HOW DO SOCIAL AND FINANCIAL PERFORMANCE OF MICROFINANCE INSTITUTIONS INTERACT?
A PANEL DATA STUDY UPON THE MENA REGION (1998-2011)

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Abstract
The relationship between social performance (SP) and financial performance (FP) of microfinance institutions (MFIs) in the Middle East and North Africa (MENA) region is a matter of substitution or complementarity. A panel data study (1998-2011) upon a sample of 64 MFIs in nine MENA countries examines both one-way and reciprocal dependency between SP and FP. We document the various determinants according to information transparency, credit methodology, status, the operating area of MFIs and their macroeconomic environment. Simultaneous equations models show that SP has a negative impact upon FP and conversely for mature MFIs: hence, substitution takes place. However, there is no clear interaction between these performances.

Keywords: Financial and social performance, MENA, microfinance institutions, panel data, simultaneous equations,

JEL: C13, C33, D23, G21, I3

1. INTRODUCTION

Although, the share of MENA population[3] living with less than \$2.00 a day (PPP at 2005 international dollars) dropped by 19.7% in 1990 to 16.8% in 2005 and 12.0% in 2010 (World Bank 2009 and 2012) , the absolute number of poor has increased since 1990 due to rapid population growth whereas the GDP trend has experienced a slowdown. Thus, income poverty remains a significant issue.

The region has the lowest share of adults with a formal account (18%) and of poor people with formal access to financial services (9%) according to *Findex*(Demirguc-Kunt and Klapper, 2012); whereas the *MIX* (Pearce, 2010) records a 3% coverage as for microfinance clients.

The question arises whether microfinance institutions (MFIs) in the MENA region try to target the poor (*outreach*) or/and look for profitability. The relationship between social performance (SP) and financial performance (FP) of MFIs may be a matter of substitution, hence there is a trade-off or a matter of compatibility and there are complementary.

The interaction between these two performances is the core of a long-standing debate opposing two approaches within the microfinance industry. The *welfarists* primarily aim at achieving SP without rejecting FP, whereas the *institutionalists f*oster FP as the first goal in order to achieve SP. Is there reciprocal relationship between SP and FP, and how do they combine? Is SP determined by FP through one-way dependency and vice-versa?

Section two summarizes the main hypotheses of interaction between SP and FP that *welfarists* and *institutionalists* put forward; it briefly examines the contradictory evidence provided by the studies devoted to the microfinance industry in the MENA region. Section three describes the characteristics of our sample comprising 64 MFIs from nine MENA countries over the period 1998-2011. Section four designs two performance models with respect to SP and to FP wherein several social, financial, institutional and macroeconomic factors constitute the explanatory variables. In order to study the interaction between SP and FP, the dependent variable in each model is included as an explanatory variable in the other one. Interaction is studied both as

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[3]Eighty five percent of the MENA population live in middle-income countries, eight per cent in high-income countries and seven percent in low-income countries.

reciprocal and one-way relationship; both models are estimated simultaneously upon a subsample of mature MFIs in order to capture the long term trend and separately in order to identify the one-way dependency between performances and test the robustness of their determinants. Section five concludes.

2. LITERATURE REVIEW

2.1. *Welfarists* vs. *institutionalists*: interactions between the performances of MFIs

Microfinance gathers a large set of MFIs (NGOs, co-operatives, Non-Banking Financial Institutions or NBFIs, credit unions and village banks) based on two contrasted philosophies that emerged during the 1990's with respect to the relationship between SP and FP: the *institutionalists'* approach *vs*. the *welfarists'* approach.

Table 1 presents the main hypotheses of these approaches, as regards the SP/FP *nexus* in terms of both the short and the long run impact.

Table 1: *Welfarists vs. institutionalist*s' main hypotheses

One-way and reciprocal dependency	Short run negative impact	Long run positive impact
SP influences FP	H_1: *Institutionalists'* approach	H_2: *Welfarists'* approach
FP influences SP	H_3: *Welfarists'* approach	H_4: *Institutionalists'* approach
SP and FP interact	H_5: Trade-off (substitution)	H_6: Compatible approaches

Source: Our design

Welfarists inspire from the studies of Morduch (1998, 1999, 2000), Dunford (1998), Hatch and Frederick (1998), Woller et al. (1999), Simanowitz and Walter (2002) and Brody et al. (2003). This school of thought fosters the social performance of MFIs through the depth of outreach and impact assessment. It targets the poorest households, whose incomes are 50% below the poverty line ($1 per day), in order to improve their living conditions. The focus is upon the "family"; loans are often dedicated to women because their control on income and household savings result in their empowerment and the improvement of their livelihood as well as that of their children. This school is primarily supported by NGOs or co-operatives, which regard microfinance as a major tool for reducing poverty of the poorest. Although it does not exclude that MFIs may be profitable, it advocates a large reliance on subsidies, even on the long run (H_2).

