Journal of International & Interdisciplinary Business Research

Volume 1 *Journal of International & Interdisciplinary Business Research* Article 7

1-1-2014

GLOBAL MICROFINANCING INSTITUTES: HIGH INTEREST RATE OR LOW LOAN-LOSS RATES?

Hoje Jo
Santa Clara University, hjo@scu.edu

Andrea Joyce
Santa Clara University, andrealynnjoyce@gmail.com

Kathryn Leahy
Santa Clara University, leahy.kathryn@gmail.com

Casey Pack
Santa Clara University, caseybpack@gmail.com

Gregory Taketa
Santa Clara University, greg@gregariousconsulting.com

See next page for additional authors

GLOBAL MICROFINANCING INSTITUTES: HIGH INTEREST RATE OR LOW LOAN-LOSS RATES?

Authors
Hoje Jo, Andrea Joyce, Kathryn Leahy, Casey Pack, Gregory Taketa, and Jeffrey Tucker

GLOBAL MICROFINANCING INSTITUTES: HIGH INTEREST RATE OR LOW LOAN-LOSS RATES?

Hoje Jo, Santa Clara University
Andrea Joyce, Santa Clara University
Kathryn Leahy, Santa Clara University
Casey Pack, Santa Clara University
Gregory Taketa, Santa Clara University
Jeffrey Tucker, Santa Clara University

The microfinancing sector has experienced a rise in both loan interest rates and borrower loan loss rates recently. By employing a sample of microfinance institutions (MFIs) from the MixMarket database during 2004-2012 around the world, we find that the lag of borrower loan loss is positively related to loan interest rates while the lag of loan interest rates is also positively related to borrower loan loss. The impact of loan loss rate on loan interest rates, however, seems to be more substantial than the influence of loan interest rates on the loan loss rate. Furthermore, we find that the higher interest rates charged by MFIs are followed by higher operating performance of MFIs, indicating the possibility that MFIs are charging relatively high interest rates mainly for their own profitability rather than helping low income people.

Keywords: Microfinancing, microfinancing institute, profitability, loan-loss rate

INTRODUCTION

Microfinance is the practice of providing financial services to low income or poor individuals who are not served by the traditional banking system. Microfinance includes microloans, microsavings and even microinsurance provided to borrowers through microfinance institutions (MFIs).[1] Prior to the spread of microfinance, the poor were ignored by banks or charged astronomical interest rates due to their assumed high-risk level and lack of collateral. The service most typically associated with microfinance is the lending of microloans to those who do not meet the criterion imposed by most traditional financial institutions.

While many believe that microfinance involves low interest lending, in practice microfinance has proved to be costly. The relative transaction costs for microloans are much higher than traditional loans, which poses a challenge for lenders. Although transaction costs are known to be high, many scholars have begun questioning the validity of increasingly high interest rates charged to borrowers. With high transaction costs and a growing desire for profits, interest rates in some countries have reached 100 percent or higher (MacFarquhar, 2010). Other studies also suggest that microlenders already charge too high interests (Fernando, 2006; Hudon, 2007; Argandona, 2010; Jo et al, 2009, 2011). Furthermore, rising rates may be encouraging loan sharking, which may make microfinance more damaging to the poor than beneficial. While the interest rates on microloans have been increasing, the historically low default rates have also been on the rise (Assefa, 2010). As microfinance becomes a greater part of the financial market and market competition grows, it is expected that default rates will increase even further. With the growth of microfinance, commercially oriented microlending will develop deeper links to the mainstream capital markets, leading to a growing rate of borrower default (Abrams, 2009).

[1] Modern microfinance is originally initiated by the success of Dr. Mohammad Yunus, who began assisting the working poor in the 1970's. In an effort to reduce poverty, he began distributing small loans to women in Bangladesh as a way to assist in their entrepreneurship efforts. Throughout his time in Bangladesh, he discovered that default rates amongst the working poor were much lower than default rates in developed countries. His work in the field ultimately earned him the Nobel Peace Prize in 2006 as well as the recognition of experts, social activist and investors (www.NobelPrize.org, 2013).

Our main research questions are two-folds. The first is the causality examination between default outcomes and interest rates of MFIs and the second is to examine the impact of interest rates and default outcomes on MFI performance measured by performance measure of return on assets (ROA). In this paper, we first examine the causal relation between MFI interest rate and default rate. We consider that this investigation makes a contribution to this ongoing and heated debate by providing empirical evidence from microfinance industries that have a set of unique characteristics that offer additional insights into the question and also mitigate some of the measurement problems of previous research. For this task, we examine the relationship between increasing interest rates and loan loss rates (used as a proxy for default rates) within the international microfinancing institute (MFI) sector during 2004-2012 period, with the ultimate goal of determining whether interest rates drive loan loss rates or if loan loss rates drive interest rates. With the World Bank estimating that over 2.5 billion people currently fall outside the reach of banking practices (www.WorldBank.org, 2013) the success of the poor is closely tied to the success of the world economy. As interest rates and loan loss rates continue to rise (Assefa, 2010), the benefits of microfinance are being questioned. Understanding the relationship between interest rates and loan loss rates is important in developing solutions that may drive interest rates and loan loss rates back to sustainable levels.

