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Performance of Micro-Finance Institutions In Muslim Countries

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Abstract

We analyze Microfinance Institutions performance based on three sets of measures: a) outreach measures, b) loan recovery and profitability measures and c) overall financial performance measures with respect to two sets of variables: i) country specific variables and ii) firm-level variables based on a cross-sectional dataset of total 2138 firm-years for 754 different Microfinance Institutions across a total of 83 countries; 33 OIC member Muslim countries and 50 non-members countries. Our results show that country GDP size is positively related with profitability in the OIC sample while otherwise not for the rest of the world. Percent of women borrower is significant for loan recovery and firm profitability in the OIC sample while otherwise different in the rest of the world sample. Later we introduce a new variable: “country religious inclination” as the difference between the country independence year and country OIC membership year, and show that it is positive and significant with outreach measures consistent with the fact that countries with higher number of years in delay in OIC membership may show lower inclination to popular Islamic beliefs and higher market penetration of conventional Microfinance outreach. Positive relationships of country religious inclination variable and loan loss ratio and loan provision are also consistent with the moral hazard hypothesis that less religious community may be more prone to default.

1. Introduction

Microfinance and Islamic Finance are two successful financial innovations that have evolved over the last three decades. As microfinance focuses on poverty alleviation by providing easier credit access to the marginal poor people, much of the existing literature on Microfinance focuses on its impact on poverty alleviation both at single country level and multi-country level.

Comparing to the welfare objective of Microfinance, the economic conscience of Islamic Finance is not much different. Islam, as a religion and a way of living, is based on a set of religious beliefs and economic norms that also focuses on the overall welfare of humanity, especially for the neglected poorer cross-section of the society. In conjecture to this religious vision and welfare objective, Islamic Microfinance has emerged as a new financial innovation as a substitute for conventional Microfinance. Scholars in Islamic finance often argue that religious belief in Islamic countries against the conventional microfinance is one reason why a Sharia’h compliant Microfinance is needed and why it is flourishing. With reference to this argument, we analyze an issue in Microfinance that is not much discussed in either of the conventional or Islamic microfinance literature.

We analyze whether the firm characteristics and the country features in microfinance performances are different in OIC (Organization of Islamic Conference) member Muslim countries and rest of the world countries and whether “religious beliefs” or “faith factors” matter in MFIs performance by introducing a new variable: “country religious inclination” that may capture religious orientation of a Muslim country. Our dataset consists 1017 firm years of 311 unique microfinance institutions of 33 OIC member countries and 1121 firm years of 443 unique microfinance institutions of 50 non-OIC countries.

We analyze the MFIs performance for three samples: a) OIC only, b) non-OIC and c) the combined overall sample in terms of three sets of performance measurements: i) outreach measures (number of depositors, number of deposit accounts and number of active borrowers), ii) loan recovery and profitability measures (loan loss ratio, loan provision and profit margin) and iii) overall financial performance measures (return on asset, return of equity, real yield on gross portfolio and operational self sufficiency) with respect to two sets of explanatory variables: a) country specific (country GDP size and GDP growth) variables, and b) firm specific variables (MFIs diamond rating, regulation criteria, maturity, asset size, number of offices and percentage of women borrower)

Our results show that firm-specific factors for MFIs are somewhat different between the OIC and non-OIC dataset. Besides, the relationship between country-specific and firm-specific explanatory variables and MFIs performance measures are different between the two samples. Later when we introduce the two new variables, country religious inclination and country age, the results show both the variables as significant is explaining several MFI performance measures.

A brief literature review follows this introductory section. The remainder of this paper is organized as follows: Section two of this paper discusses the Data and Methodology and descriptive statistics of explanatory and dependent variables. Section three presents the empirical evidence and in section four, we summarize the findings.

1.1 Literature Review

Existing literature provides evidence from a number of empirical studies (see: Mersland and Strøm(2009), Christen (2000), and others)¹ analyzing plausible relationship among firm-specific and country-specific factors and performance of microfinance institutions.

Brau and Woller (2004) survey paper on Microfinance analyzes empirical evidence on (a) contribution of MFIs in women empowerment and (b) mixed impact of women participation on MFI

¹ Roy Mersland , R. Øystein Strøm, (2009) Performance and governance in microfinance institutions, Journal of Banking & Finance 33 (2009) 662–669.

profitability. They discuss that although some studies, like; Amin et al. (1998) report positive impact of MFI on women empowerment, Ehlers and Main (1998) find otherwise contradictory evidence. Evidence on gender participation and borrower creditworthiness and poverty alleviation is also mixed. While Pitt and Khandker (1998) show women are better borrowers and their economic growth is higher than otherwise male borrowers with Bangladesh data, Kevane and Wydick (2001) study on MFIs in Guatemala presents contradictory evidence.

Hermes et al. (2008) uses a Stochastic Frontier Analysis (SFA) to analyze the trade-off between MFI's outreach and performance. They find out a negative relationship between the two with a cross-sectional data of 1300 observations. Later, Mersland and Strøm (2009) analyze board governance characteristics and their plausible impact on; (a) financial performance specified as: ROA (Return on Asset), OSS (Operating Self Sufficiency), PY (Portfolio Yield) and OC (Operational Cost); and (b) outreach performance specified as: average loan size and the number of credit clients; of the Microfinance institutions.

More recently, Ahlin et al. (2009) analyzes the macro-economic factors and country-level characteristics under which MFIs flourish. They conclude that MFIs are more likely to better perform when growth is stronger and the macroeconomic environment is more favorable; i.e. inflation and interest rates are relative low.

