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SOCIAL VERSUS FINANCIAL RETURN IN MICROFINANCE

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Abstract

In this paper we examine the interaction between social and financial returns in microfinance. Running multivariate regression models and using 1,508 observations on microfinance institutions between 2004 and 2010, we find strong evidence suggesting that institutions with more social engagement in terms of outreach to the poor earn higher portfolio yields. We also find that some measures of outreach are associated with increased operating expenses. As return figures are influenced by both costs and yield, and both increase with depth of outreach, these two contradictory results lead to a zero sum effect on return measures.

Key words: microfinance, financial return, outreach, operating expenses, portfolio yield

JEL classification: G21, L11, O16.

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1 INTRODUCTION

To date, the causal association between microfinance and social impact has not been proven. A number of institutions, banks, funds and researchers claim that microfinance might help to reduce poverty and improve the living standards of marginalized households and communities (Morduch (1999), CGAP (2004), Khandker (2005), Islam (2009)). Attempts to measure the causal relationship are being made in impact studies (Roodman (2012), Armendáriz and Morduch (2010), Duvendack et al. (2011)), nevertheless, the results are inconclusive.[1] It is therefore not clear how financial and social factors interact in microfinance. The aim of this paper is to analyse this relationship by using data on microfinance institutions.

In recent years, microfinance institutions (MFIs) have been increasingly interested in achieving financial sustainability. On the one hand, donors and investors have been giving more attention to promoting self-sufficient institutions, while on the other hand, MFIs have been increasingly focused on surviving independently from external subsidies. Even non-profit organizations have begun to indicate financial performance as one of their main goals Quayes (2011). At the same time, microfinance investors have started to base their investment decisions not only on financial but also on social factors (Urgeghe (2010), CGAP (2012)). From both private and institutional investor's perspectives, the social return of an investment and also its association to financial performance are thus increasingly of interest.

Previous studies on social and financial returns in microfinance largely focus on efficiency and return figures as respective proxies, and findings on the interaction with social factors are not consistent. This paper contributes to filling this gap and tries to solve the puzzle by additionally concentrating on yield measures. Similar to many other quantitative empirical analyses on microfinance we use measures of depth of outreach as proxies for social return. We focus on two particular measures of outreach: percentage of female clients and average loan distributed (in relation to GNI per capita).[2] We use panel data including 1,508 observations to analyse the interaction between the two social performance measures and different indicators for financial return (portfolio yield, costs and return).

2 RELATED LITERATURE

Findings on the interaction between financial and social return do not yield consistent results. Researchers find that more socially oriented procedures incur higher costs (Conning (1999), Paxton

[1]Impact studies try to measure the effect of microfinance directly in the markets by different qualitative or quantitative approaches or (non-) randomized trials.

[2]One may argue that the two measures are not the best ones that could have been chosen; nevertheless it is difficult to find data on more detailed social performance indicators at the MFI-level. Furthermore, it is the aim of this paper to solve the puzzle why existing research finds no clear interaction between social and financial performance indicators and those papers also make use of these simplified indicators to represent social performance.

(2003), Cull et al. (2007), Hermes et al. (2011)). However, except for Quayes (2011), most studies find no significant impact on return measures, such as return on assets (ROA) and operational self-sufficiency (OSS). According to Conning (1999), more socially-orientated MFIs charge higher interest rates.

Conning (1999) finds namely that institutions distributing smaller loans charge higher interest rates on average. He differentiates between low-end microfinance lending organizations (MFOs) serving clients with loans that are on average less than 20% of GNP per capita, and high-end MFOs with loans on average exceeding 85% of GNP per capita. MFOs in between the two categories are defined as the broad-end group. Staff expenses per average loan are reported to be more than three times higher than average for low-end MFOs in a sample of 72 institutions. He also finds that low and broad-end MFOs charge interest rates that are on average around twice as high as those charged by high-end MFOs. The reason for the higher interest rates is assumed to be the intention to cover higher costs. Finally, low and broad-end MFOs are shown to have lower levels of leverage.

Paxton (2003) creates a poverty outreach measure that includes depth of outreach and scale. She finds that MFIs organized as banks and credit unions serve a large number of clients below the poverty level. Furthermore, she measures a zero or even negative relationship between reliance on subsidies and depth of outreach, indicating that financially self-sufficient MFIs reach out to the largest number of poor people.

Cull et al. (2007) do not find a significant relationship between profitability and average loan size while using financial self-sufficiency as main measure of profitability and ROA and OSS for robustness checks. They find that larger loans imply lower average costs for both individual-based and solidarity-group lenders. Village banks are found to face the highest costs and subsidy levels while individual-based lenders earn the highest profits with lower levels of outreach. The analyses are based on data on 124 institutions in 49 developing countries.