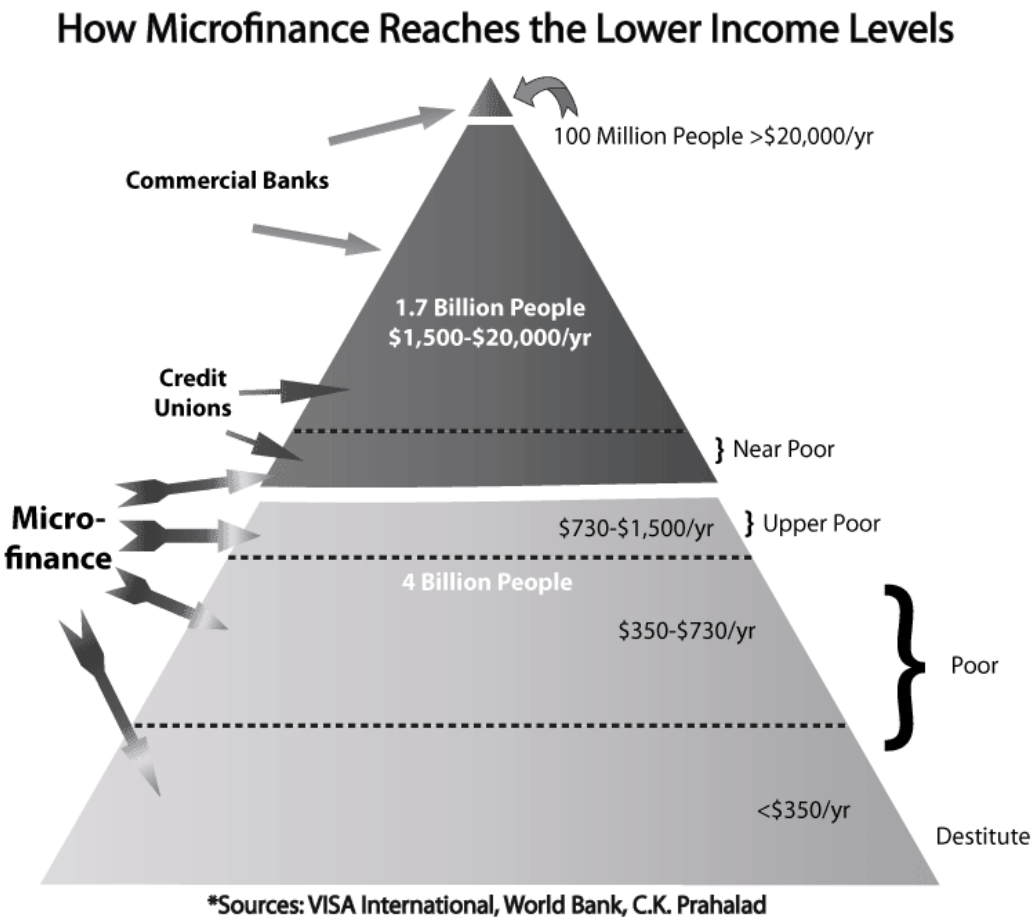
Using those empirical proxies, we examine the direction and causality of the relation to determine whether high interest rate causes high default rate or the other way around. Next, we investigate the MFI financial performance using return on assets (ROA) when different MFIs have observed different combination of interest rate and loan default rates. To the best of our knowledge, there is no previous microfinance research that examines the causal relation between the two or the MFI operating performance based on the specific combination of interest rate and loan-loss rate.

By employing a sample of 1,222 microfinance institutions (MFIs) from the MixMarket database during 2004-2012 around the world, our empirical results suggest that the lag of borrower loan loss is positively associated with loan interest rates while the lag of loan interest rates is also positively associated with borrower loan loss. The impact of loan loss rate on loan interest rates, however, seems to be more substantial than the influence of loan interest rates on the loan loss rate. In addition, we find that the higher interest rates charged by MFIs are followed by higher operating performance of MFIs, indicating the possibility that MFIs are charging relatively high interest rates mainly for their own profitability rather than helping less-than-successful income people.