Tucker and Miles (--)² presents comparative analysis of MFIs and their peer commercial bank counterparts in four geographic areas: Asia, Africa, Latin America and Europe using a set of financial ratios; a) Return on Asset (ROA), b) Return on Equity (ROE), c) Net Profit Margin, d) Debt-to-Equity Ratio. They conclude that in general MFIs underperform their commercial counterparts and also find that an encouraging number of 57 self-sufficient MFIs are profitable.

2. Data and Research Methodology

2.1 Data

We collect Microfinance data from the MixMarket dataset³ that provides self-reported information of the participating Microfinance Institutions (MFIs) across the world. For the OIC member countries dataset, we collect OIC membership dates for its entire fifty-seven member countries from the OIC official website⁴ and then match respective countries year of independence data from other publicly available sources; like: www.google.com. Next, we collect the GDP and GDP growth

2 Michael Tucker and Gerard Miles, (undated) Financial Performance of Microfinance Institutions: A Comparison to Performance of Regional Commercial Banks by Geographic Regions, Journal of Microfinance, Vol. 6 Number 1

³ MIX market dataset website : <http://www.mixmarket.org/>

⁴ Please see OIC website : <http://www.oic-oci.org/home.asp>

data for the countries from United States Department of Agriculture (USDA) Economic Research Services Database⁵. After that; we match up the country list based on OIC membership and their year of independence and availability of the Mix market Micro-finance dataset and USDA dataset on GDP and GDP growth.

The final dataset of OIC-member Muslim countries includes annual firm specific information on 311 MFIs of 33 member countries for the period of 2003 to 2009 for a total 1017 firm years. Countries included are; Afghanistan, Albania, Azerbaijan, Bangladesh, Benin, Bosnia and Herzegovina, Burkina Faso, Chad, Cote d'Ivoire (Ivory Coast), Egypt, Gambia, Guinea, Indonesia, Iraq, Jordan, Kazakhstan, Lebanon, Mali, Morocco, Mozambique, Niger, Nigeria, Pakistan, Senegal, Sierra Leone, Sudan, Syria, Tajikistan, Togo, Tunisia, Turkey, Uzbekistan, Yemen.

For the non-OIC country dataset, we match country GDP and GDP growth data availability on USDA dataset and microfinance data on MixMarket dataset and then drop out the missing values. Our final non-OIC country dataset includes 443 unique MFIs from 50 countries for a total of 1121 firm years. Our final overall sample consists of 2138 number of firm years for 754 unique MFIs for 83 countries. (See Appendix A for detailed composition of data by countries)

2.2 Methodology

Existing literature on Microfinance shows that both firm specific characteristics and country level characteristics may affect the performance of MFIs. Because a majority of the MFIs are not exchange traded, we analyze MFIs performances based on different sets of financial ratios. We use three broad categories of measures: a) Outreach measures, b) Loan Recovery and Profitability measures, and c) Overall Profitability measures.

We include the analysis of number of active borrower as an outreach measurement as referred in Hermes et al. (2008) study and also add two more measurements; a) number of depositors and b) number of deposit accounts. For loan recovery and profitability measures, we use (i) Loan Loss Ratio (Loan Loss to Total Loans), (ii) Loan Provision and (iii) Profit Margin. We analyze overall financial performance of Microfinance in terms of measures as: return on assets (ROA) and operational self-sufficiency (OSS), as in Mersland and Strøm(2009) study and include two additional measures: a) Return on Equity (ROE) and b) Real Yield on Gross Portfolio (RYLD).

In explaining MFIs performance with these ten financial ratios, we use two sets of explanatory variables; a) country specific variables and b) firm specific variables. Ahlin et al (2009) shows that

⁵ Please see USDA ERS Database: Refer to: <http://www.ers.usda.gov/Data/Macroeconomics/>

growth in country GDP may play a role in MFIs performance. In addition to growth in GDP, we also include country GDP size as a country specific variable. For the set of firm specific variables, we include a) diamond (rating provided by rating agency), b) firm regulation variable (Regulated as a dummy of one if regulated, zero otherwise), c) number of age (a discrete variable that takes the value of one if the firm is new, two if the firm is young and three if the firm is mature), d) log of assets size, e) number of offices and f) percentage of women borrowers.

2.2.1 Religious Inclination, Country Age and the Control Variables

Similar to the MFIs in the non-OIC countries, MFIs in the Muslim countries may be influenced by the similar (i) country specific factors: a) GDP and b) growth in GDP; and (ii) firm specific factors: a) diamond rating, b) MFIs regulations, c) MFIs age, d) number of offices and e) percentage of women borrowers. In addition to these common factors, performance of MFIs in OIC-member Muslim may also be affected because of the “faith factors”. We introduce a new variable, “country religious inclination”, as a proxy of how religious inclination being a Muslim country may affect the MFI performances that is constructed as a discrete variable calculated as the difference between the year of independence of a country and its membership year.

By construction, a lower (higher) value of the country religious inclination variable means that the country is more (less) religiously inclined as it has become OIC member in a shorter (larger) number of years after its independence. The variable is non-negative and zero-bound at its lower value in case a country being one of the founding members of OIC.

Besides “country religious inclination”, we also introduce another discrete variable called “country age” that is the number of years of independence for the Muslim Countries. While “country religious inclination” may capture the effect of how religious inclination of a country and its political forces are as a whole, “country age” may be inferred as how strong the country is institutionally.

Existing literature on Microfinance argues that country GDP size (see: Ahlin et al. (2009)) and MFIs asset size (see: Hermes et al. (2008)) may affect the MFIs performance. In our analysis, we include these two variables in the set of explanatory variables as control variables to make sure that our findings are robust of country-size effect and MFIs-size effect.