Institutionalists federate upon the studies of the World Bank, the Consultative Group to Assist the Poor's (CGAP), USAID and the Ohio State University Rural Finance Program. As the targeting of the poor proves very expensive, the first objective of this school is to achieve financial performance (H_1). It designed a set of "best (banking) practices" in order to increase the effectiveness of MFIs' management systems: It advocates the absence of ceiling upon lending interest rates, good institutional and human capacity and a significant transparency of financial activities and information services (CGAP, 2004). The adoption of these practices is an essential step to achieve financial self-reliance on a large scale and access the financial market. Thanks to self-reliance, MFIs can target a large number of poor and fulfill at best their social mission (H_4). This school represents financial institutions that look for profitability: regulated institutions specializing in microfinance (some NGOs, NBFIs and micro credit unions), upscaling village banks as well as some commercial banks that have recently started downscaling their activity within the microfinance industry.

According to *institutionalists*, any subsidy is only justified as to cover the start-up costs of MFIs. As regards the risk from donors to forsake their support on the long run, profitability allows to enlarging the funding sources of MFIs and enables to reach sustainable self-sufficiency. Thus, self-reliant MFIs that operate on a large scale will serve a larger set of poor customers than MFIs whose goal is restricted to target and provision services to these customers.

In response to *institutionalists*, *welfarists* argue on the quality of donors, whose main concern is to alleviate hardship on the poor: Thus, there is no reason why donors should forsake their support in as much as it generates a better impact. Conversely, the pursuit of financial performance hampers technical innovation (group lending, dynamic incentives, etc.) and relegates the social mission on the backstage (H_3): There is a risk of marginalizing the poor over time as well as dropping rural areas in favor of urban areas. Thus, financial sustainability may become an end rather than a means, and miss the social mission of microfinance.

The debate between *institutionalists* and *welfarists* underlines a trade-off between SP and FP in the short run (H_5). Although they follow two different paths towards poverty alleviation; both approaches could work together in the future (H_6), although how long it will take remains unknown. To date, the *institutionalists* seem to dominate academic arena, and may be suspected to prompt a drift in the MFIs' social mission. However, some authors (Dunford, 1998; Woller et al., 1999) consider that *welfarists* should accept the *institutionalists'* requirement for profitability. If the *welfarists'* approach enables to relieving the poor on the short run, only an expansion of funding sources advocated by the *institutionalists* will ensure the sustainability of MFIs as well as a long lasting improvement in the situation of the poor. The *welfarists* and the *institutionalists* represent two phases in the development of microfinance that should combine.

2.2. Some puzzling evidence from studies upon the MENA MFIs

Despite success stories and some cases of severe crisis, little research has been devoted so far to the microfinance industry in the MENA region (Adair and Berguiga 2010; Omri and Chkoundali 2011; Ben Abdelkader et al. 2012; Ben Soltane 2012)

Adair and Berguiga (2010) use a cluster analysis to examine the relationship between SP and FP upon a sample of 51 most transparent MFIs from nine MENA countries in 2008. It comprises three North African countries - Egypt (13), Morocco (9) and Tunisia (1) - and six Middle-East countries, i.e. Jordan (7), Yemen (6), Lebanon (3), Palestine (8), Syria (3) and Iraq (2). Key determinants vary according to the NGO *vs*. non-NGO status, maturity, collective *vs*. individual credit methodology, rural *vs*. urban operating areas, level of information disclosure regarding performance and the regulations of countries wherein MFIs operate. Although there is no trade-off for some MFIs, which achieve both performances, large discrepancies show up: most MFIs in Egypt are both socially and financially successful, whereas those in Yemen are socially successful and those in Jordan are financially successful.

Omri and Chkoundali (2011) use a static balanced panel data analysis of 16 Mediterranean MFIs over the period 2001–2008 (i.e. 128 observations) to assess the impact of outreach upon financial performance. They find contradictory evidence: On the one hand, there is a positive relationship between outreach and profitability, which increases both with average loan size and the number of women borrowers (and their outstanding loans). On the other hand, when MFIs target poor clients, the profit margins tend to decrease; outreach and portfolio quality follow opposite ways. They conclude that the relationship between financial and social performance depends on the corporate governance of MFIs.