HYPOTHESES

While traditional banks mainly lend large amounts of money, microloans usually consist of small denominations ranging from a couple hundred dollars to a couple thousand dollars. The population size that microloans can reach versus traditional banks can be seen in Figure 1. Microloans allow borrowers to meet their basic needs and prepare for risks, which microfinance non-profit Kiva suggests enables these individuals to improve their welfare at a greater rate than their peers not involved in microfinance (Kiva.org, 2013). This is reflected in the ultimate goal of microfinance of helping low income individuals raise themselves out of poverty. In many ways it is a form of charity, and microlending is one of the most substantial methods for permanently decreasing poverty and strengthening the global economy even though microfinancing gets some criticisms and objections.

Figure 1: Microfinance's Global Size



Notes: Though commercial banks are more commonly known and sought after for loans the vast majority of the population is still left out of being able to utilize them as either access to the banks is not possible or the individual is not in a economic position that would support working with a bank. Commercial banks: 31% of market (in population) captured: (100M + 1.7B) / (100M + 1.7B + 4B) and Microfinance: 69% of market captured: (4B) / (100M + 1.7B + 4B).

As we can see in Figure 1, poverty is a daily reality for billions of people on the planet. Approximately 3 billion people live on less than $2 a day (Russell, 2009). Russell further suggests that over 140 million children in developing countries are underweight and over 2 billion are undernourished; Every year more than 10 million children die of hunger and preventable diseases - that's over 30,000 per day and one every 3 seconds; 800 million people go to bed hungry every day; Every year nearly 11 million children die before their fifth birthday; 600 million children live in extreme poverty; and income per person in the poorest countries in Africa has fallen by a quarter in the last 20 years. The World Bank also estimates that 1.4 billion people are living in extreme poverty.

Karlan and Zinman (2008) suggest that raising interest rate would reduce repayment rate by exacerbating information asymmetries. Further, they find that the lender could not have increased profits by changing interest rates. Based on information asymmetry theoretical modeling using a new field experiment methodology, Karlan and Zinman (2009) further maintain that a positive correlation between loan default and a randomly assigned interest rate, conditional on observable risk, could be due to adverse selection ex ante (those with relatively high probabilities of default will be more likely to accept a high rate) or moral hazard ex post (because those given high rates have greater incentive to default). They find strong evidence of moral hazard and weaker evidence of hidden information problems. In particular, they claim that about 13% to 21% of default is due to moral hazard. Asymmetric information thus may help explain the prevalence of credit constraints even in a microfinance market that specializes in financing high-risk borrowers.

Garmais and Natividad (2010) provide empirical evidence on the impact of asymmetric information on both financing and operating activities through a study of credit evaluations of MFIs, and Garmais and Natividad (2013) demonstrate that an increase in political affinity leads to a greater quantity of debt supplied and a reduction in the rate paid by an MFI to a given lender.

If there is a positive relation between the interest rates (input) and loan loss rate (output), higher costs of borrowing influence higher loan loss rates. Karlan and Zinman (2008) suggest that while examining microfinance phenomena occurring in South Africa, causes behind this relationship include "adverse selection, moral hazard, and/or bad shocks that are difficult for borrowers to smooth". Thus, relatively high interest rate charged by MFIs mainly to cover high transaction costs as well as to produce additional profits for themselves, will make borrowers difficult to pay back their loans, resulting potential default. If correct, we expect the following;

Hypothesis 1: *Interest rates cause loan loss rates*.

Alternatively, if there is a positive relation between loan loss rate (input) and the interest rates (output), then lenders reactively increase interest rates to recoup losses. Because lenders have an incentive to become self-sustaining, they tend to raise interest rates to cover operations based on "descriptive evidence and intuition" rather than "methodological guidance on how to derive optimal rates" (Karlan and Zinman, 2008). The common presumption amongst policymakers is that the poor are "largely insensitive to interest rates". If this interpretation is more valid, then we expect the following;

Hypothesis 2: *Loan loss rates drive interest rates*.

Clearly, null hypotheses in both cases naturally assert no relation between interest rates and loan loss rates. But which of Hypothesis 1, Hypothesis 2, or null hypothesis is more valid? That is an empirical question and we turn next to the task of describing and analyzing the empirical data that can provide an answer.

DATA AND MEASUREMENT

Our main data source is a database of the Microfinance Information Exchange (MIX) Network,[2] a global web-based microfinance platform that provides data on individual MFIs. The platform is among the most renowned and extensive databases in worldwide microfinance and provides high quality information between 641-2,240 MFIs operating in four geographical regions, including Latin America, Eastern Europe, central, east, and south Asia, and Africa.
We also obtain microfinancing institutes' interest rates and loan-loss rates from the MIX Market database (www.mixmarket.org) that is the premier source for objective, qualified and relevant microfinance performance data and analysis. The MIX Market database includes approximately 2,000 MFIs operating in 110 countries. This vast database represents an estimated 80% of all known microfinance clients worldwide which equates to roughly $50 billion in loans per year for the last five years.