2.2.2 Econometric Techniques

We use simple OLS (Ordinary Least Squared) regressions to analyze the MFIs performances in three set of measures: a) outreach measures, b) loan recovery and profitability measures and c) overall financial performances by using two sets of explanatory variables: i) country specific variables and ii)

firm specific variables. Because we intend to analyze whether MFIs and factors affecting their performances in the OIC-member countries are different from the non-OIC and the overall sample (inclusive all countries), we conduct regression analysis on each of the three datasets: a) OIC-only countries dataset, b) Non-OIC-only countries dataset and c) the combined overall dataset with the common explanatory variables.

Later, for the OIC member country dataset, we include two new variables: country religious inclination and country age. In all the regressions, we use country GDP-size and MFIs asset-size as control variables for country-size and MFIs-size respectively. Following this methodology section, we discuss the descriptive statistics for the three samples and then report the OLS regression results in following section three: the Empirical Results.

2.3 Descriptive Statistics

We use MFIs of annual data from 2003 to 2009 period to create a cross-sectional dataset after we match country level data (GDP and growth of GDP) and firm level data. Table 01 presents the final composition of the dataset used in the analysis. Panel A of Table 01 shows that the OIC-dataset comprises 1017 number of firm years for 311 unique firms of 33 OIC-member countries and the non-OIC dataset includes 1121 firm years from 443 firms of 50 countries. The overall dataset includes 2138 firm years of 754 different MFIs of 83 countries for the 2003 to 2009 time period.

Table 01: Composition of Samples

Panel A: By Number of Firms, Countries and Firm Years

	No. of Countries	No. of Firms	No. of Firm Years
Sample 01: OIC	33	311	1017
Sample 02: Non OIC	50	443	1121
Total Sample: All	83	754	2138

Panel B: By Firm Maturity

	New (in Percent)	Young (in Percent)	Old (in Percent)	All (in Percent)
Sample 01: OIC	14.98	24.73	60.29	100
Sample 02: Non OIC	5.08	17.76	77.16	100
Total Sample: All	21.07	9.79	69.14	100

Panel B of Table 01 presents the composition of the samples in terms of MFIs maturity. For

OIC sample, new, young and mature MFIs account for 14.98, 24.73 and 60.29 percent respectively and for the non-OIC sample the proportion of the same are 5.08, 17.76 and 77.16 percent. Later in Panel A of Table 01, we report the mean and standard deviation of the dummy variables created for new, young and mature MFIs which shows that the mean of the maturity dummies in each case are statistically different for OIC and non-OIC samples.

Panel A of Table 01 shows that among the explanatory variables, difference of means for country GDP growth and percent of women borrower in MFIs between OIC and non-OIC sample are statistically significant at 1% and 5% level respectively. Panel B of Table 01 shows that among the dependent variables, only Return on Asset (ROA) is significantly different between the two samples while other variables are otherwise not significant.

Table 02: Descriptive Statistics of Explanatory Variables and Dependent Variables

OSS is Operational Self Sufficiency; RYLD is Real Yield on Gross Portfolio

Panel A: Descriptive Statistics of Explanatory Variables

	OIC Only			Non OIC			Welch' s t-stat.	All: Both OIC & Non OIC		
	Mean	Std. Dev.	N	Mean	Std. Dev.	N		Mean	Std. Dev.	N
Ln_GDP	69.21	98.02	101	174.44	342.41	112	-17.40	124.39	262.26	213
GDP_Growth	6.69	5.06	7	4.79	4.02	1	8.90	5.69	4.64	8
Religious_Inclination	3.67	7.05	101			112	**			213
Country Age	49.99	21.25	7			1	*			8
Diamond	4.03	0.81	5	4.11	0.69	0	-0.65	4.07	0.75	5
Regulated	0.62	0.48	7	0.66	0.48	1	-1.30	0.64	0.48	8
Number_Age	2.35	0.85	7	2.72	0.55	1	-4.29	2.55	0.73	8
NEWDUMMY	0.1495	0.3567	7	0.0508	0.2198	1	8.7358	0.2105	0.4077	8
YOUNGDUMMY	0.2468	0.4314	7	0.1775	0.3823	1	4.7688	0.0978	0.2971	8
MATUREDUMMY	0.6028	0.4896	7	0.771632	0.419968	1	-6.0986	0.6913	0.4621	8
Ln_Asset	33484858.0	103000000.0	101	64676218.0	227000000.0	112		49839168.0	180000000.0	213
Offices	82.60	336.26	1	31.62	66.44	1	4.80	55.79	237.82	2
Percent of Women	0.60	0.29	936	0.65	0.24	1	-2.38	0.63	0.27	7

Panel B: Descriptive Statics of Dependent Variables

	OIC Only			Non OIC			Welch'	All: Both OIC & Non OIC		
	Mean	Std. Dev.	N	Mean	Std. Dev.	N		Mean	Std. Dev.	N

	Mean	Std. Dev.	N	Mean	Std. Dev.	N	s t-stat.	Mean	Std. Dev.	N
No. of Deposits	155080.80	874289.70	967	59075.61	229279.20	112	3.41	93196.53	508693.30	213
No. of Deposit Accounts	155356.60	873121.00	942	88357.03	292474.50	112	2.35	118950.10	628866.80	206
No. of Active Borrower	130806.70	695435.10	101	82375.58	277208.80	112	2.21	116047.00	629571.50	208
Loan_Loss_Rate	0.02	0.04	7	0.01	0.03	101	0.70	0.02	0.04	8
Loan_Provision	0.02	0.03	6	0.02	0.02	101	-0.44	0.02	0.03	7
Profit_Margin	0.07	1.70	7	0.13	0.43	101	-1.02	0.10	1.21	7
ROA	0.08	0.10	7	0.05	0.07	112	9.11	0.06	0.08	213
ROE	0.22	4.01	7	0.11	1.51	112	0.84	0.16	2.97	8
RYLD	0.23	0.14	7	0.24	0.17	112	-1.64	0.24	0.16	213
OSS	1.18	0.47	7	1.15	0.27	112	0.71	1.16	0.38	213

Welch's t-statistics is a test of differences in sample means

3. Empirical Results

In this section, we report the empirical results and discuss how country-level variables and firm-specific variables may affect Microfinance Institutions performance in terms of three sets of performance measures: a) Out Reach Measures, b) Loan Recovery and Profitability Measures and finally c) Overall Financial Performance Measures.

