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The Lending Interest Rates in the Microfinance Sector: Searching for its Determinants

Pablo Cotler *
Universidad Iberoamericana, México, DF, Mexico

Deyanira Almazan
University of Sussex, Brighton, UK

Abstract

Using data from 1299 microfinance institutions (MFIs) in 84 countries and following different approaches, it was found the lending interest rate is determined by the funding cost, the loan size, and the efficiency level of MFIs. With respect to competition, results are mixed. Only in Asia is a negative correlation between competition and lending interest rates detected. For other subsamples, it was found the competition is more likely to be negatively correlated with the size of loans.

Keywords: Africa, Latin America, Asia, lending interest rates, microfinance

JEL Classification codes: G21, G28

The correlation and nature of causality between economic growth and financial development has been analyzed thoroughly at the macroeconomic level (Levine, 2005). Further studies by Beck, Demirgüç-Kunt, and Levine (2007) revealed the importance of greater financial leverage: it affects the income of the poorest 20% of the population in disproportional manner. Thus, the possibility exists that the development of financial institutions not only helps to reduce poverty, but also helps to scale down inequality.

According to Beck, Demirgüç-Kunt, and Martinez Peria (2008), roughly 40% to 80% of the population in most developing countries lack access to formal sector banking services. It is possible the increased surge of MFIs across less developed countries might help cash starved entrepreneurs unleash their productivity and raise their incomes above poverty lines. However, measurable results of MFIs effects are not easy to find. Papers by Pitt and Khandker (1998), Morduch (1998), Banerjee and Duflo (2008), Alexander-Tedeschi and Karlan (2006), and Hermes and Lensink (2007), among others, show several methodological difficulties exist with respect to correctly assessing the effect of access to financial products. As a result, the debate concerning the effect of microfinance on poverty reduction is far from settled. The lack of research is puzzling given the steady growth of micro lending institutions across the developing world.

Loans offered by MFIs are not necessarily new to the populations they serve. Small entrepreneurs and poor families have typically been in contact with informal lenders offering short-term, small-loans who have made use of social and market sanctions to avoid borrowers from defaulting (Aleem, 1990)[1]. If informal lenders exist, MFIs may have a positive impact on businesses profitability and household wealth when they charge an interest rate that is well below the cost of informal loans and/or if the loan size offered is sufficiently large to solve indivisibility problems. But how high are interest rates in the microfinance industry? According to the Microfinance Information Exchange (MIX) database[2], the annual nominal lending interest rate charged by MFIs during the period 2000-2008 was, on average, 42% in Africa and Latin America, and 35% in Asia.

Because the annual inflation rate was approximately 7% per year on all three continents, real interest rates were high. Even though no worldwide cross section-time series data on interest rates charged by individual moneylenders is available, rates charged by MFIs are perceived, according to conventional wisdom, to be well below those charged by neighborhood loan sharks. Notwithstanding such perceptions, plenty of dissatisfaction among microfinance practitioners is apparent regarding the high interest rates most MFIs charge (Gonzalez, 2010; Rosenberg, Gonzalez, & Narain, 2009).

Because interest rates affect the probability that financing spurs growth, it would be useful to know what factors cause high interest rates. Do MFIs' interest rates closely follow the interest rates that financial institutions pay for their funding? Alternatively, are operating costs the main cause? Perhaps high interest rates are the result of lack of competition in credit markets? To answer such questions, the information collected by the MIX was used. The dataset includes information on financial income, the value of the loan portfolio, average loan size, cost of funds, lending interest rates, operating costs, delinquency rates, number of clients, profitability, etc., for 1299 financial institutions located in 84 countries throughout Africa, Asia, and Latin America for the period 2000 to 2008. As it happens with any non-mandatory database, self-selection may bias the results. However, given the visibility of the webpage (300000 visits per month) and the funding opportunities the webpage provides, it is likely the most important MFIs of all 84 countries are included in the MIX database.

To fulfill the objective, two approaches were followed. Like Cull, Demirgüç-Kunt, and Morduch (2006), the determinants of the lending interest rate is examined by regressing the lending interest rate against cost of funds, operational cost, average loan size, rate of profitability, a proxy for competition, type of financial institution (bank, cooperative, etc.) offering micro loans, and a set of dummies to control for time waves and geographic location. The approach may be misleading, however, if managers of MFIs have a profitability goal, regardless of whether profitability is distributed among owners, which enables them, for example, to increase the loan portfolio and/or the number of borrowers, expand the number of branches and/or the number of loan officers, or simply to be financially self-sufficient. Whatever their objectives, a profitability target and characteristics of their market niche are essential when deciding on an appropriate pricing policy and loan size within the time-scale they are willing to offer. Taking the possibility of a misleading result into account, a second approach consisted of estimating a system of equations that is solved simultaneously.