Quayes (2011) finds a positive impact of financial self-sustainability (FSS[3]) on the depth of outreach (using average loan balance divided by GNI per capita) for high-disclosure MFIs. A sample of 702 MFIs is divided based on the MFIs' disclosure levels into high- and low-disclosure MFIs. Furthermore, the author confirms the result by calculating a logit model using FSS as dependent variable, as it is found that a lower average loan balance per borrower increases the probability of reaching financial self-sustainability, again for high-disclosure MFIs.

Another study by Hermes et al. (2011) shows evidence of a negative relationship between efficiency and depth of outreach measured as percentage of female borrowers and average loan balances. The analysis is based on the interaction between efficiency and social return, using data on more than 1,300 MFIs. The authors use stochastic frontier analysis to examine whether there is a trade-off between outreach and efficiency for MFIs.

To conclude, only a few studies provide evidence on the relationship between financial and social

[3]FSS is here defined as OSS>100% and takes the value 1 if OSS is greater than or equal to 100%, and 0 otherwise.

return. Furthermore, the studies find inconclusive results. This paper tries to solve this puzzle and to close the research gap by focusing the empirical analysis on different measures of financial performance. We run three regression analyses using the same data set to capture the effect between social performance and different types of financial return measures.

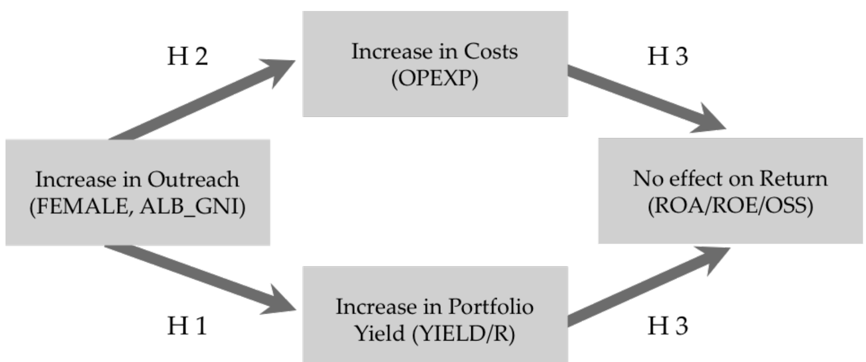
3 METHODOLOGY

3.1 *HYPOTHESES*

The hypotheses developed here are based on the assumption that outreach to the poor might be contradictorily linked to different measures of financial return (see Figure 1).

We use the percentage of female clients and the average loan balance of an MFI as measures of outreach. The proportion of female clients is taken as a measure of depth of outreach because it is assumed that women are likely to be poorer as they usually have less access to financial services IFC (2011). Furthermore, women have traditionally rather been excluded from decisions related to finance at the household level and often they lack access to financial services Ledgerwood (1999). Among investors and donors, the average size of the loan is commonly used as a second proxy for a MFI's outreach to the poor Mersland and Strom (2010).

Figure 1. Overview of Hypotheses



Source:Meyer (2013)

However, because average loan size is difficult to use as a standardized measure as it very much depends on the economic situation of a particular region we use an improved, standardized measure by putting the average loan balance per borrower in relation to the average Gross National Income (GNI) per capita. Both measures can be criticized for not being a perfect substitute for outreach[4], however data on other social performance indicators are not available for such a large set of MFIs

[4]For example, other reasons than a more social attitude could force or motivate an institution to serve more or less women (e.g. religious or ethical context Urgeghe (2010)).

over such a long period. Furthermore, it is the aim of this paper to solve the puzzle of existing research and it is therefore important to use the same performance measures.

The first hypothesis reflects the findings of Conning (1999), which indicate that MFIs providing smaller average loans charge higher interest rates. Portfolio yield measures client's payments by dividing interest and fee income by average loan portfolio; smaller loans indicate higher levels of outreach. This results in our hypothesis 1:

- *Hypothesis 1: The higher the outreach, the higher the portfolio yield.*

The second hypothesis is predicated on the results of several authors including Conning (1999), Paxton (2003), Cull et al. (2007) and Hermes et al. (2011) who show evidence that social return (outreach) comes at lower efficiency:

- *Hypothesis 2: The higher the outreach, the higher the costs for the MFI.*

The third hypothesis follows directly from the first two and is based on the findings of Dam (2008), who states that various financial measures are diversely connected to social factors. Financial return measured as ROA, ROE or OSS is affected by portfolio yield and costs. If outreach has a positive relation to both portfolio yield and costs, the resulting effect on return could be erased.[5]

- *Hypothesis 3: Outreach is not related to financial return.*[6]

Hypothesis 3 is also supported by the fact that until now, researchers have not found a significant relationship between financial return, measured as profitability, and social return, measured through a variety of indicators (Cull et al. (2007), Quayes (2011)).