3.1 Out-reach Measures of MFI's

In Table 03, we report the regression results for three outreach measures: a) number of depositors, b) number of deposit accounts and c) number of active borrowers in Panel A, Panel B and Panel C respectively. We summarize the results in terms of impacts of the country-specific and firm-level variables on the selected outreach measures in the following.

Among the country-specific variables, country GDP size is statistically significant and negative for OIC sample for two outreach measures: number of depositors and number of deposit accounts. However for overall and non-OIC sample, its coefficients are not significant and positive. Country GDP growth is statistically not significant in all three samples for all three outreach measures. However, its signs are always positive for the OIC sample and not consistent for other two samples. Combining the two country specific variables, we note that MFIs outreach flourishes in smaller economies in the OIC countries and is positively related with growth, although later not statistically significant.

Between the two unique variables for OIC-sample, Country age variable is not statistically significant for any of the outreach variables but country religious inclination is statistically significant in two occasions, for: a) number of depositors and b) number of deposit accounts. The positive sign of country religious inclination means that outreach is higher in countries less religiously inclined. That is for example: for one year of delay in OIC membership of Muslim country, number of depositors may increase by 2,693 persons.

Among the firm specific variables; the diamond rating is significant for overall sample and non-OIC sample only for number of account borrowers. Otherwise, diamond rating is not significant for other outreach measures in the three samples. MFI regulation variable is significant for the overall sample in all three outreach measures and otherwise not significant for non-OIC sample. For OIC-sample, regulation is significant for number of depositors and number of deposit accounts but for number of active borrowers otherwise not.

The overall effect of firm maturity is statistically insignificant and negative in all the outreach measures for all three samples. The negative sign depicts the relationship that with higher maturity, outreach declines and for younger firms outreach is higher.

In general, size of Microfinance Institutions has statistically significant affect on all the outreach measures in the three samples with one major difference. Although the signs of its coefficient are positive for both overall sample and non-OIC samples, for OIC sample they are

negative. So there is a structural difference between the two samples regarding the relationship of firm size and outreach measures that may be contributed by the difference of maturity compositions of the samples.

Coefficient of number of Offices is statistically significant in all the samples in all outreach measures and, however, is much higher in magnitude in OIC sample. For example: in general, with an additional branch office being opened the number of depositors will increase by 2506 in the OIC sample where the same will increase by 1549 in non-OIC sample.

Impact of Percent of women borrower is rather mixed. Out of three outreach measures, only for number of account borrowers, we find percent of women borrower as statistically significant in only OIC-member countries.

Table 03: Out Reach Measures of MFI's

Table 03 presents four sets of regression results for three Out Reach Measures a) Number of Depositors, b) Number of Accounts and c) Number of Active Borrowers in Panel A, Panel B and Panel C respectively. In each panel, the first column of regression results corresponds to the Overall Sample, and then the second and third columns for Non-OIC and OIC sub-samples (denoted as (a)). The last column represents regression results for OIC sub-sample where two additional explanatory variables (i) religious inclination and (ii) country age are added.

Panel A: No of Depositors								
	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	123948.4000	**	655862.9000	***	331955.1000	***	318134.3000	***
LN_GDP	-1977.8140		3187.8050		-11637.2900	**	-8495.0810	
GROWTH	-1700.7370		-827.6662		827.1522		1268.0470	
RELIG_INCLINATION							2693.7920	**
COUNTRYAGE							45.7141	
DIAMONDS	-8825.2410		209.7573		-15154.0800		-14391.3600	
REGULATED	37705.1700	***	-2104.4670		44159.4200	**	40039.0300	**
NUMBERAGE	-20.4394		-5291.8050		-8478.9500		-10716.0700	
LN_ASSET	8211.6070	**	42402.6300	***	-20434.1600	***	-20782.8700	***
OFFICES	2399.8610	***	1548.9740	***	2505.8030	***	2506.1690	***
PCT_OF_WOMEN	3268.4090		10761.5700		20784.8400		19738.8600	
R-squared	0.8511		0.2966		0.9277		0.9280	
F-statistic	1426.2740		58.5595		1405.7580		1128.4630	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	

*** refers to statistically significant at 1%

** refers to statistically significant at 5%

* refers to statistically significant at 10%

Table 03: Out Reach Measures of MFI's (continued..)