Dozens of financial, operating, social, geographic and other explanatory data points are collected for each MFI on an annual basis. The database includes limited data points beginning in the 1990's. The collection of large samples of useful information, however, begins to appear in 2002, when MIX was incorporated. The reliability of the data is ensured by a process of quality audits as well as strict compliance with International Financial Reporting Standards (IFRS). Based on the reliability of the expansive MIX Market database and the precedent set by ongoing research in the microfinance field, we choose to perform our analysis using MIX during the cleaner period of 2004-2012.

We used the following proxies for our explanatory and response variables. Specifically, we use Gross Yield of Portfolio = (Interest + Fees) / Gross Loan Portfolio as a proxy for interest rates because it represents the cost of borrowing. As we examine the interest rate and loan loss rate causal relationship, we use both real and nominal gross yields to control for inflation differences across the 110 countries represented in the database. Regarding the default rate, we use Loan Loss Rate = (Write offs – Value of Loans Recovered) / Gross Loan Portfolio as a proxy for default rates because it represents value lost when the MFI discontinues attempts to collect. All the variables of choice are detailed in Table 1.

[2] See www.mixmarket.org.

RESEARCH METHODOLOGY

In order to analyze the causal relationship between interest rates and loan loss rates, we conducted a linear regression using "Granger causality" and seven control variables. Granger causality is used to study whether one time series is predictive of another. We used the Granger causality test to determine if interest rates in year t-1, are significant predictors of loan loss rates in Year t and vice versa. In summary,

$$y_t = a_0 + b_1 y_{t-1} + b_2 z_t + \cdots + b_8 z_t + b_9 x_{t-1} + residual$$

Where x = the explanatory variable (the causer), y = the response variable (the caused) and z = control variables. Time lags of one year were used in the model due to data availability and the assumed responsiveness of borrowers to changes in interest rates and debtors to changes in loan loss rates.

We test our hypotheses by controlling for the financial, socio-economic and firm-characteristic variables defined in Table 1. In testing both types of causation hypotheses, we maintained identical control variables. Each hypothesis test is repeated using both nominal gross yield (nominal interest rate) and real gross yield rates (real interest rate). The strength of each trial model is evaluated based on explanatory power (R-squared), goodness of fit (F-test), explanatory power of each control variable (t-test) and explanatory power of the lagged explanatory variable (t-test).

Table 1. Variable Definitions

Variable Name	Variable Definition
Yield on Gross Portfolio (nominal) (%)	Interest and Fees on Loan Portfolio/ Loan Portfolio
Yield on Gross Portfolio (real) (%)	(Yield on Gross Portfolio (nominal) - Inflation Rate)/ (1 + Inflation Rate)
Loan loss rate	(Write-offs - Value of Loans Recovered)/ Loan Portfolio
Return on Assets	(Net Operating Income less Taxes) / Total Assets
Return on Equity	(Net Operating Income less Taxes)/ Total Equity
Net Operating Income	Financial Revenue - (Financial Expense + Impairment Loss + Operating Expense).
Portfolio at Risk (30 days)	The value of all loans outstanding that have one or more installments of principal past due more than 30 days. This includes the entire unpaid principal balance, including both the past due and future installments, but not accrued interest. It also includes loans that have been restructured or rescheduled
Average outstanding balance / GNI per capita	GNI per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population
Percent of Female Borrowers	Number of Active Female Borrowers / Number of Active Borrowers
Total expense / assets	(Financial Expense + Impairment Loss + Operating Expense) / Assets
Profitability Status	Dummy variable with '1' signifying a for-profit MFI and a '0' signifying a non-profit MFI
Regulation Status	Dummy variable with '1' signifying a regulated MFI and a '0' signifying an unregulated MFI

Note: Definitions provided by MIX Market Glossary (http://mixmarket.org/about/faqs/glossary).

RESULTS

A. Descriptive Statistics

Our sample includes 1,222 MFIs encompassing 4,620 firm-year observations. Table 2 provides descriptive statistics. On average, the Loan Loss Rate is 1.72% while the mean Nominal and Real Yield Rates are 33.8% and 24.8%, respectively, suggesting relatively low loan-loss rate and much higher interest rates. Of the 1,222 firms, 485 are for profit and 722 are regulated. The average return on assets (ROA) for all firm-years in the study is 1.5%. The mean Portfolio at Risk (30 days) is 6.4%, and the mean Percent of Women Borrowers is 64.7%. These characteristics support our assertion that the sample used is representative of the MFI industry.