Since most MFIs are not publicly listed, accounting indicators such as ROA, ROE and efficiency measures must be used as indicators for performance (Galema et al. (2011), Tchakoute-Tchuigoua (2010)). To test the first hypothesis, we take portfolio yield on both a nominal (YIELD) and real (YIELDR) base. Portfolio yield captures average interest rates at MFI levels (González, 2011).

As a proxy for costs (hypothesis 2), we use operating expenses divided by assets (OPEXP), as they have been found to be the most important driver of differences in total costs between institutions (Cull et al., 2009).[7] Operating expenses (divided by assets) are the best indicator for the MFI's efficiency regarding lending operations (Ledgerwood, 1999) and therefore an appropriate

[5] Assuming that the two effects are of similar size.

[6] The interaction between the three hypotheses is of course limited because earnings other than portfolio yield could influence return. Also, a wide spectrum of costs, possibly not all connected with outreach, could affect financial return.

[7] In the dataset used, operating expenses and total expenses strongly correlate (coefficient of 0.92, significant on 1% level). Results therefore only differ marginally if including total expenses in the analysis instead of operating expenses.

measure.

ROA, ROE and OSS are used to measure the financial return of MFIs and to test the third hypothesis. ROA and ROE are measures widely used for the performance of banks and companies as well as microfinance institutions (Ledgerwood, 1999). OSS reflects performance of institutions before subsidies. Subsidies are usually provided in the form of grants or loans at interest rates below market rates. It is likely that some institutions would not be able to maintain their performance without subsidies (Rosenberg, 2009). OSS measures the degree to which operational income covers expenses.

3.2 DATA ANALYSIS

To estimate the model, cross-sectional data on MFIs is pooled for the years 2004 to 2010, resulting in an unbalanced panel dataset.[8]

As panel data are collected at different points in time, this analysis includes more than one observation per MFI. As a consequence, the assumptions on underlying OLS-estimators may not be met, which might result in inconsistent estimators (Green (2012) and Petersen (2009)). One way to encounter the potential for biased estimators is the use of random effects models. The random effects model is based on the assumption that the observations for one MFI tend to be related to each other over time, more so than different MFIs are related to each other (Petersen, 2009). Unobserved individual heterogeneity is therefore assumed to be uncorrelated with the variables that are included.

Another way to handle panel data is the use of fixed effects models. Using fixed effects makes sense when it is expected that an effect varies over time and therefore needs to be estimated using dummy variables (measuring a group-specific constant term) (Green (2012), Wooldridge (2003)). To decide which of the two models to use, we run a Hausman test (Green, 2012). The null hypothesis states that the random effects model is preferred, while the alternative hypothesis favors the fixed effects model. This means that the null hypothesis does not expect the unique errors to be correlated with the regressors. In this study, we cannot reject the null hypothesis and decide to use the random effects model.

[8] Using an unbalanced dataset rather than a balanced one has the advantage of representing the market more effectively by including all MFIs and preventing survivorship bias (see Baum (2006)).

To test the three hypotheses developed above, we estimate the following three regression models:

Model 1:

$$
\begin{aligned}
YIELD_{it}/YIELDR_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 ALB\_GNI_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 PAR30_{it} \\
+\beta_6 LEVERAGE_{it} + \beta_{7-11} LEGAL_{it} + \beta_{12-16} REGION_{it} + \epsilon_{it}
\end{aligned}
$$

Model 2:

$$
\begin{aligned}
OPEXP_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 ALB\_GNI_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 PAR30_{it} \\
+\beta_6 LEVERAGE_{it} + \beta_{7-11} LEGAL_{it} + \beta_{12-16} REGION_{it} + \epsilon_{it}
\end{aligned}
$$

Model 3:

$$
\begin{aligned}
ROA_{it}/ROE_{it}/OSS_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 ALB\_GNI_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 PAR30_{it} \\
+\beta_6 LEVERAGE_{it} + \beta_{7-11} LEGAL_{it} + \beta_{12-16} REGION_{it} + \epsilon_{it}
\end{aligned}
$$

The three models are elaborated for the three types of hypotheses, whereas the relevant dependent variables used and the predicted sign of the coefficients differ. Outreach is measured based on two variables (female and average loan balance in relation to GNI), whereas the two expected effects are opposite, as average loan is an inverse measure of outreach.