Panel B: No of Deposit Accounts

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	181952.3000	***	706060.6000	***	292218.9000	***	282635.1000	***
LN_GDP	-2245.6130		2497.4080		-11788.7100	*	-8451.9510	
GROWTH	-1776.5740		-1234.8060		837.4477		1213.3450	
RELIG_INCLINATION	--		--		--		2705.2190	*
COUNTRYAGE	--		--		--		-61.0792	
DIAMONDS	-7229.1360		1486.8960		-13785.2600		-13524.7200	
REGULATED	35200.2900	***	971.4576		36707.1500	*	31856.7500	
NUMBERAGE	466.0084		-7259.1500		-7193.4640		-9436.9700	
LN_ASSET	11876.4500	***	45780.2100	***	-17738.2000	***	-17836.1100	***
OFFICES	2433.8080	***	1595.2350	***	2543.6730	***	2542.7780	***
PCT_OF_WOMEN	1415.1860		14400.3400		13803.1700		12105.7700	
R-squared	0.8327		0.2940		0.9171		0.9174	
F-statistic	1226.2200		57.8321		1176.0870		943.2082	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	

Panel C: No of Account Borrowers

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	-67992.1300	***	220579.1000	***	124698.0000	*	116401.4000	*
LN_GDP	522.3042		-960.9227		1320.8130		571.6782	
GROWTH	927.5004		2673.0220		1033.9740		1155.6540	
RELIG_INCLINATION	--		--		--		91.8194	
COUNTRYAGE	--		--		--		214.8910	
DIAMONDS	-10852.5600	*	-21067.9500	**	-1520.1400		-531.6585	
REGULATED	17304.7400	*	-1676.5560		20698.0400		22270.8800	
NUMBERAGE	-2643.9480		-820.7022		-11356.4300		-11267.1500	
LN_ASSET	4590.5970		19153.5900	**	-11292.0700	***	-11754.8000	***
OFFICES	1972.8450	***	1727.1520	**	2020.9750	***	2023.5120	***
PCT_OF_WOMEN	17454.8700		-8775.4060		39838.3500	*	41006.5800	*
R-squared	0.8624		0.3297		0.9310		0.9310	
F-statistic	1598.8610		68.3118		1550.4810		1238.3630	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	

*** refers to statistically significant at 1%

** refers to statistically significant at 5%

* refers to statistically significant at 10%

3.2 Loan Recovery and Profitability of MFI's

In general country GDP size and GDP growth are not statistically and economically significant for Loan Loss Rate and Loan Provision for any of the three samples. However, for OIC sample, we note that both country GDP size and GDP growth are statistically significant with the previous one being positive and the latter being negative.

For the country religious inclination and country age variables, we find that coefficients are statistically significant for all the three measures: a) Loan Loss Ratio, b) Loan Provision and c) Profit Margin. While the coefficients are positive for the prior two variables, they are negative for the latter one as loan provisions are set aside from the operating earnings. Positive coefficients for religious inclination for loan loss rate and loan provision mean that MFIs in countries with less religious inclination may have to set higher amount of provisions. One interpretation may be that less religiously inclined population may suffer from higher moral hazard which is consistent with the Islamic faith that “debt is bad”. If a country is more religiously inclined, the population may be less prone to debt default and that may result in lower loan loss and loan loss provisions.

Among the firm-specific variables, impact of diamond MFI rating is mixed for both the overall and non-OIC sample but otherwise consistently statistically insignificant for the OIC sample for loan loss, loan provision and net profit margin. In general, MFI regulation is statistically significant for all the three samples and the three measures of loan recovery and profitability.

MFI maturity is not significant for any samples for loan loss ration but otherwise significant and negative for loan provision for non-OIC sample only. For Profit margin, the impact of MFIs maturity is otherwise reverse of the impact on loan provision. MFIs maturity is statistically significant and negative for both OIC and overall sample but otherwise not similar for the non-OIC sample.

MFIs size is not significant for either of the loan loss rate or loan provision for any sample. But MFIs size is statistically significant and positive for net profit margin for all three samples which means that higher the MFIs size, higher the profitability all others being the same. Number office is not significant for any sample for any measures of loan recovery and profitability measures.

Percentage of women borrower is not significant for any measures for the non-OIC sample. However, for the OIC and overall sample, its coefficients are statistically significant and negative for loan loss and loan provisions and positive for net profit margin.

Table 04: Loss Recovery and Profitability of MFI's

Table 04 presents four sets of regression results for three measurements of Loan Recovery and Profitability of MFI's; a) Loan Impairment to Asset, b) Loan Loss Rate and c) Profit Margin in Panel A, Panel B and Panel C respectively. In each panel, the first column of regression results corresponds to the Overall Sample, and then the second and third columns for Non-OIC and OIC sub-samples (denoted as (a)). The last column represents regression results for OIC sub-sample where two additional explanatory variables (i) religious inclination and (ii) country age are added

Panel A: Loan Impairment to Asset

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	0.0299	***	0.0226		0.0304	**	0.0204	
	-							
LN_GDP	0.0006		-0.0005		-0.0011		-0.0016	
	-							
GROWTH	0.0002		-0.0005	*	0.0000		0.0001	
RELIG_INCLINATION	--		--		--		0.0004	*
COUNTRYAGE	--		--		--		0.0002	***
	-							
DIAMONDS	0.0019		0.0013		-0.0044	**	-0.0033	*
	-							
REGULATED	0.0067	***	-0.0047	*	-0.0089	***	-0.0077	**
NUMBERAGE	0.0007		-0.0021		0.0026		0.0024	
LN_ASSET	0.0002		-0.0002		0.0011		0.0006	
OFFICES	0.0000		0.0000		0.0000		0.0000	
	-							
PCT_OF_WOMEN	0.0065	*	0.0052		-0.0165	***	-0.0154	***
R-squared	0.0095		0.0131		0.0261		0.0427	
F-statistic	2.4400		1.8427		3.0815		4.0940	
Prob(F-statistic)	0.0126		0.0656		0.0020		0.0000	
N	2138		1121		1017		1017	

*** refers to statistically significant at 1%

** refers to statistically significant at 5%

* refers to statistically significant at 10%

Table 04: Loss Recovery and Profitability of MFI's (Continued..)