Table 2. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Median	Min	Max
Loan loss rate	4620	0.0172	0.0483	0.0041	-0.2942	1.0919
Yield on gross portfolio (real)	4620	0.2478	0.1761	0.2109	-0.2467	2.2206
Yield on gross portfolio (nominal)	4620	0.3378	0.1782	0.29615	-0.0387	2.4273
Return on assets	4620	0.0153	0.1087	0.0233	-2.4078	0.6309
Portfolio at risk; 30 days	4620	0.0639	0.1004	0.0357	0	1
Average outstanding balance / GNI per capita	4620	0.5348	0.9042	0.27025	0.0089	20.9746
Percent of female borrowers	4620	0.6468	0.2569	0.6364	0	1.1016
Total expense/ assets	4620	0.2572	0.1572	0.2215	0.0023	2.957
Profit (1=yes)	4620	0.3861	0.4869	0	0	1
Regulated (1=yes)	4620	0.5781	0.4939	1	0	1
Return on equity	4620	-0.0805	16.0564	0.09725	-1058.7848	230.9675

B. The Causal Impact of Interest Rates on Loan Loss Rates

Our findings in Table 3 indicate a significant positive relation between lagged yields and loan loss rates, supporting Hypothesis 1. Although the real yield coefficient of 0.018 seems relatively small, it is not unheard of for an MFI to charge 100% annualized yield or greater, which might increase loan loss probability by 1.8%, increasing the 2004-2012 average loan loss rate of 1.65%. In addition, real yield bears a slightly higher t-stat of 3.297 than its nominal counterpart t-stat of 3.046 since the real burden on the borrower more likely impacts the repayment rate. Other noteworthy variables include the percentage of female borrowers (the primary market), for which every 1% increase relates to a 55 basis points reduction in loan losses. Profit-seeking MFI status, on the other hand, is associated with a 33 basis points increase.

Table 3. The Causal Impact of Interest Rates on Loan Loss Rates

	(1)	(2)
	Loan Loss Rate	Loan Loss Rate
Real Yield on gross portfolio (t-1)	0.0180***	
	[3.297]	
Nominal Yield on gross portfolio (t-1)		0.0175***
		[3.046]
Loan loss rate (t-1)	0.2562***	0.2578***
	[16.867]	[16.923]
Return on assets	-0.0415***	-0.0417***
	[-4.709]	[-4.605]
Portfolio at risk; 30 days	0.0704***	0.06995***
	[10.514]	[10.439]
Average outstanding balance / GNI per capita	-0.0005	-0.0005
	[-0.645]	[-0.720]
Percent of female borrowers	-0.0055**	-0.0056**
	[-2.010]	[-2.062]
Total expense/ assets	0.0359***	0.0349***
	[4.619]	[4.183]
Profit (1=yes)	0.0033**	0.0032**
	[2.226]	[2.143]
Regulated (1=yes)	-0.0006	-0.0007
	[-0.426]	[-0.493]
Intercept	-0.0016	-0.0025
	[-0.579]	[-0.928]
Observations	4620	4620
# of MFIs	1222	1222
R-Squared	0.173	0.173

Note: Dependent variable of the regressions is Loan Loss Rate. Heteroscedasticity-robust t-statistics are presented in brackets. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively. Structural Model of Regression:

$$Loan\ Loss\ Rate = a_0 + \sum_{i=1}^{k} a_i\ (Real\ \ or\ Nominal\ Yield) + \sum_{j=k+1}^{n} a_j\ (Control\ Variables) + \ \varepsilon$$

C. The Causal Impact of Interest Rates on Interest Rates

The results in Table 4 indicate a significant positive relation between lagged loan loss rates and yields, supporting Hypothesis 2. Our findings are consistent with common assumptions about the institutions as Karlan and Zinman (2008) have articulated. While our results are generally consistent with both of our Hypotheses 1 and 2, we find, however, that one relation is more statistically significant than the other. In particular, lagged loan loss rate as an input variable has yielded a t-stat of 6.44 (reported in Table 4), greater than lagged input variable of real yield's t-stat of 3.30 (reported in Table 3). We also note that our loan loss rate's driving yields has borne R2 figures above 0.70, suggesting a relatively stronger linear relation. On the other hand, the causal impact of interest rates on loan loss rates reported in Table 3 has R2 figures below 0.20, suggesting a relatively weaker linear relation. Our results confirm the causal impact of loan loss rates on interest rates empirically on average as a worldwide phenomenon. These results are complementing Karlan and Zinman (2008) who have observed the similar observation in their South African microfinance study. Seeing that lenders typically have high sensitivities to loan loss rates, we explore potential focal points to avert rises in defaults. Not surprisingly, for profit status is associated with both higher real and nominal yields. However, we oddly find that regulation is strongly negatively associated with real yields but only weakly associated with nominal yields. One consideration is that although these regulations put a mere dent in the stated interest rates (typically higher numbers), the real interest rates (typically lower numbers) show more relative impact.