To control for other effects that might influence the relationship between social and financial return, we include several control variables. SIZE and AGE of an institution have often been found to correlate with performance measures (Cull et al. (2007), Barnett and Salomon (2006), Zacharias (2008)). We include PAR30 to control for different risk structures by measuring the share of the portfolio with payments being overdue by more than 30 days.[9] The debt to equity ratio (LEVERAGE) is included as a control for different financing structures that could influence financial performance (Conning, 1999). Existing research finds contradictory results on the direction of the influence (Kyereboah-Coleman (2007), Quayes (2011)). To control for structural characteristics of MFIs, we define the following fixed effects for legal status based on MIX variables (LEGAL): BANK, COOP (credit union / cooperative), NGO (non-governmental organisation),

[9]We also analyse the write-off ratio as a control, but the results remain stable and as the focus here is not on risk measures, only PAR30 is included in the main regression.

OTHER, RURBANK (rural bank) and NBFI (non-banking financial institution). For regional fixed effects (REGION), we include dummies for Africa, Eastern Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, East Asia and Pacific (Cull et al., 2007).[10]

4 DATA

We use data on MFIs from the Microfinance Information eXchange database (MIX).[11] MFIs voluntarily participate in the database. MIX does not check the reliability of each participating MFI's data, although it undertakes some adjustments to make comparison easier, such as correcting for inflation, loan loss provisioning / write-offs and subsidies (MIX, 2007).

Still, data collected by MIX are credited with being the best available representation of the top MFIs in the microfinance industry (Krauss and Walter (2008), Di Bella (2011), Hartarska and Nadolnyak (2007)). Furthermore, as the data quality of the MIX database has often been criticized, MIX has implemented a rating system using a scale of one to five, to indicate the reporting quality and completeness of MFIs. In order to receive five diamonds, a MFI needs to publish audited financial statements on a yearly basis accompanied by a rating or due diligence report.[12] To ensure that the regression results are not biased by MFIs with bad reporting standards or missing information, only MFIs with 5 diamonds were included in the present analyses.[13] The resulting data file for the purpose of the regression analysis includes 1,508 observations between 2004 and 2010.

5 RESULTS

Evidence is found to support the first hypothesis, which states that portfolio yield is positively correlated to outreach (see columns (1) and (2) in Table 1). The variable FEMALE shows a positive coefficient for both nominal (YIELD) and real yield (YIELDR). The coefficients for both measures are significantly different from zero at the 1% level (indicated by three stars), representing a margin of error of less than 1%. The more women served by an MFI, the higher the portfolio yield. The value of the coefficient (0.102) implies that institutions serving only female clients request interest rates that are on average 10 percentage points higher (both real and nominal) than the rates that

[10] The consideration of multiple dummy variables (LEGAL, REGION, and YEAR) results in different intercepts for each observation, controlling for the various fixed effects of the particular variables (Wooldridge, 2003).

[11] www.mixmarket.org

[12] Four diamonds means that audited financial statements are available with lack of rating/due diligence. An institution receiving three diamonds needs to have an active profile (one diamond), some data on clients and products for the year (two diamonds) and some financial data for the year (see `www.mixmarket.org/faq/diamond-rankings`).

[13] The decision to exclude all MFIs with less than 5-diamonds is taken because strange values reported by several low-diamond MFIs were discovered (for example percentage of female customers>100%). Additionally, MFIs reporting negative levels of leverage (18 observations) and one observation with a leverage of over 2,000 were excluded.

a hypothetical institution serving only male customers would charge. One reason for this could be that women accept higher prices for loans because they face more difficulties with regard to financial access in general.

Evidence is also found to support hypothesis 1 based on the coefficient of ALB_GNI (average loan balance divided by GNI per capita) in relation to YIELD and YIELDR, which is significantly negative at the 1% level. Therefore, the lower the average loan size divided by GNI per capita (that is, the more outreach achieved), the higher the portfolio yield for a given MFI. The value of the coefficient is rather small though, indicating that an increase in average loan balance in relation to GNI of 10 percentage points leads to a reduction of the yield by 0.3 percentage points. On average, higher prices are charged on smaller loans, which could indicate the intention of MFIs to cover the higher costs incurred by smaller loans. Cross subsidisation between smaller and larger loans did so far not seem to happen to a significant extent.

The results for the second hypothesis are found in the regression using OPEXP as the dependent variable (see column (3) of Table 1). The significantly positive coefficient for FEMALE and the significantly negative coefficient for ALB_GNI indicate confirmation of hypothesis 2. Higher outreach thus comes at higher operating expenses. The results are again strongly significant at the 1% level, illustrating a low probability of error. The coefficient is higher for the variable FEMALE than ALB_GNI, similar to the results for hypothesis 1. It therefore seems to be more costly to increase outreach by targeting female clients than by reducing the average loan sizes. Possible explanations for higher costs for female clients would be increased marketing efforts to target them or the development of group-building techniques in order to meet their requirements.