Panel B: Loan Loss Rate

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	0.0310	***	0.0222	**	0.0380	***	0.0319	***
	-							
LN_GDP	0.0001		0.0001		-0.0009		-0.0011	
	-							
GROWTH	0.0002		-0.0004	**	0.0000		0.0001	
RELIG_INCLINATION	--		--		--		0.0003	*
COUNTRYAGE	--		--		--		0.0001	***
	-							
DIAMONDS	0.0017	**	0.0008		-0.0038	***	-0.0031	**
	-							
REGULATED	0.0042	***	-0.0038	**	-0.0051	**	-0.0045	**
	-							
NUMBERAGE	0.0010		-0.0039	***	0.0005		0.0003	
LN_ASSET	0.0003		0.0004		0.0004		0.0001	
OFFICES	0.0000		0.0000		0.0000		0.0000	
	-							
PCT_OF_WOMEN	0.0043	*	0.0022		-0.0098	***	-0.0092	***
R-squared	0.0107		0.0201		0.0228		0.0366	
F-statistic	2.7534		2.8409		2.6866		3.4845	
Prob(F-statistic)	0.0050		0.0040		0.0064		0.0002	
N	2138		1121		1017		1017	

Panel C: Profit Margin								
	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	-							
LN_GDP	1.1525	***	-0.2244		-2.2521	***	-1.9720	***
	0.0319	*	0.0003		0.1015	**	0.1043	**
GROWTH	-							
RELIG_INCLINATION	0.0058		0.0060	*	-0.0146		-0.0200	*
COUNTRYAGE	--		--		--		-0.0166	*
	--		--		--		-0.0056	*
DIAMONDS	0.0550		-0.0223		0.1013		0.0720	
REGULATED	0.1389	**	0.0256		0.3614	***	0.3430	**
NUMBERAGE	-							
LN_ASSET	0.0824	**	0.0032		-0.1653	**	-0.1559	**
OFFICES	0.0591	***	0.0259	***	0.1021	***	0.1156	***
PCT_OF_WOMEN	0.0000		-0.0001		-0.0001		-0.0002	
	0.2026	*	-0.0467		0.4312	**	0.4067	*
R-squared	0.0153		0.0178		0.0290		0.0376	
F-statistic	3.9539		2.5185		3.4329		3.5835	
Prob(F-statistic)	0.0001		0.0103		0.0007		0.0001	
N	2138		1121		1017		1017	

3.3 Overall Financial Performance of MFI's

Among the country-specific factors, impact of country GDP size on overall financial performances is mixed. Country GDP size is negative and statistically significant for ROA for OIC and overall sample but not significant for non-OIC sample. For ROE, the effect of country GDP size is just reverse that may be due to the difference in debt-equity composition of the samples. For Real Yield on Gross Portfolio and OSS (operational self sufficiency), in general, the coefficients of country GDP size are statistically significant and positive for all the samples. The impact of GDP growth is similar to the effects of GDP size with otherwise a reverse sign. While GDP growth has positive effect on ROA, ROE and OSS, it has a negative effect on Real Yield on Gross Portfolio.

Country religious inclination is positive and significant for only Real Yield on gross portfolio but otherwise insignificant for ROA, ROE and Operational Self Sufficiency. Country age is significant in all cases and positive for ROA and ROE but otherwise negative for Real Yield and Operational Self Sufficiency.

Among the firm-specific variables, MFIs diamond rating pretty closely captures OSS for the overall and the OIC sample but otherwise not significant and negative for non-OIC sample.

Impact of an MFI being regulated or not is mixed. While its coefficients are significant for ROA in all samples, they are otherwise not significant for ROE that may be contributed by the heterogeneity among the sample regarding Debt-to-Equity ratios of the MFIs. For Real Yield, they are significant for only OIC sample and for the OSS, coefficients are not significant in any sample.

In general, MFIs maturity is not significant for ROA and ROE but otherwise statistically significant and negative for Real Yield and Operational Self Sufficiency. The impact of MFIs size is

statistically significant for ROA and Real Yield and otherwise not significant for ROE and OSS. Number of office is positively related and statistically significant for overall and OIC sample but otherwise not significant and negative for non-OIC sample. For ROA, ROE and Real Yield, the impact of number of office is not significant. Coefficients of Percent of women borrower are significant and positive for ROE and Real Yield in all samples other than non-OIC sample. However, its impact on ROA and OSS is not significant.

Table 05: Overall Financial Performance of MFIs

Table 05 presents four sets of regression results for three measurements of Overall Financial Performance of MFI's; a) Return on Assets (ROA), b) Return on Equity (ROE), c) Real Yield on Gross Loan Portfolio and d) Operational Self Sufficiency in Panel A, Panel B, Panel C and Panel D respectively. In each panel, the first column of regression results corresponds to the Overall Sample, and then the second and third columns for Non-OIC and OIC sub-samples (denoted as (a)). The last column represents regression results for OIC sub-sample where two additional explanatory variables (i) religious inclination and (ii) country age are added.