Table 4. The Causal Impact of Loan Loss Rates on Interest Rates

	(1)	(2)
	Real Yield on Gross Portfolio (t)	Nominal Yield on Gross Portfolio (t)
Loan loss rate (t-1)	0.1916***	0.1523***
	[6.439]	[6.009]
Real Yield on gross portfolio (t-1)	0.4798***	
	[44.751]	
Nominal Yield on gross portfolio (t-1)		0.4820***
		[50.432]
Return on assets	0.5207***	0.5668***
	[30.186]	[37.618]
Portfolio at risk; 30 days	-0.0013	-0.0279**
	[-0.102]	[-2.500]
Average outstanding balance / GNI per capita	-0.0035**	-0.0002
	[-2.273]	[-0.170]
Percent of female borrowers	-0.0043	0.01394***
	[0.806]	[3.076]
Total expense/ assets	0.5587***	0.6073***
	[36.715]	[43.749]
Profit (1=yes)	0.0059**	0.0077***
	[2.027]	[3.082]
Regulated (1=yes)	-0.0102***	-0.0033
	[-3.441]	[-1.309]
Intercept	-0.0259***	-0.0030
	[-4.917]	[-0.679]
Observations	4620	4620
# of MFIs	1222	1222
R-Squared	0.761	0.832

Note: Dependent variables of the regressions are Real Yield on Gross Portfolio in Column 1 and Nominal Yield on Gross Portfolio in Column 2. Heteroscedasticity-robust t-statistics are presented in brackets. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively. Structural Model of Regression:

$$\text{Real or Nominal Yield} = a_0 + a_1(\text{Loan Loss Rate}) + \sum_{j=2}^{n} a_j\,(\text{Control Variables}) + \varepsilon$$

Table 5 Model (1) suggests that the MFI firms' operating performance measured by return on assets (ROA) is positively and significantly associated with the loan interest rates. The results seem intuitive because high interest rates bring

more profitability to MFI's. The impact of loan-loss rates on MFIs' ROA reported in Model (2), however, is not significantly affecting ROA, although the sign of the coefficient is negative. When we examine the interaction effect of interest rates by the loan-loss rates, the coefficient on the interaction variable is significant and negative, suggesting that the MFI's profitability is adversely influenced by the loan-loss rate even though the positive impact of interest rates on ROA still remains. Thus, our results suggest that MFIs' profitability measured by ROA is largely affected by high interest rate rather than the low loan-loss rate. These results indicate the possibility that MFIs are charging relatively high interest rate for their own institutional profits instead of helping poor people that is their initial and beneficial goal.

Table 5. Profitability as a Function of Interest Rates and Loan Loss Rates

	(1)	(2)	(3)
	Return on Assets	Return on Assets	Return on Assets
Nominal Yield on gross portfolio (t-1)	0.3548***		0.3683***
	[46.055]		[46.776]
Loan loss rate (t-1)		-0.0359	
		[-1.206]	
Lag Nominal Yield * Lag Loan Loss			-0.2420***
			[-7.397]
Portfolio at risk; 30 days	-0.1441***	-0.1979***	
			-0.1385***
	[-13.535]	[-15.420]	[-13.059]
Average outstanding balance / GNI per capita	-0.0033***	-0.0062***	
			-0.0031**
	[-2.640]	[-4.092]	[-2.511]
Percent of female borrowers	0.0009	0.0186***	0.0001
	[0.004]	[3.496]	[0.0213]
Total expense/ assets	-0.6646***	-0.4038***	-0.6598***
	[-73.913]	[-45.804]	[-73.613]
Profit (1=yes)	0.0070***	0.0271***	0.0073***
	[2.863]	[9.332]	[2.994]
Regulated (1=yes)	-0.0129***	-0.0245***	-0.0127***
	[-5.259]	[-8.326]	[-5.228]
Intercept	0.0795***	0.1273***	0.0750
	[18.906]	[25.843]	[17.756]
Observations	4620	4620	4620
# of MFIs	1222	1222	1222
R-Squared	0.567	0.369	0.573

Note: Dependent variable of the regressions is return on assets as defined in Table 1. Heteroscedasticity-robust t-statistics are presented in brackets. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively. All intercepts & input variables used in the regressions are listed in their respective columns with the appropriate coefficients.

E. Potential Economic Impact

To examine potential economic benefits by lowering the interest rates as well as the loan-loss rate, we compute potential economic impact based on certain assumptions and report the results in Table 6 based on MixMarket data. If banks reduced defaults (using "loan loss rate" as a proxy) down to their lowest recorded point of 0.86% versus the 2.24% in 2012, the average bank would see a drop from $2,042,474 in defaults down to $782,692; a $1,259,783 savings based off the estimated $33.039 billion market. Additionally, if banks made a reduction in interest rates (we used "yield on gross portfolio" as a proxy) to the lowest recorded point of 19.81% versus the 27.49% in 2012, then borrowers would see a drop in interest payments from $9.083 billion to $6.545 billion; a $2.538 billion savings again based off the estimated $33.039 billion market. Even if we were to drastically cut these potential figures to a mere tenth for the purpose of conservative judgment ($125,000 in average default savings per bank and $250 million worldwide annual costs of borrowing), we can see that conscionable policy changes in microfinance will yield a macrocosm in economic impact because the provision of credit to financial institutions at below-market interest rates is one of the primary tools used by governments and central banks to regulate and stimulate the broad economy (Garmaise and Natividad, 2013).