Ben Soltane (2012) selected a sample of 64 MFIs over a period of three years (2008-2010) including three North African countries - Egypt (14); Morocco (10) and Tunisia (1) – as well as seven Middle-East countries, namely Jordan (8), Yemen (6), Lebanon (3), Palestine (8), Syria (3),; Sudan (1) and Iraq (10). He assumes that time has no specific effect; however, the model is only based upon 128 observations (64 MFIs observed for two consecutive years). There is no evidence that better financial performance triggers higher depth of outreach. Conversely, there is no significant impact of FP upon the depth of outreach. MFIs may experience a mission drift, i.e. moving apart from the poor people in order to minimize risk.

Ben Abdelkader et al. (2012) use a Bootstrap-DEA methodology in order to assess the performance of an unbalanced sample of 61 MFIs (46 NGOs, 10 NBFIs, one bank and four

others) from the MENA region (Egypt, Iraq, Jordan, Lebanon, Morocco, Palestine, Sudan, Syria, Tunisia and Yemen) over the period 2006-2009. They provide two puzzling conclusions. Contrary to expectations, first is that young MFIs are more efficient than mature MFIs (over eight years). Second is that efficiency differs significantly according to the legal status of MFIs. All the aforementioned studies fall short in terms of coverage, time-period and dynamic analysis. Our study embodies a larger coverage and span of time; in order to address the trade-off *vs*. complementary relationship between performances of the MENA MFIs.

3. THE SAMPLE: DATA AND VARIABLES

Worldwide information on MFIs is available from the Microfinance Information Exchange (*MIX*) database[4], it develops a transparent information market and enables a comparison of the MFIs' performances with both the SP and FP of their peers. We selected a sample of 64 MFIs from nine countries in the MENA region: Egypt (13), Jordan (7), Morocco (10), Tunisia (1), Yemen (4), Lebanon (3), Palestine (7), Syria (2) and Iraq (2). These MFIs include all social and financial data that are updated and available[5].The unbalanced panel over the period 1998-2011 (i.e. 14 years) comprises 468 observations.

We first sorted a subsample of 26 mature[6] MFIs and designed a balanced panel over the period 2004-2011 (208 observations), in order to study the interaction between SP and FP and to examine the long run relationship upon MFIs that are experiencing the same stage of development as regards their lifecycle. Afterwards, we focused on the unbalanced panel in order to test the robustness of determinants and identify one-way dependency between SP and FP.

We designed the index "Depth of outreach" (*Depth*) to measure SP as a quantitative variable that identifies specific customers targeted by MFIs (see Table 2). It is the difference between the poverty line ($2 a day *per capita*) and average loan per borrower (*AL*) based on Gross National Income (GNI) *per capita*. The lower is average loan amount per borrower (below poverty threshold) and the more a MFI is targeting the very poor. It may be used as a dummy variable (poor. *vs*. non-poor) that varies slightly from one year to another for each MFI.

We gauged FP with both the adjusted return on assets ratio (*AROA*) and financial self-sufficiency (*FSS*) (see Table 2), which are the best indicators of the MFIs' sustainability and profitability: they are positively and significantly correlated[7] and allow to assessing the MFIs' capacity to grow without resorting to subsidies.

We highlight various determinants of SP and FP (see Table 2), some of which being already identified in Adair and Berguiga (2010). A correct assessment of FP first depends on the components of net operational result and especially the portfolio yield (*Yield*), operational efficiency or cost per borrower (*CPB*) and portfolio quality (*PAR*). Several ways contribute to a better SP: an MFI must serve a growing number of poor according to location (*Rural*) and target category (*women*) as well as methodology (*Group* lending); it must improve the quality and adequacy of diversified financial services as well as the livelihood of clients especially women (empowerment) and ensure social responsibility towards the customers (transparency). Other factors act upon both SP and FP, such as the MFIs' characteristics: age, status (*NGO*),

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regulation (*Regu*) and transparency information levels (*Trans*), as well as the countries' characteristics regarding political (*Politic*) and macroeconomic environment (*GNIPPA*).