The third hypothesis is confirmed, as we find no significant relationship between ROA, ROE and OSS and FEMALE or ALB_GNI (see columns (4), (5) and (6) of Table 1). The effect on the return variables (ROA and ROE) is similar to the one on the yields, as the coefficient for female is positive and the one for ALB_GNI is negative; however, the coefficients are not significantly different from zero. Outreach measures therefore show a tendency to be slightly negatively correlated with returns. However, the effects on ROA and ROE are very small and not significantly different from zero. The outcomes therefore indicate the acceptance of all three hypotheses for this data set even when controlling for a large set of variables.[14]

[14]When including all MFIs in the analysis, without controlling for the number of diamonds, the results for hypotheses 1 and 2 remain significant. The regression estimation contains 4,454 observations and leads to similar coefficients, significant at the 1% level. Regarding ROE and OSS, small differences result when all diamonds are included. ROE is positively influenced by FEMALE, significant at the 5% level, and OSS is positively connected to ALB_GNI (significant at the 5% level), indicating that lower outreach involves higher values of OSS. However, as stated before, some MFIs with low diamond scores report implausible results and these scarcely significant results are therefore probably not valid.

Table 1. Random Effects Regression: Using Data from 2004 to 2010

VARIABLES	(1) YIELD	(2) YIELDR	(3) OPEXP	(4) ROA	(5) ROE	(6) OSS
FEMALE	0.102***	0.097***	0.072***	0.015	0.076	-0.010
	(4.882)	(4.053)	(5.231)	(1.159)	(0.461)	(-0.152)
ALB_GNI	-0.033***	-0.032***	-0.015***	-0.002	-0.006	0.008
	(-6.412)	(-5.342)	(-4.508)	(-0.712)	(-0.127)	(0.436)
SIZE	-0.018***	-0.025***	-0.029***	0.007***	0.028	0.029***
	(-7.180)	(-8.433)	(-17.570)	(4.405)	(1.230)	(3.237)
AGE	-0.003**	-0.002*	-0.001	0.000	0.005	-0.000
	(-2.382)	(-1.925)	(-1.255)	(0.546)	(0.813)	(-0.068)
PAR30	-0.050	0.030	0.020	-0.257***	-0.408	-1.100***
	(-1.375)	(0.680)	(0.821)	(-9.519)	(-1.000)	(-7.080)
LEVERAGE	-0.014	0.001	0.013	-0.052***	0.493***	-0.123*
	(-0.832)	(0.056)	(1.175)	(-4.197)	(2.611)	(-1.719)
BANK	0.048*	0.049*	0.029	-0.002	0.195	-0.043
	(1.662)	(1.739)	(1.593)	(-0.172)	(1.413)	(-0.783)
COOP	-0.125***	-0.105***	-0.074***	-0.001	0.010	-0.030
	(-4.521)	(-3.919)	(-4.254)	(-0.123)	(0.077)	(-0.578)
NGO	-0.032*	-0.038**	-0.022*	0.016**	0.071	0.061*
	(-1.713)	(-2.061)	(-1.849)	(1.994)	(0.794)	(1.708)
OTHER	0.032	0.014	0.040	0.020	0.056	0.116
	(0.228)	(0.100)	(0.449)	(0.338)	(0.081)	(0.422)
RURBANK	-0.102	-0.146**	-0.163***	0.038	0.175	0.128
	(-1.618)	(-2.319)	(-4.053)	(1.307)	(0.461)	(0.864)
AFRICA	0.058	0.029	0.058**	-0.024	-0.083	-0.130
	(1.310)	(0.671)	(2.053)	(-1.253)	(-0.385)	(-1.505)
ECA	-0.011	-0.031	-0.008	0.001	-0.024	-0.014
	(-0.250)	(-0.714)	(-0.292)	(0.076)	(-0.110)	(-0.159)
LAC	0.043	0.062	0.042	-0.008	-0.039	-0.091
	(1.008)	(1.482)	(1.537)	(-0.454)	(-0.189)	(-1.085)
MENA	-0.007	0.018	-0.001	-0.005	-0.074	-0.030
	(-0.140)	(0.370)	(-0.040)	(-0.247)	(-0.304)	(-0.308)
SA	-0.110**	-0.120***	-0.058*	-0.040**	0.045	-0.151
	(-2.320)	(-2.590)	(-1.929)	(-1.994)	(0.193)	(-1.636)
Time Fixed Effects	Included	Included	Included	Included	Included	Included
Constant	0.640***	0.656***	0.622***	-0.085**	-0.467	0.869***
	(10.224)	(9.765)	(15.370)	(-2.456)	(-1.049)	(4.975)
Observations	1,508	1,508	1,508	1,508	1,508	1,508
Number of MFIs	327	327	327	327	327	327

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The dependent variables in this table are the following: yield on portfolio nominal / real is the interest and fee income divided by average loan portfolio, OPEXP is operating expenses in relation to total assets, ROA and ROE are return in relation to total assets and equity, respectively, OSS (operational self-sufficiency) is the degree to which operational income covers expenses. The two most important explanatory variables with respect to the hypotheses are the percentage of female borrowers (FEMALE) and the average loan balance in relation to the GNI per capita (ALB_GNI).