Table 6. Estimated Potential Economic Impact of Policy Changes

Row Labels	Average of Loan loss rate	Average of Yield on gross portfolio (real)	Average of Gross Loan Portfolio	Sum of Gross Loan Portfolio
2004	1.43%	29.28%	$20,056,897	$3,369,558,768
2005	1.56%	26.12%	$24,945,037	$7,508,456,074
2006	0.86%	24.83%	$32,678,261	$16,012,348,117
2007	1.45%	24.76%	$43,523,268	$30,335,717,519
2008	1.49%	19.81%	$44,809,154	$36,250,605,404
2009	2.11%	25.39%	$47,493,849	$44,216,773,233
2010	1.91%	25.89%	$62,210,168	$60,406,073,521
2011	1.45%	23.14%	$76,314,438	$73,338,175,167
2012	2.24%	27.49%	$91,010,641	$33,036,862,755
Grand Total	**1.65%**	**24.46%**	**$53,501,067**	**$304,474,570,558**

Row Labels	Write-offs (Value of loans recovered)	Total Market of Loans	Interest Rate Paid by Borrower	Interest paid by borrower if average yield on portfolio was 19.81%	Write-offs if at 0.86% Loan Loss Rate
2004	$286,455	$3,369,845,223	$986,652,570	$667,566,339	$172,489
2005	$389,242	$7,508,845,316	$1,961,307,902	$1,487,502,257	$214,527
2006	$281,140	$16,012,629,257	$3,975,919,505	$3,172,101,856	$281,033
2007	$632,967	$30,336,350,486	$7,509,961,598	$6,009,631,031	$374,300
2008	$667,235	$36,251,272,639	$7,179,566,787	$7,181,377,110	$385,359
2009	$1,004,033	$44,217,777,266	$11,225,084,091	$8,759,541,676	$408,447
2010	$1,190,649	$60,407,264,170	$15,636,821,594	$11,966,679,032	$535,007
2011	$1,109,251	$73,339,284,418	$16,971,549,886	$14,528,512,243	$656,304
2012	$2,042,474	$33,038,905,229	$9,082,577,080	$6,545,007,126	$782,692

Note: Average Bank Writeoff @ 2.24% Loan Loss Rate =$91,010,641 average bank gross loan portfolio (FY2012) * 2.24% Loan Loss Rate (FY2012) =$2,042,474 (rounding errors included); Average Bank Writeoff @ Record Low 0.86% Loan Loss Rate =$91,010,641 average bank gross loan portfolio (FY2012) * 0.86% Loan Loss Rate (Low) =$782,988 (rounding errors included)

Potential Difference per bank: $2,042,474 - $782,988 = $1,259,486 annual loan loss savings.; Potential Difference in Worldwide Annual Borrowing Costs if 19.81% historical low average real yield charged versus 27.49% in 2012: $9,082,577,080 – 6,545,007,126 = $2,539,219,857.***; ***Because the 2012 data sample only uses 1,433 reported MFIs out of 12,000 worldwide, this figure grossly understates potential impact.

DISCUSSION AND CONCLUSIONS

Using the MixMarket database during 2004-2012 around the world, we find that the borrower loan loss is positively associated with loan interest rates while the loan interest rates is also positively associated with borrower loan loss. The impact of loan loss rate on loan interest rates, however, is more substantial than the influence of loan interest rates on the loan loss rate. In addition, we find that the higher interest rates charged by MFIs are followed by higher operating performance of MFIs, indicating the possibility that MFIs are charging relatively high interest rates mainly for their own profitability rather than helping less-than-successful income people.

Based on the results detailed above, we formulated two suggestions that we believe will help to reduce the vicious cycle the microfinance market is currently experiencing of increased interest rates causing increased loan loss rates and increased loan loss rates causing increased interest rates. In order to reduce borrower loan loss rates and in turn reduce the default risk for the MFI, we believe borrower financial education should be a focus. It has been suggested that increased financial knowledge has a positive causal effect on better financial decision making behavior (Martin, 2007). This relationship has also been observed in the microfinance sector (Gray et al, 2009) although the

current body of knowledge does not directly address the premise that increased borrower financial education plays a direct role in reducing loan loss rates. That being said, increased financial education for the world's poor furthers the overarching social mission of microfinance by arming this underserved population with additional tools that will aid in their quest to rise above the poverty line.

