and sustainability of the subject MFIs. This is with the coefficients of 0.001 and 0.273 respectively (Table 4). Finally, and concerning the impact of portfolio quality on the financial sustainability, there is no evidence that it is significant. Thus, the only determinant significant independent variable among the studied ones is the personnel productivity.

5. CONCLUSION

This study investigates for the determinants that have an impact of MFIs' profitability and sustainability in the Moroccan context. The literature highlights the importance of the use of metrics that includes ROA, ROE, and OSS to measure these institutions' performance. While the number of contributions that assess the determinants of Moroccan MFIs is limited (El Kharti, 2014; Aguenau et al., 2019), the following paper distinguishes itself in the current literature in two ways. First, the use of the structural equation modelling that allows the use of endogenous and exogenous variables. Second, the model of this paper accounts for five aggregate indicators of governance quality in Morocco.

Results indicate that staff productivity significantly and positively impacts the profitability and sustainability of these microfinance institutions. This aligns with the contribution of Aguenau et al. (2019), as the authors found a significant impact using OLS regression of the loan per staff member on ROE, ROA, and OSS.

In addition to that, El Kharti (2014) confirms the same relationship between staff productivity, ROA and ROE. The following indicates that personnel efficiency plays a critical role to achieve profitability and sustainability of Moroccan MFIs. This suggests to policy makers to continuously improve their staff management and introduce strategies to enhance staff performance.

Concerning the impact of portfolio quality on MFIs' financial profitability and sustainability, results deny any evidence that approves significancy. This aligns with the contribution of El Kharti (2014). But for the contribution of Aguenau et al. (2019), the authors found a weak significancy only at a 10% significance level between portfolio quality and return on assets, and between portfolio quality and return on equity. According to Bitok et al. (2020), failures of many microfinance institutions was attributed to their impoverished policies, which negatively impact their portfolio quality. For this, and even if this variable does not impact the profitability and sustainability of these institutions, it is of prime importance for Moroccan MFIs to continuously update as well as enhance their loan policies to avoid increased default rates (Tchakoute-Tchuigoua and Soumaré, 2019). Finally, and with regards to the impact of the regulatory environment variables on Moroccan MFIs, no significant relationship is found.

It is important to note that the following contribution has few limitations. First, there is a use of unbalanced panel data and a relatively small sample size of 138 observations, which we believe constituted a constraint towards the use of SEM. Second, there is an unavailability of public data that could have improved the models suggested. This is because the use of more latent variables would have improved the results. Third, while building the models, approximations led us to omit some observed variables (e.g. number of active borrowers) due to unacceptable covariance between residuals. For this, suggested venue for future research can be including more latent variables to enhance the performance of latent variables and using other statistical techniques to confirm or deny the findings of this paper. This includes a combination of GMM dynamic models, the use of instrumental variables, moderation variables, and more control variables.

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