6 ROBUSTNESS CHECK[15]

Although we include several control variables in the model, it is possible that some correlated variables are omitted. This would lead to biased test results. One example would be that MFIs located in rural areas serve poorer clients while charging higher interest rates. This would mean that both variables are influenced by the regional allocation of the institution. Other than that, the mission of a particular MFI or the obligations imposed by donors or investors could lead to the service of poorer clients at higher prices. Also the management quality or the quality of human resources might influence both the dependent and the independent variables at the same time. In order to test for possibly omitted variables we use a form of a fixed effects model. To control for all possibilities of endogeneity, 326 dummy variables are included in the fixed effects regression accounting for all MFIs and using one as reference group. The inclusion of a dummy variable per MFI allows different intercepts for each institution Wooldridge (2003). The dummy variables control for all the time-constant, unobservable characteristics of the MFIs that could possibly affect the dependent variable by monitoring the unobserved heterogeneity between MFIs Wooldridge (2003). This is a very strong test, which controls for all the characteristics of the single MFIs that could possibly influence the relationship between the independent and the dependent variables.

Table 2. Fixed Effects Regression

VARIABLES	(1) YIELD	(2) YIELDR	(3) OPEXP	(4) ROA	(5) ROE	(6) OSS
Institution Fixed Effects	Included	Included	Included	Included	Included	Included
FEMALE	0.090***	0.052*	0.071***	0.023	-0.045	0.086
	(3.61)	(1.77)	(4.39)	(1.20)	(-0.14)	(0.70)
ALB_GNI	-0.031***	-0.029***	-0.012***	-0.005	-0.005	0.020
	(-5.38)	(-4.22)	(-3.11)	(-1.04)	(-0.07)	(0.69)
Controls	Included	Included	Included	Included	Included	Included
Time Fixed Effects	Included	Included	Included	Included	Included	Included
Constant	0.337**	0.546***	1.023***	-0.676***	-1.737	-0.790
	(2.48)	(3.42)	(11.56)	(-6.38)	(-0.98)	(-1.17)
Observations	1,508	1,508	1,508	1,508	1,508	1,508
R-squared	0.881	0.839	0.892	0.673	0.392	0.494

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The dependent variables in this table are the following: Yield on portfolio nominal / real is the interest and fee income divided by average loan portfolio, OPEXP is operating expenses in relation to total assets, ROA and ROE are return in relation to total assets and equity, respectively, OSS (operational self-sufficiency) is the degree to which operational income covers expenses. The two most important explanatory variables with respect to the hypotheses are the percentage of female borrowers (FEMALE) and the average loan balance in relation to the GNI per capita (ALB_GNI).

[15] Besides the regression diagnostic test presented here, more have been conducted (multicollinearity, control for outliers, inclusion of all MFIs irrespective of their number of diamonds and so forth) and are available upon request.

With regard to hypothesis 1 (with YIELD as dependent variable), the value of both coefficients decreases when including institutional fixed effects, with the size of the coefficient for FEMALE decreasing from 0.102 to 0.090 and the size of the coefficient for ALB_GNI decreasing from -0.033 to -0.031 (see Table 2). This means that part of the relationship between YIELD and the two outreach measures is eliminated by institution-specific factors influencing both variables.

Nevertheless, the results demonstrate that the positive relationship between social performance and nominal yield persists with strong statistical significance at the 1% level even after the inclusion of fixed effects.

The effect for the real yield is only weakly significant at the 10% level in the fixed effects model for the variable FEMALE while the coefficient for ALB_GNI remains significant. However, the coefficients of outreach for real yield were already smaller than for nominal yield in the standard OLS-regression. The effect of outreach is stronger on nominal yield and therefore also persists in the fixed effects model. This could indicate that if MFIs adjust interest rates according to the characteristics of the client or the loan size, they do it on a nominal level, meaning they neglect the development of the national price level.

Regarding OPEXP, the significant effect of social return remains statistically significant for both outreach variables. Both coefficients decrease for OPEXP as well, with FEMALE slightly decreasing from 0.072 to 0.071 and ALB_GNI from 0.015 to 0.012, indicating that some institution specific variables influence both the explanatory factors and the dependent variable OPEXP at the same time.