To reduce interest rates, we suggest increased consumer protection such as increased MFI transparency and predatory lending laws. As emphasized by Rutledge (2010), consumer protection in the microfinance sector should address transparency, choice, redress, as well as privacy. Transparency strives for full disclosure of relevant information from the lender to the borrower. Choice looks to ensure fair and reasonable business practices such as truth in advertising and reasonable payment collection practices. Redress provides a mechanism to address complaints and resolve disputes. Lastly, privacy protects personal financial information provided by the borrowers to the lenders.

It should be noted that care needs to be taken in selecting the appropriate level of regulation to impose on MFIs. For example, some countries have implemented an interest rate ceiling with the aim of protecting borrowers from exorbitant rates. However, as suggested by Helms and Reille (2004) and Jo et al. (2011), these ceilings are often detrimental to the borrower by driving lenders out of the market, reducing market competition and in turn further limiting the borrower's access to credit. Additionally, interest rate caps often lead to reduced MFI transparency. By implementing suggestions that impact both sides of the interest rate, default rate causal relationship in a positive way (i.e. we will see a decrease in loan loss rates and a decrease in interest rates), the vicious cycle can be turned into a virtuous cycle. In turn, this can have a sizable impact for both lenders and borrowers.

WORKS CITED

Abrams, J. (2009). Zero is not the number: The microfinance debt default rate. *International Association of Microfinance Investors*. https://www.luminismicrofinance.com/Documents/Zero%20is%20not%20the%20number-%202009.pdf

Argandona, A. (2010). Microfinance, Chapter 22 of Finance Ethics: Critical Issues in Theory and Practice, edited by John R. Boatright, Kolb series in Finance, John Wiley & Sons, Inc.

Assefa, E., Hermes, N., & Meesters, A. (2010). Competition and performance of microfinance institutions. *Microfinancegateway.org*. http://www.microfinancegateway.org/gm/document-1.1.9499/competition%20and%20performance%20of%20MFIs.pdf

FeedAdam.org. (2011). Why microfinance? http://www.feedadam.com/blog/?p=148

Fernando, N. (2006). Understanding and dealing with high interest rates on microcredit. Working paper, Asian Development Bank.

Garmaise, M. J., & Natividad, G. (2013). Cheap credit, lending operations, and international politics: The case of global microfinance. *Journal of Finance,* 68(4), 1551-1576.

Gray, B., & Sebstad, J. (2009). Can financial education change behavior? Lessons from Bolivia and Sri Lanka." 21 December. https://www.freedomfromhunger.org/sites/default/files/GFEP.LowIncome.Paper_.pdf

Helms, B., & Reille, X. (2004). Interest rate ceilings and microfinance: The story so far. 1 Sep. http://www.cgap.org/sites/default/files/CGAP-Occasional-Paper-Interest-Rate-Ceilings-and-Microfinance-The-Story-So-Far-Sep-2004.pdf

Hudon, M. (2007). Fair interest rates when lending to the poor. *Ethics and Economics,* 5(1), 1-8.

Jo, H., Bratcher, N., Freitag, C., Lewis, M., & Olson, Q. (2009). Doing well while doing good? Microfinancing and social responsibility. *International Journal of Business Research,* 9(4), 112-120.

Jo, H., Jo, H. S, & Pathak, M. (2011). Microfinancing, interest rates, and biblical safeguards. *Review of Business Research,* 2011, 11(3), 59-67.

Karlan, D. S., & Zinman, J. (2008). *C*redit elasticities in less-developed economies: Implications for microfinance. *American Economic Review*, 98(3), 1040–1068.

Kiva.org. (2013). About microfinance. Kiva. http://www.kiva.org/about/microfinance/

MacFarquhar, N. (2010). Banks making big profits from tiny loans. *NYtimes.com*. http://www.nytimes.com/2010/04/14/world/14microfinance.html?pagewanted=all&_r=1&

Martin, M. (2007). A literature review on the effectiveness of financial education. FRB Richmond Working Paper No. 07-03. Available at SSRN: http://ssrn.com/abstract=2186650

Nobelprize.org.(2013). The Nobel peace prize 2006. Nobel Media AB 2013. http://www.nobelprize.org/nobel_prizes/peace/laureates/2006/index.html

Pack, C. (2013). Cross market analysis report. MIX Microfinance World, 2 July.

Russell, M. (2009). The spiritual mission of microfinance, The Entrepeurial Life.

Rutledge, S. L. (2010). Consumer protection and financial literacy: Lessons from nine country studies (June 1). World Bank Policy Research Working Paper Series, Available at SSRN: http://ssrn.com/abstract=1619168

WorldBank.org. (2013). Microfinance and financial inclusion. The World Bank. http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20433592~menuPK:34480~pagePK:64257043~piPK:437376~theSitePK:4607,00.html