Regardless of the approach followed, three results stand out for their policy implications. First, a reduction in funding cost leads to lower lending interest rates. However, 90% of all MFIs in the sample had an average cost of capital of 0% in real terms; thus, not much room for further reductions exists. Second, an increase in efficiency leads to lower lending interest rates. Third, it appears competition is more likely to have an effect on the loan size than on the lending interest rate.

To show these results, the paper was organized in the following way. In the next section, the related literature is reviewed. Thereafter, the database consulted and the methodology used is described, followed by the findings in the results section. Finally, the paper is concluded.

Literature Review

When analyzing lending interest rates charged to small entrepreneurs, the first issue involves whether interest rates follow a pattern consistent with how much competition financial institutions encounter in such markets. While structure-conduct-performance theory suggests greater competition among lending institutions should bring interest rates down, the informational problems surrounding credit market transactions may weaken the argument. Furthermore, some authors predicted the existence of a negative correlation between market power and interest rates. For example, Petersen and Rajan (1995) found lending institutions wielding greater market power are those with enough resources to invest in relationship lending. Thus, as market power increases, the likelihood smaller firms will be granted a loan is greater and interest rates should decline.

With a different argument, Marquez (2002) and McIntosh and Wydick (2005) arrived at the same conclusion: As competition among financial institutions increase, default risks follow a similar path and so do interest rates. However, other authors have an opposite view. For example, Boot and Thakor (2000) claimed a relationship lending helps to protect the financial institution from competition. More intense competition may induce financial firms to reallocate resources to more relationship lending, and therefore, smaller firms may face a reduction in the lending interest rates. Thus, two conflicting hypotheses are apparent about the effects of increased competition in credit markets for small firms with respect to the lending interest rate.

The structure-conduct-performance framework also may be misleading if market contestability is a relevant feature of credit markets for small firms. If potential borrowers lack formal documentation to certify their incomes and expenditure flows, it is very likely financial institutions may need to develop special techniques to assess the risk profile of potential borrowers. In this scenario, an entrance threat is not necessarily sustainable and calls into question the issue of market contestability and its effects on interest rates. Taking into account all these factors, the interaction between competition and the lending interest rate charged to small entrepreneurs appears complex.

Whether the correlation between market structure and interest rate is positive, negative, or null is a question to be solved empirically. A review of the literature confirms conflicting results. On the one hand, the findings of Boot and Thakor (2000) as well as Ongena and Smith (2001) supported the traditional structure-conduct-performance hypothesis. On the other hand, the findings of Petersen and Rajan (1995) and Zarutskie (2003) rejected such hypothesis. Furthermore, the results depend on the methodology and characteristics of the database. For example, Carbó-Valverde, Rodríguez-Fernández, and Udell (2009) showed the correlation is sensitive to how market power is assessed. If market power is defined by the Lerner index, the results support the conventional theory: Greater market power implies higher interest rates. However, if market power is defined by concentration indexes, the results are the opposite, and the conventional theory is discarded.

Interest rates are determined not only by real or potential competition, but also, by the characteristics of borrowers and lenders. For the microfinance sector, Rosenberg et al. (2009) and Gonzalez (2010) suggested tiny loans with very low default rates incur high administrative expenses that may not be offset by economies of scale. Further, even though MFIs have, on average, a profitability rate that is above commercial banks rate, these authors claimed the search for returns is not an important driver of interest rates. While such hypotheses may be appealing, the authors do not explain how they arrived at such conclusions: No information exists about the econometric method used nor other explanatory variables considered or information regarding the statistical significance of the results.

Cull et al. (2006) examined the determinants of profitability, portfolio at risk, and loan size in the microfinance sector without taking into account how much competition lenders face because the typical proxies for measure of competition have endogeneity problems and do not measure how intense the competition is. Using the MIX database for the period 1999-2002, they found, among other results, that lending interest rates and capital costs affect the profitability of financial institutions. Their conclusions may need to be re-examined because they were obtained through least squares estimations in which it is implicitly assumed the estimated coefficients are independent of the size of the institutions and no simultaneity exists on the decisions taken by managers of MFIs regarding interest rates, loan size, and profitability.