Table 2: *Variables description*

| Indicators	Variables	Code	Definition	Unit	Sources
Financial Performance	Adjusted return on assets	*AROA*	Adjusted net income/ Average assets	%	*MIX, IMF*
	Financial self-sufficiency	*FSS*	Financial revenue + other operating income Adjusted financing Costs + Loan Loss Provisions+ operating expenses	%	*MIX, IMF*
Financial variables	Portfolio yield	*Yield*	Financial revenu/ loans portfolio	%	*MIX*
	Cost per borrower	*CPB*	Operating expenses/ Number of borrowers	US$	*MIX*
	Personnel productivity	*PP*	Number of borrowers / number of staff	Number	*MIX*
	Portfolio at risk	*PAR*	Portfolio at risk>30 days/ loans portfolio	%	*MIX*
Social Performance	Depth of outreach	*Depth*	Gap between the poverty line ($2 per day *per capita)* and the average loan per borrower, both according to GNI *per capita*	Number	*WDI, MIX, POVCAL-NET*
Social variables	WomenBorrowers	*WB*	% of womenborrowers	%	*MIX*
	Breadth of outreach	*NAB*	Number of active borrowers	Thousands	*MIX*
	Number of services	*Services*	Credit, deposit, insurance, training and funds transfer	Ordinal (1,...,5)	*MIX,* questionnaire
Institutional variables	Operating area	*Rural*	Qualitative (Rural *vs.*Urban)	*Dummy* (0,1)	Questionnaire, *MIX (SPS)*
	Loanmethodology	*Group*	Qualitative (Group *vs.* Individual)	*Dummy* (0,1)	Questionnaire, *MIX (SPS)*
	Legalstatus	*Regu*	Qualitative (regulated *vs.* non-regulated)	*Dummy* (0,1)	*MIX, CGAP*
	Transparency	*Trans*	Ordinal (level 1,…, level 5)	Ordinal	*MIX*
	Age	*Age*	Difference between observation year and the birth date	Years	*MIX*
	Age2	*Age2*	Age* Age	Years	*MIX*
Macroeconomic variables	PPP GNI *per capita*	*GNIPPP*	Gross National Income at Purchasing Power Parity	Thousands	*WDI, POVCALNET*
	Politicalenvironment	*Politic*	RanksHighest to Lowest: 0-100	%	*WGI*

Source: Our selection

The evolution of depth of outreach (*Depth*) along with *AROA* and *FSS* shows that no significant linear relationship exists between SP and FP. Between 2004 and 2010, the relationship between *Depth* and financial sustainability reflects a trade-off between SP and FP (Graph 1)[8]: the more MFIs are financially self-reliant, the less they are addressing a very poor population. This relationship is also consistent with the *AROA* variable (Graph 2). Hence, the positive effect of the age of MFIs in the sample is emphasized by financial self-sufficiency (linear relationship) and not by *AROA* and *Depth.* These two variables experience a cyclical and opposite pattern.

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[8]In both graphs *Depth, FSS* and *AROA* variables are represented by their average over 32 MFIs (26 mature MFIs and 6 additional MFIs) in year *t*.

In 2011, *FSS* and *AROA* variables declined respectively by 0.107 and 0.03 points. MFIs in the sample experienced a decrease in FP and moved towards non-poor borrowers. However, this decrease may be due to unfavourable political environment of the countries encapsulating most MFIs in the sample (Tunisia, Yemen, Egypt, Syria, Iraq and Palestine).

Graph 1: *Evolution of Depth and FSS*   **Graph 2:** *Evolution of Depth and AROA*
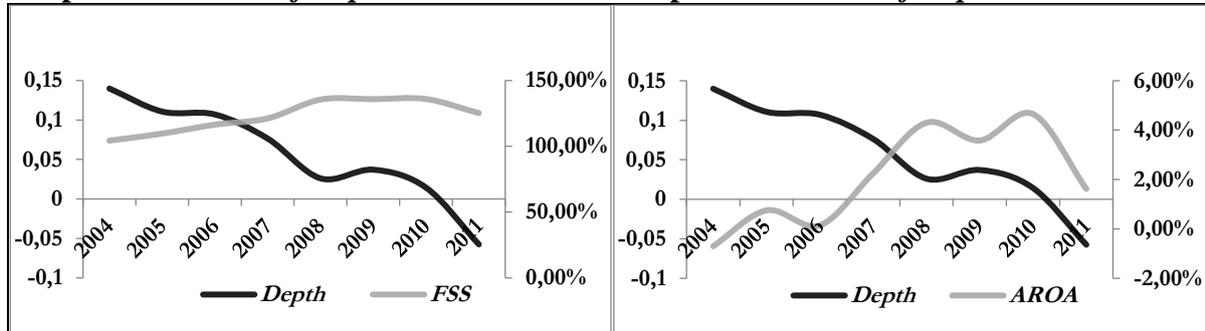
Source: Our design