Panel A: Return on Asset (ROA)								
	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	0.2671	***	0.1405	***	0.3498	***	0.3267	***
LN_GDP	-0.0027	**	-0.0011		-0.0041	*	-0.0067	***
GROWTH	0.0022	***	0.0006		0.0028	***	0.0031	***
RELIG_INCLINATION	--		--		--		-0.0001	
COUNTRYAGE	--		--		--		0.0006	***
DIAMONDS	-0.0054	**	-0.0020		-0.0067	*	-0.0039	
REGULATED	-0.0186	***	-0.0139	***	-0.0273	***	-0.0220	***
NUMBERAGE	-0.0031		0.0031		-0.0001		0.0004	
LN_ASSET	-0.0109	***	-0.0066	***	-0.0149	***	-0.0163	***
OFFICES	0.0000	*	0.0000		0.0000		0.0000	**
PCT_OF_WOMEN	0.0082		0.0355	***	-0.0021		0.0015	
R-squared	0.1163		0.0909		0.1279		0.1438	
F-statistic	33.5744		13.8898		16.8599		15.4129	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	
Panel B: Return on Equity(ROE)								
	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	-0.9639		-1.2909	**	-0.7283		-1.2510	
LN_GDP	0.0268		0.0543	**	0.0029		-0.0726	
GROWTH	0.0512	***	0.0161		0.0767	***	0.0828	***
RELIG_INCLINATION	--		--		--		-0.0113	
COUNTRYAGE	--		--		--		0.0156	**
DIAMONDS	-0.0831		0.0812		-0.2264		-0.1590	
REGULATED	0.0921		0.1559		0.1238		0.2668	
NUMBERAGE	0.0461		0.2279	***	-0.0061		0.0152	
LN_ASSET	0.0293		-0.0028		0.0320		0.0003	
OFFICES	-0.0002		0.0001		-0.0002		-0.0001	

PCT_OF_WOMEN	0.7219	***	0.1765		1.3550	***	1.4474	***
R-squared	0.0089		0.0156		0.0152		0.0203	
F-statistic	2.3004		2.1962		1.7779		1.8988	
Prob(F-statistic)	0.0188		0.0255		0.0777		0.0419	
N	2138		1121		1017		1017	

*** refers to statistically significant at 1%

** refers to statistically significant at 5%

* refers to statistically significant at 10%

Table 05: Overall Financial Performance of MFIs (Continued ..)

Panel C: Real Yield on Gross Portfolio

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	0.3024	***	0.1658	**	0.4311	***	0.4542	***
LN_GDP	0.0106	***	0.0148	***	-0.0013		0.0065	*
GROWTH	-0.0020	***	-0.0047	***	0.0008		0.0008	
RELIG_INCLINATION	--		--		--		0.0032	***
COUNTRYAGE	--		--		--		-0.0010	***
DIAMONDS	0.0209	***	0.0103		0.0316	***	0.0278	***
REGULATED	-0.0084		-0.0125		-0.0207	**	-0.0339	***
NUMBERAGE	-0.0194	***	-0.0243	***	-0.0117	**	-0.0151	***
LN_ASSET	-0.0125	***	-0.0026		-0.0218	***	-0.0200	***
OFFICES	0.0000	*	-0.0001		0.0000		0.0000	
PCT_OF_WOMEN	0.1253	***	0.1877	***	0.0770	***	0.0700	***
R-squared	0.1091		0.1359		0.1360		0.1693	
F-statistic	31.2273		21.8433		18.1015		18.7111	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	

Panel D: Operational Self Sufficiency

	All		Non OIC		Only OIC (a)		Only OIC (b)	
C	0.6934	***	0.3967	***	0.8493	***	1.0739	***
LN_GDP	0.0087	*	0.0114	***	0.0113		0.0349	***
GROWTH	0.0074	***	0.0153	***	0.0015		-0.0016	
RELIG_INCLINATION	--		--		--		-0.0005	
COUNTRYAGE	--		--		--		-0.0061	***
DIAMONDS	0.0590	***	-0.0229	*	0.1315	***	0.1042	***
REGULATED	0.0227		-0.0158		0.0274		-0.0202	
NUMBERAGE	0.0490	***	0.0725	***	0.0475	**	0.0433	**
LN_ASSET	0.0017		0.0339	***	-0.0241	**	-0.0113	
OFFICES	0.0001	***	-0.0001		0.0002	***	0.0001	*
PCT_OF_WOMEN	-0.0303		-0.0042		-0.0327		-0.0665	
R-squared	0.0433		0.1134		0.0591		0.1203	
F-statistic	11.5464		17.7617		7.2257		12.5566	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000	
N	2138		1121		1017		1017	

*** refers to statistically significant at 1%

** refers to statistically significant at 5%

* refers to statistically significant at 10%

4. Conclusion

Among the country-specific factors, country GDP size has only significant impact on OIC sample for two outreach measures. However, it does not show any significant impact on loan loss ratio and loan loss provision but shows a positive and significant relation with net profit margin. The overall impact is negative impact on ROA and positive impact on Real Yield for the overall and OIC sample. Country GDP growth has no impact on outreach measures in any sample. It also has no significant impact on other samples with exception of negative impact on loan loss ratio and loan loss provision and positive impact on net profit margin for non-OIC sample.

Country religious inclination has positive effect on outreach measures. By construction, higher value of country religious inclination value means a country is otherwise less Islamic oriented because of its delayed membership with the OIC. The positive effect of the variable on outreach measures shows that in OIC member countries where the countries are late to become OIC members, the MFIs outreach flourishes. This is consistent with the argument that conventional Microfinance will face more resistance in a more religious country. Besides this, Country religious inclination variable has positive impact on loan loss ratio and loan provision which also implies that with higher variable value (lower religious orientation) the risk of default also increases. The overall impact is significant in Real Yield which means that, on average, MFIs are more likely to earn higher real yield on gross portfolio in countries with delayed OIC membership.

Although country age has no significant impact on any outreach measure for any sample, it has positive impact on loan loss ratio and loan provision and negative impact on net profit margin. This finding is consistent with the observation that countries with higher age may possess better institutional and regulatory framework that may ensure MFIs identify loan loss properly and account for the provision.

Among the firm-specific factors, MFIs diamond rating does not have much of significant effect on outreach measures. Moreover, although it affects loan loss ratio for OIC sample and loan loss provision for OIC and overall sample, it has no significant impact on net profit margin. The overall impact is no effect on ROE and significant negative effect for overall and non-OIC sample. However, for the Real Yield and OSS, its impact is in general positive and significant.