Data and Methodology

Obtaining financial information from institutions involved in microfinance is not easy; in most countries, no financial authority exists that supervises the collection of such data. Furthermore, the absence of organized market supervision means MFIs could freely decide how to measure the variables describing their different sources of income and expenditure. Finally, even if an informal consensus exists on how to measure the relevant variables, the consensus would not necessarily ensure the information is reliable because it is likely accounting deficiencies exist.

To solve these problems, information collected by the MIX was used. Members of the network report their financial results to managers of the organization, which in turn, make sure the definition and methodology used to define each variable is common across institutions. Annual information for the period 2000 to 2008[3] about financial income, value of the loan portfolio, average loan size, cost of funds, lending interest rates, operating costs, delinquency rates, loan loss provision rate, number of clients, profitability, etc., is available for 1299 financial institutions located in 84 countries throughout Africa, Asia, and Latin America (see Table 1). Given the time span considered and the number of years these institutions have been reporting their data to the MIX, an unbalanced cross section-time series panel data of 4718 observations can be generated.

Table 1
The Database

Continent	# MFIs	# Countries	# Obs.	Average number of years operating in 2008
Africa	294	32	1 096	11.44
America	358	20	1 431	15.06
Asia	647	32	2 191	10.42
Total	1 299	84	4 718	12.43

Even though the database could have a self-selection bias, it is worth using it for several reasons. First, it is a conceptually homogeneous database: Each variable has the same meaning for each institution. Second, very few micro-finance institutions are willing to share their inter-temporal experiences, so having such a panel of data may help with understanding the dynamics of lending interest rates. Finally, even if the panel of data is not representative of all MFIs, collectively, it is likely MFIs serve a very large fraction of microfinance customers worldwide. This work is considered an important step in the gathering empirical literature on the management of MFIs in developing countries.

As is usually done, the lending interest rate is measured as the portfolio yield: all interest and fee revenue from loans divided by the average gross loan portfolio. Thus, a weighted average of the interest rate actually received by the financial institution is calculated. Using the definition, Table 2 shows the median interest rate charged in Asia is lower relative to what is being charged in America and Africa. Notwithstanding the result, microfinance entities in Asia earn a similar rate of return. Operating and funding costs and the size of financial firms may help explain such an outcome.

Table 2
Distribution of some Key Data during the Period 2000-2008

	Africa			America			Asia		
%	Real interest rate (%)	*ROA* (%)	Loan as % of GDPpc	Real interest rate (%)	*ROA* (%)	Loan as % of GDPpc	Real interest rate (%)	*ROA* (%)	Loan as % of GDPpc
1	- 4.10	- 57.60	2.80	-11.20	- 40.60	1.90	- 5.20	- 48.10	3.00
10	10.90	- 15.90	12.30	13.10	- 4.70	5.00	9.10	- 6.50	8.20
25	18.40	- 4.80	25.50	21.30	0.60	12.20	15.50	0.00	13.80
50	28.20	0.80	56.60	30.90	3.00	29.30	23.30	2.50	25.40
75	45.10	4.30	117.40	44.40	6.20	58.20	34.60	6.00	69.70
90	64.90	8.90	252.40	63.20	10.20	103.50	50.60	10.90	164.60
99	145.80	21.50	692.00	103.00	19.10	312.20	88.00	25.90	1 125.00

Note. Gross domestic product per capita (GDPpc).

Following Martinez Peria and Mody (2004), three sets of variables might be used to explain the pattern followed by the lending interest rate. First is capital cost and operational cost per peso lent from the financial entities. If the latter is turned upside down, it could be used as a proxy of how efficient these entities are[4]. However, the "quality of the product" needs to be considered. To explain this better, consider two examples. First, imagine two financial entities reporting the same average operational costs but having different default rates. In this scenario, the institution with the lowest non-payment rate would be considered more efficient. Bearing this in mind, efficiency may be measured better by adjusting the average operational cost by the portfolios' default rate. Second, consider two financial entities whose average operational costs and default rates are similar, but they report different average loan sizes. Taking into consideration smaller loans involve higher operational costs, the entity with the smaller loan size would be considered more efficient. For these reasons, a better proxy for efficiency would be achieved if the operational cost per peso lent were adjusted by the portfolio default rate and by the relative size of loans granted by the institution[5].