4. THE ECONOMETRIC MODEL

In order to study the SP/FP *nexus*, we designed two econometric panel data models. The first model (1) explains SP as measured by the depth of outreach (*Depth*), whereas the second model (2) explains FP as estimated by *AROA* and *FSS*. Within a model of simultaneous equations, the dependent variable in each model is explained by the dependent variable of the other model and *vice versa*.

Equation of the social performance (SP):

$Depth_{it} = \zeta_{it}$ *Social variables*$_{it} + \eta_{it} Y_{it} + \theta_{it}$ *Institutional variables*$_{it} + \lambda_{it}$ *Macroeconomic variables*$_{it} + \mu_{it}$ [1]

Equation of the financial performance (FP):

$Y_{it} = \alpha_{it}$ *Financial variables*$_{it} + \beta_{it}$ *Depth*$_{it} + \gamma_{it}$ *Institutional variables*$_{it} + \delta_{it}$*Macreconomicvariables*$_{it} + \varepsilon_{it}$ [2]

Y_{it} expresses FP of the ith MFI at time t, measured by *AROA* and *FSS*.
$Depth_{it}$ expresses the SP of the ith MFI at time t and measures the depth of outreach.
μ_{it} and ε_{it} are the errors terms on the ith MFI at time t, with respect to each model.

We first start estimating this model in order to check the interaction between SP and FP for a subsample of mature MFIs. We focus thereafter upon one-way dependency between SP and FP upon the overall sample. The addition of age square variable highlights the non-linear relationship between these two performances.

4.1. A model of simultaneous equations

MFIs in the sample stand out from each other by specific characteristics that may be either fixed or random. Two estimation methods of each model can be used: The fixed-effects method (*Within*) and random effects method (FGLS). Both methods take into account the heterogeneity of data, but differ as regards the nature of specific effects. The Hausman specification test allows to capture the nature of these individual effects by helping us to decide which of the two estimation methods - fixed or random - is appropriate to the data we use (Sevestre, 2002). In the case of a probability test over 5%, we accept the null hypothesis: The estimators of the two methods are convergent, but only the FGLS estimators are asymptotically efficient. Otherwise, the instrumental variables method of Hausman and Taylor (1981) can overcome two problems of the *Within* method: endogeneity of variables and estimation of the constant variables over

time (Baltagi, 2008). However, this method also faces a problem: the choice of the right instruments[9]. The status of the MFI (*NGO*), its lending methodology (*Group vs. Individual*), its operating area (*Urban vs. Rural*), its Depth of outreach (*Depth*), its financial self-sufficiency (*FSS*) and its profitability (*AROA*) have been considered as endogenous variables because they appear to be correlated with unobserved and specific characteristics of MFIs. These are not taken into account in both performance models: managerial quality that acts upon both these endogenous variables and the performance of MFIs (*FSS*, *AROA* and *Depth*) (Besley and Ghatak, 2004, Hartarska and Nadolnyak, 2007).

Moreover, another version of the Hausman test, based on the difference between the Hausman and Taylor (HT) and FGLS estimators, enables to choose the most effective method: HT in the case of a probability test below 5% or FGLS otherwise.

In the model of simultaneous equations, we cannot estimate the parameters of a single equation without taking into account information provided by the other equation of the system. To capture individual effects of MFIs in the sample, we applied two methods of estimates to a balanced panel of 26 mature MFIs for the period 2004-2011. The first method is the three stage least squares with fixed effects (FE3SLS), which eliminates the structural differences between MFIs focusing on data relative to their averages and provides short term estimators. The second estimation method is error component three stage least squares (EC3SLS) (Baltagi, 2008), which allows to collecting random characteristics of MFIs. However, no test is available in order to decide which of the two methods is appropriate for our data.

4.2. Results from the study of interaction: FE3SLS and EC3SLS

Regarding the estimation of the constant variables over time (*Services, NGO,* and *Regu*), we rely on results from the EC3SLS method because the FE3SLS cannot estimate these. We restrict the interpretation of coefficients to those whereby *AROA* expresses FP, because the variables of interest (*AROA* and *Depth*) are significant.