MFIs being regulated have statistical significant impact on number of depositors and number of deposit account for OIC sample and overall sample but not non-OIC sample. Although its impact is significant and negative for all the samples for loan loss ratio and loan provision; its effect is positive for OIC and overall sample, not the non-OIC sample. The overall impact is negative significant effect on ROA for all samples but no significant impact ROE and OSS for any sample. For Real Yield, it is negative and significant for only OIC sample.

We find no statistically significant evidence of impact of MFIs maturity on their in any of the outreach measures (number of depositors, number of deposit account and number of active borrowers). In general, MFIs maturity has no significant impact on loan loss ratio and loan loss provision for any sample with one exception for loan loss provision for non-OIC sample. For the net profit margin, maturity is negatively related for OIC and overall sample but no significant effect on non-OIC sample. The overall effect is mixed. While ROA and ROE shows no significant impact, Real Yield shows the negative relation between firm maturity and return. For operating self sufficiency, the effect positive because mature MFIs are more operationally efficient and resilient to macro-economic shocks consistent with the findings of ().

Impact of MFIs size on outreach measures is significant and positive for overall and non-OIC samples but otherwise negative for OIC sample. Although it has no effect on loan loss ratio and loan loss provision, its impact on Net Profit margin is positive and significant for all the samples. The overall impact of MFI size is mixed. While its impact on Return on Asset and Real Yield on gross portfolio is negative, it has no significant impact on Return on Equity.

Although number of office has statistically significant positive impact on all outreach measures (number of depositors, number of deposit accounts and number of active borrower) for all the three samples, it has no significant effect on any of the loan recovery and profitability ratios (loan loss ratio, loan provision and net profit margin). The overall impact is only statistically significant on ROA for OIC countries and on both ROA and ROE for the overall sample.

Percentage of women is not significant for number of depositors and number of deposit accounts for any sample but it is only significant for number of active borrowers for OIC sample. Besides, it has negative impact on loan loss ratio and loan loss provision and positive impact on net profit margin for the OIC sample and the overall sample. These two results are consistent with the hypothesis that percentage of women borrower is positively correlated with MFIs profitability and the basic assumption that women are inherently better borrowers. This is also reflected in the statistically significant effects of women participation on ROE and Real Yield on gross portfolios. However, for the non-OIC sample, we fail to find any supporting evidence.

We conclude that country-specific and firm-specific variables for are different for the OIC and non-OIC dataset and also their impact on the different measures of MFIs performance. The religious inclination variable may capture some unobservable features; like a country's commitment toward Muslim world and also the overall religious conscience of the country.

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Appendix A: Number of MFIs by Countries

Panel A: Sample composition of Number of Firms by OIC Countries

Country	Firm		Country	Firm		Country	Firm	
	Years	Percent		Years	Percent		Years	Percent
Afghanistan	55	5.41	Indonesia	101	9.93	Pakistan	94	9.24
Albania	28	2.75	Iraq	3	0.29	Senegal	31	3.05
						Sierra		
Azerbaijan	68	6.69	Jordan	36	3.54	Leone	5	0.49
Bangladesh	85	8.36	Kazakhstan	31	3.05	Sudan	4	0.39
Benin	34	3.34	Kyrgyzstan	49	4.82	Syria	5	0.49
Burkina Faso	12	1.18	Lebanon	16	1.57	Tajikistan	64	6.29
Chad	3	0.29	Mali	35	3.44	Togo	23	2.26
Cote d'Ivoire								
(Ivory Coast)	3	0.29	Morocco	53	5.21	Tunisia	7	0.69
Egypt	57	5.6	Mozambique	30	2.95	Turkey	2	0.2
Gambia, The	4	0.39	Niger	9	0.88	Uzbekistan	18	1.77
Guinea	11	1.08	Nigeria	19	1.87	Yemen	22	2.16
Total	1017	100						

Panel B: Sample composition of Number of Firms by Non- OIC Countries

Country	Firm	Percent	Country	Firm	Percent	Country	Firm	Percent
---------	------	---------	---------	------	---------	---------	------	---------

	Years			Years			Years	
Angola	2	0.18	El Salvador	11	0.98	Panama	4	0.36
Argentina	1	0.09	Ethiopia	58	5.17	Paraguay	21	1.87
Armenia	4	0.36	Georgia	1	0.09	Peru	88	7.85
Bolivia	47	4.19	Ghana	55	4.91	Philippines	131	11.69
Brazil	6	0.54	Guatemala	14	1.25	Russia	63	5.62
Bulgaria	7	0.62	Haiti	6	0.54	Rwanda	15	1.34
Cambodia	59	5.26	Honduras	35	3.12	Samoa	5	0.45
Cameroon	10	0.89	India	58	5.17	Serbia	4	0.36
Central African Republic	1	0.09	Kenya	28	2.5	Sri Lanka	17	1.52
Chile	12	1.07	Macedonia	12	1.07	Tanzania	14	1.25
China, People's Republic of	4	0.36	Madagascar	8	0.71	Thailand	1	0.09
Colombia	18	1.61	Malawi	8	0.71	Uganda	26	2.32
Congo, Democratic Republic of the	4	0.36	Mexico	50	4.46	Ukraine	1	0.09
Congo, Republic of the	2	0.18	Mongolia	4	0.36	Venezuela	7	0.62
Costa Rica	1	0.09	Namibia	2	0.18	Vietnam	24	2.14
Croatia	2	0.18	Nepal	45	4.01	Zambia	5	0.45
Ecuador	94	8.39	Nicaragua	26	2.32			
Total	1121	100						

* * *