The coefficients of outreach and ROA, ROE and OSS remain statistically insignificant as in the original model, meaning that hypothesis 3 is again confirmed, even when taking unobservable effects into account.

Not surprisingly, the R-squared increased strongly to between 80% and 90% as the inclusion of dummies for each MFI allows much of the variation of the dependent variable to be captured (columns (1), (2) and (3)).

To conclude, all the hypotheses are confirmed with strong significance, even when controlling for all institution-specific factors by including fixed effects.

7 CONCLUSIONS

To investigate the relationship between the financial and social return of microfinance institutions, we present a comprehensive empirical regression analysis. Results indicate that institutions charge female clients and smaller loans higher interest rates. Because operational expenses increase at the same time, the total influence on return measures (such as ROA, ROE and OSS) is very small and not statistically significant.

The results of the present research lead to the suggestion that some of the existing studies finding puzzling results on the relation between financial and social return have not focused on the best choice of variables. Return figures are influenced by both costs and yield at the same time, and these both increase with higher depth of outreach. Most previous papers look at ROA, ROE, OSS or FSS, and costs in relation to outreach. All four return measures are positively influenced by yield (earnings) and negatively by costs.[16] Supposing that outreach has a positive impact on yield (argued by Conning (1999) and reinforced by the present study) and a negative impact on costs (supported by Hermes et al. (2011), Cull et al. (2007), and Conning (1999) as well as by the present study) the combined effect results in zero or a very weak consequence on return measures. This could explain the weak and rather contradictory results found on the relationship between social and financial return in microfinance (see present study as well as Cull et al. (2007) and Quayes (2011)).

Fund managers still do not put strong emphasis on including social factors in their investment decision processes. Several impediments are identified, including the belief that microfinance is social "per se", the existing lack of standardization in the measurement of social performance, and lax regulation Urgeghe (2012). However, in view of increased commercialization of the industry and crises hitting several regions, the focus on social factors gained importance. The present study indicates that including socially responsible elements in investment decisions might lead to better financial performance, as the expected trade-off between social and financial factors does not seem to exist. Although charging poorer clients higher interest rates is not in line with the social nature of microfinance institutions, it appears to be necessary in order to cover higher costs and to satisfy investors.

A focus on social factors would be important to ensure the future responsibility of the microfinance sector. Besides serving poor clients, funds can emphasize their social approach by signing social investment principles and informing investors about social performance. Profitable funds have the possibility to favor the sustainable growth of institutions and thus the emergence of further investment options by providing capacity building and technical assistance to MFIs.

The results on YIELD and YIELDR and the relation to outreach raise the question as to how MFIs decide on the level of the interest rates charged. Di Bella (2011) analyses factors influencing interest rates in an empirical investigation using data from the MIX. He shows that interest rate levels are positively influenced by the MFI's borrowing rates and confirms the results found here, that interest rates are inversely related to the average loan size and the age of the MFI Di Bella (2011). The techniques and criteria of MFIs on how to determine interest rates could be subject to further research.

[16] OSS is calculated by dividing financial revenue by financial expenses plus impairment losses and operating expenses. FSS measures how far that MFIs are able to cover their costs (considering adjustments) and is calculated by dividing adjusted revenue by total expenses adjusted for subsidies and inflation Rosenberg (2009). ROA and ROE are calculated by dividing return by assets or equity, while return is calculated by subtracting costs from earnings (simplified).

Another issue raised by the current analysis should be investigated further: more socially orientated MFIs (from an outreach perspective) seem to charge higher interest rates. This practice is understandable, as MFIs need to compensate for the potential default of such very poor clients and the higher than average costs. Future research could be based on theoretical work by Stiglitz and Weiss (1981) who analyse the equilibrium of credit markets and argue that the augmentation of interest rates could squeeze low-risk clients out of the markets. Furthermore, the fact that the poorest clients have to pay most would indicate a somewhat "unsocial" strategy. Additional analyses on the loan policies of MFIs might explain whether they actually adjust interest rates based on clients' profiles and loan sizes.

References

Armendáriz, Beatriz, and Jonathan Morduch, 2010, *The Economics of Microfinance* (The MIT Press Cambridge, Massachusetts London, England).

Barnett, Michael, and Robert M. Salomon, 2006, Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance, *Strategic Management Journal* 27.

Baum, Christopher, 2006, An introduction to modern econometrics using stata, *Stata Press* .

CGAP, 2004, Key principles of microfinance, building financial systems for the poor, CGAP.

CGAP, 2012, How have market challenges affected microfinance investment funds? highlights from the cgap market scan, CGAP Brief.