According to the estimations of both methods –FE3SLS and EC3SLS- , the *Depth* and *AROA* variables have negative coefficients. The profitability of mature MFIs (*Age* is over 5 years) has a negative and significant influence upon targeting the poor. However, the negative impact of *Depth* upon *AROA* is not significant with the FE3SLS method. The interaction between SP and FP is then ambiguous: better FP impairs SP but the reverse relationship remains unclear. This result confirms partially the H_5 trade-off hypothesis and does not support the H_6 hypothesis of compatible performances.

The first determinant of FP is the portfolio at risk of 30 days (*PAR*). These mature MFIs gradually mitigate their targeting on non-poor because they already have loyal customers and a good potential. The *PAR* variable is significantly and negatively correlated with the *AROA* ratio. The more portfolio is affected by payback delay over 30 days, the less loans are likely to be reimbursed. Therefore, a loan portfolio that bears high risk will reduce the returns from microcredit activities and drive a negative impact on financial outcomes. Hence, the MFI will target a less risky clientele and mission drift favouring less poor customers may occur.

The percentage of women borrowers (*WB*) is the first indicator of SP (*Depth*) for two reasons. In the first place, microfinance is often if not exclusively targeting the women. Banks are more oriented towards men and official businesses, thus neglecting women who are poorer and need financial resources to manage small-scale activities that generate income improving their family

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[9] Hausman and Taylor use the following instruments: First, the explanatory variables that vary over time and are doubly exogenous as regards both individual average and deviations from the individual average. Second, the explanatory variables that are invariant over time and are doubly exogenous. Third, the explanatory variables that vary over time and are simply exogenous, expressed in terms of deviations from individual averages. The lack of correlation between the instruments used and the disturbance models can be validated by the Sargan test, which must be below the tabulated value of khi2 to *P - (k +1)* degrees of freedom. *P* represents the number of instrumental variables and *(k +1)* represents the number of estimated coefficients of the model.

livelihood. In the second place, microfinance is also a tool for the women's *empowerment* that favours freedom of speech and social recognition, and enables to decrease inequality. The more MFIs will target the poor, the more it will target women. This finding confirms those in many empirical studies (Guerin and Landing, 2006; Olivares-Polanco, 2005). In order to be socially performing, mature MFIs should adopt the joint liability group loans methodology, because poor women lack collateral, and opt for the NGOs status. The *Group* variable is positively and significantly (at 5%) correlated with *Depth*: The more a MFI provides loans to groups comprising from three to 10 people (Ben Soltane, 2011), the more it will increase SP by covering a broad set of poor clients. A *NGO* status urges MFIs to focus on their social mission addressing a deprived population: this result corroborates the findings of Hartaska (2005), and Besley and Ghatak (2004).

Table 3: *Estimations of simultaneous equations*

Variables	3SLS AROA	3SLS Depth	FE3SLS AROA	FE3SLS Depth	EC3SLS AROA	EC3SLS Depth
Depth	0.0451		-0.0401		-0.0562***	
AROA		-0.7549		-0.5686***		-0.8471**
Yield	0.1570**		0.1808		0.1776***	
CPB	0.0000		-0.0004		-0.0001**	
PAR	-0.1828***		-0.2462**		-0.1833***	
PP	0.0003**		0.0002		0.0002***	
WB		0.6132***		0.4030***		0.5520***
NAB		0.0001		-0.0015***		-0.0007
Services		-0.0373				-0.0062
NGO	-0.0159	0.2252***			-0.0139	0.3328***
Regu	-0.0362***	-0.2485***			-0.0515***	-0.2470**
Trans	0.0080	0.0548	0.0111	0.0235	0.0071*	0.0490*
Group	-0.0150	0.3053***	0.0323	0.0883**	0.0134	0.1788**
Rural	0.0086	-0.0413	0.0180	0.0426	0.0118	0.0219
Politic	0.0937*	0.3603	0.1375	0.5923*	0.0899***	0.7783**
GNIPPP	0.0043*	0.0378**	0.0109	0.0264**	0.0051***	0.0335**
Constant	-0.0963**	-0.9967***			-1.0024***	
Number of MFIs	26		26		26	
Observations	208	208	416		416	
R-squared	0.369	0.429	0.191		0.46	

***significant at 1%, **significant at 5% and *significant at10%. *Source*: Our computation
Age and Age2 variables are deleted from these equations because MFIs are mature (age is over5 years).

Both performances are negatively affected by regulation due to the lack of specific microfinance regulation for most MENA MFIs. In addition, the regulation law is scarcely enforced in Tunisia and Morocco (Lyman and Reille, 2005) and the absence of prudential regulations in the microfinance industry in Morocco was conducive to an impairment of the loan portfolio in recentyears[10]. Mature MFIsmust not be regulatedin order to be socially and financially performing. Political environment (*Politic*) has a significant positive effect on SP (at 5% threshold) according to FE3SLS and EC3SLS method. A favourable political environment facilitates targeting the poor and may enhance the level of trust between market participants especially MFIs, private lenders (banks) and customers: MFIs can better finance their activities through market funding sources and extend their targeting to the poor able to repay their loans. Gross National Income at Purchasing Power Parity (*GNIPPP)* has a positive impact on SP. In the context of economic growth, investment opportunities of the MFIs increase as they extend their target to a poorer clientele. In contrast, MFIs may have an incentive to decrease outreach and maintain a high return in times of economic stress.

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[10]The Moroccan *Zakoura* MFI first experienced a success story (see Counts et al, 2006). It was taken over in 2010 by another MFI when it proved financially inefficient, due to an unsustainable *PAR* (Chehade and Nègre, 2013)**.**

4.3. Results from one-way dependency

We now focus on one-way dependency upon the overall unbalanced panel; it enables us to test the robustness of our previous results from interaction and take into account all key determinants. The results provided by the estimation of each the two models of performance (FP and SP) are close. We first discuss the determinants of FP, then those of SP.

4.3.1. Financial performance

The coefficient associated to Depth of outreach variable (*Depth*) is negative and significant at 1%. The more a MFI addresses poor clients, the more the adjusted return on assets (*AROA*) decreases by 5.46%. Although FP is strongly determined by SP, the latter has then a negative impact upon FP, which confirms hypothesis H_1 of the *institutionalists'* approach. In order to reach very poor clients, MFIs provide loans for smaller amounts and record higher administrative expenses per loan, i.e. cost per borrower (*CPB*), which have a negative and significant impact on net profitability (*AROA)*.

Table 4: *Estimation of financial and social performance models*

Dependent variable	AROA - Adjusted Return On Assets	Depth - Depth of outreach
Independent variables	**HT**	**FGLS**
Depth	-0.0546***	
AROA		-0.1282
PP	0.0005***	
Yield	0.0440	
CPB	-0.0003***	
PAR	-0.0684*	
NAB		-0.0006*
WB		0.5695***
Services		-0.0272
Age	0.0032	-0.0285**
Age2	-0.0001	0.0003*
NGO	-0.1119	0.4678
Regu	-0.0241	-0.3844
Trans	0.0059	0.0014
Rural	0.0080	0.0864**
Group	0.0076	0.1092***
Politic	0.0274	0.0371
GNIPPP	0.0106**	0.0464
MFIs	64	64
Observations	468	468
R-squared		
Fisher		
Breusch Pagan		0.0000
Wald	413.01	67,56
Sargan	0,0663	
Hausman	0.0000	0.0686

***significant at 1%, ******significant at 5% and *****significant at10%. *Source*: Our computation

Other variables are significant, such as Staff productivity (*PP*) and portfolio quality (*PAR*). On the one hand, the *PP* coefficient is positive and significant (at 1%) but has a very weak impact on the FP of MFIs, which may be due to the increase in the number of borrowers, being *almost* proportional to that of employees. On the other hand, the *PAR* coefficient is negative but less significant at 10%. FP of MFIs is determined by maintaining a good payback rate. No institutional variable is significant and the addition of *Age2* variable enabling the observation of age effect on the long run did not improve the significance of the *age* variable. However, macroeconomic variable *GNIPPP* is significant at 5%: economic growth influences positively

an MFI's profitability and can drive higher returns for micro-enterprises and for MFIs to charge higher interest rates. Thus, it bolsters financial sustainability by reducing default rate and operating costs (Ahlin et al., 2011)

4.3.2. Social performance

The coefficient of the adjusted return on assets ratio (*AROA*) is negative. FP has a negative impact on SP, which may confirm hypothesis H$_3$ of the *welfarists*' approach. However, this coefficient is not significant.