Conning, Jonathan, 1999, Outreach, sustainability and leverage in monitored and peer-monitored lending, *Journal of Development Economics* 60, 51–77.

Cull, Robert, Asli Demirgüç-Kunt, and Jonathan Morduch, 2007, Financial performance and outreach: A global analysis of leading microbanks, *The Economic Journal* 107–133.

Cull, Robert, Asli Demirgüç-Kunt, and Jonathan Morduch, 2009, Microfinance meets the market, *Journal of Economic Perspectives* 23, 167–192.

Dam, Lammertjan, 2008, *Corporate Social Responsibility and Financial Markets*, Ph.D. thesis, Nederland.

Di Bella, Gabriel, 2011, The impact of the global financial crisis on microfinance and policy implications, *IMF Working Paper* WP/11/175.

Duvendack, Maren, Richard Palmer-Jones, James Copestake, Lee Hooper, Yoon Loke, and Nitya Rao, 2011, What is the evidence of the impact of microfinance on the well-being of poor people?, Institute of Education, University of London.

Galema, Rients, Robert Lensink, and Laura Spierdijk, 2011, International diversification and microfinance, *Journal of International Money and Finance* 30, 507–515.

González, Adrian, 2011, Defining responsible financial performance: understanding efficiency, *MIX MicroBanking Bulletin* .

Green, William, 2012, *Econometric Analysis*, 7th edition (Prentice Hall, USA).

Hartarska, Valentina, and Denis Nadolnyak, 2007, Do regulated microfinance institutions achieve better sustainability and outreach? cross-country evidence, *Applied Economics* 39, 1207–1222.

Hermes, Nick, Robert Lensink, and Aljar Meesters, 2011, Outreach and efficiency of microfinance institutions, *World Development* 39, 938–948.

IFC, GPFI /, 2011, Strengthening access to finance for women-owned smes in developing countries, Washington D.C.

Islam, Nazrul, 2009, Can microfinance reduce economic insecurity and poverty? by how much and how?, *DESA Working Paper* No. 82.

Khandker, Shahidur, 2005, Microfinance and poverty, evidence using panel data from bangladesh, *The World Bank Economic Review* 19, 263–286.

Krauss, Nicolas, and Ingo Walter, 2008, Can microfinance reduce portfolio volatility?, *NYU Working Paper* .

Kyereboah-Coleman, Anthony, 2007, The impact of capital structure on the performance of microfinance institutions, *The Journal of Risk Finance* 8, 56–71.

Ledgerwood, Johanna, 1999, *Microfinance Handbook: An Institutional and Financial Perspective* (The World Bank, Washington D.C.).

Mersland, Roy, and Oystein Strom, 2010, Microfinance mission drift?, *World Development* 38, 28–36.

Meyer, Julia, 2013, *Investing in Microfinance: An Analysis of Financial and Social Returns*, Ph.D. thesis, University of Zurich.

MIX, 2007, Mix microbanking bulletin.

Morduch, Jonathan, 1999, The microfinance promise, *Journal of Economic Literature* XXXVII, 1569–1614.

Paxton, Julia, 2003, A poverty outreach index and its application to microfinance, *Economics Bulletin* 9, 1–10.

Petersen, Mitchell A., 2009, Estimating standard errors in finance panel data sets: Comparing approaches, *The Review of Financial Studies* 22, 435–480.

Quayes, Shakil, 2011, Depth of outreach and financial sustainability of microfinance institutions, *Applied Economics* 44, 3421–3433.

Roodman, David, 2012, *Due Diligence: An Impertinent Inquiry into Microfinance* (CGD Books, Washington).

Rosenberg, Richard, 2009, Measuring results of microfinance institutions - minimum indicators that donors and investors should track - a technical guide, Consultative Group to Assist the Poor/The World Bank, Washington D.C.

Stiglitz, Joseph, and Andrew Weiss, 1981, Credit rationing in markets with imperfect information, *American Economic Review* 71, 393–410.

Tchakoute-Tchuigoua, Hubert, 2010, Is there a difference in performance by the legal status of microfinance institutions?, *The Quarterly Review of Economics and Finance* 50.

Urgeghe, Ludovic, 2010, Les véhicules d' investissement en microfinance et le défi de la performance sociale, *Mondes en développement* 69–82.

Urgeghe, Ludovic, 2012, Microfinance investments: What are the impediments to the integration of social performance in investment decisions?, Working paper.

Wooldridge, Jeffrey, 2003, *Introductory Econometrics - A modern Approach*, second edition (Thomson South Western, USA).

Zacharias, Joshua, 2008, *An Investigation of Economies of Scale in Microfinance Institutions*, The Leonard N. Stern School of Business, Glucksman Institute for Research in Securities Markets.