In order to be socially performing, MFIs should target more women as well as *rural* areas and use *Group* methodology. The more a MFI operates in rural areas, the better it will target the poor wherein they are concentrated (Luzzi and Weber, 2006; Merslandand Strøm, 2009). Indeed the *Rural* variable is significant at 5% and has a positive impact upon SP.

Despite these two targeting tools, as the number of active borrowers (*NAB*) of a MFI increases, fewer borrowers are poor. The coefficient of the *NAB* variable is negative but it has little impact on *Depth* and it is only significant at 5%.

The age of MFIs influences negatively on SP. However, the coefficient of age squared (*Age2*) is positive and significant at 10%, suggesting that the relationship between age and SP becomes nonlinear and follows a "*U shape*" on the long run. An additional year would represent a decrease of 2.79% in *Depth* at the start of the MFI and an increase of 0.03% after 48 years of operation.

Other institutional and macroeconomic variables are not significant.

4.3.3. Robustness

Robustness checks are based on split-sample tests. Hence, we estimate these two models of performance upon sub-samples according to informational transparency, credit methodology, operating areas and the geographical setting of MFIs in the MENA region.

The regression[11] results display robust signs previously found (See Table 3): the depth of outreach (*Depth*), quality of portfolio (*PAR*), personnel productivity (*PP*) and cost per borrower (*CPB*) have an impact upon FP; adjusted return on assets (*AROA*), the percentage of women borrowers (*WB*), joint liability loans (*Group*), rural operating areas (*Rural*) and *Age* variables (including *Age2*) affect SP.

Theses regressions reveal other relationships between variables: Transparent MFIs should operate in urban areas in order to be financially performing and be unregulated NGOs in order to be socially performing. The regulation, including country specific legislation on microfinance, mitigated MFIs social performance and therefore should improve to achieve a better social performance. In order to be financially successful, MFIs providing loans to groups should be located in rural areas where trustworthiness exists between the members of groups and default rate is low. Economic growth increases social performance of the most transparent MFIs, whereas the stability of political environment reduces social performance, especially in Middle East.

5. CONCLUSION

Although both *welfarists* and *institutionalists* approaches refer to a trade-off between social performance and financial performance on the short run, a positive one-way dependency may be found between social performance and financial performance on the long run for a balanced panel of mature MFIs. Moreover, interaction shows that the financial performance has a negative impact on social performance on the long run, whereas no significant and negative impact of social performance upon financial performance shows up: this interaction is unclear. Financial performance is strongly determined by portfolio quality whereas the exclusive

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[11]Detailed tables regarding the regressions are available from the authors upon request.

targeting of women is the first determinant of social performance.

Our panel data study upon one-way dependency has documented that the more a MFI is socially efficient, the less it seems to be financially successful and conversely. The relationship between age and performance is non-linear: it displays a "*U shape*" with respect to SP and inverted "*U shape*" with respect to FP. Hence, there is a trade-off between social performance and financial performance of MFIs on the short run, which might be persistent on the long run. Once a high level of maturity occurs, largely superior to 5 years, the signs of these two types of performance oppose. The definition of the level of maturity is subject to criticism; which may explain that no clear interaction was found between the two performances.

Our results have highlighted the most relevant determinants of both performance. On the short run, MFIs seek to decrease their depth of outreach in order to secure payback. Some institutional determinants such as loans methodology (*Group*) and operating area (*Rural*) have positive influence only upon the social performance.

The restricted number of observations, especially as regards the balanced panel, has prevented an analysis of Granger causality. Our study faces two other limitations. First, we selected the sample from the *MIX* wherein MFIs are the most financially efficient; we ignore indeed the characteristics of non-registered MFIs. Second, the definition of a five years maturity for MFIs in accordance with the Moroccan benchmark remains questionable: the microfinance industry is still recent in the MENA region.

Data regarding improved livelihood of the poor becoming less poor over time thanks to microcredit and remaining customers in the MFI are not available. Designing a longitudinal study of MFIs' borrowers in the MENA region may assess for the enhancement of SP and subsequently the FP of MFIs. However, such a design is not within our research prospects, which are twofold. One prospect is to include other relevant variables, such as savings that improve the impact of microcredit; unfortunately, they are banned in Morocco and Tunisia; we will then focus on the institutional aspect of regulation. The other prospect is to focus on the interest rates charged by MFIs and their trend overtime; such rates have an impact on both the social performance (lending to the poor at lower cost?) and the financial performance (reaching self-reliance without resort to subsidies?).

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