The second set of variables includes those variables describing the size and nature of the financial institutions, the earnings they make, and the number of years they have been operating. As an indicator of the financial firms' size, the value of firms' financial assets and loan portfolios are both measured in real terms and expressed in logarithms. Regarding the nature of these financial entities, six dummies were considered, each one representing the following type of institution: non-bank financial institution, non-government organization, rural banks, credit union or cooperative, banks, and any other type. Further, the average loan size, the rate of loan loss provision, and a proxy for their market niche were included. For the latter, denoted as outreach, the average loan size divided by gross domestic product per capita was used.

As explained, it is difficult to measure how much competition financial entities face. Further, given the characteristics of the dataset, a cross section-time series panel data set for such a variable would be required. Because most institutions comprising the sample do not operate at the national level and often compete with informal moneylenders, the information required to construct such a variable would be tremendously helpful, but such a dataset does not appear to exist. Notwithstanding these problems, the traditional approach (see, for example, Kai, 2009) was considered in which the fraction of the adult population who are borrowers of MFIs as a proxy for competition was considered. Finally, to describe the economic environment, a legal rights index and a credit information index, variables that are available in the World Bank dataset Doing Business, were included. Table 3 provides the descriptive statistics of these three sets of variables.

Table 3
Descriptive Statistics of Main Variables

		Mean	Maximum	Minimum	St. deviation
Nominal lending interest rate	Africa	0.42	2.58	0.01	0.27
	America	0.42	1.50	0.02	0.21
	Asia	0.35	2.01	0.03	0.18
Funding cost	Africa	0.03	0.22	0.00	0.03
	America	0.06	0.71	0.00	0.04
	Asia	0.05	0.56	0.00	0.05
Efficiency (in logs)	Africa	1.23	3.95	-1.73	0.77
	America	1.47	5.08	-0.72	0.70
	Asia	1.73	7.01	-1.20	0.79
Return on assets	Africa	-0.02	0.83	-0.97	0.14
	America	0.02	0.53	-0.89	0.11
	Asia	0.02	0.73	-1.80	0.12
Average loan size (in logs)	Africa	0.19	3.39	-2.91	1.06
	America	1.15	3.88	-2.12	0.93
	Asia	0.40	4.62	-5.28	1.39
Competition	Africa	0.015	0.046	0.0002	0.012
	America	0.057	0.149	0.0004	0.046
	Asia	0.036	0.238	0.00002	0.036
Initial assets (in logs)	Africa	8.69	13.51	0.90	1.86
	America	9.68	14.66	4.01	1.78
	Asia	8.52	15.47	0.62	1.91
Age of the financial institution	Africa	9.43	58.00	0.00	6.90
	America	14.07	51.00	0.00	9.47
	Asia	11.01	52.00	0.00	8.98
Provisions as a % of assets	Africa	2.10	83.90	0.00	3.90
	America	2.40	33.30	0.00	3.10
	Asia	1.40	55.40	0.00	2.90
Biodiversity	Africa	5.94	29.22	0.13	7.00
	America	27.00	100.00	0.89	24.01
	Asia	19.20	80.96	0.17	22.37
Population density	Africa	82.95	394.03	2.59	67.28
	America	65.96	358.36	8.95	79.64
	Asia	287.62	1 229.16	1.70	352.89

With the use of this data, first, the standard approach was followed, and the determinants of the lending interest with the use of one equation were found. In this scenario, the hypothesis may be described by the following functional relationship:

$$Iloan = F(Ifund, effic, ROA, Avgloan, competition); \quad (1)$$

whereas: $I_1 > 0,\ I_2 < 0,\ I_3 > 0,\ I_4 < 0,\ I_5 < 0;$

where *Iloan* describes the lending rate of interest, *Ifund* measures how much lenders pay for their funds, *effic* the efficiency of the institution to deliver its loans, *ROA* the return on assets, and *Avgloan* the average loan size. Next to this functional form, the sign of the partial derivative expected is described. Thus, for example, if a positive correlation between the lending interest rate (*Iloan*) and the cost of funds (*Ifund*) is expected, the hypothesis is denoted by $I_1 > 0$. Further, a negative correlation between the lending rate and the proxy for efficiency is expected because as financial firms become more efficient, they may be able to reduce their lending rates and still reach the same profit rate.

If these financial firms wish to increase profits, they will surely increase their lending rate, thus, $I_3 > 0$. With respect to the average loan size, two possible explanations may be provided to explain why a negative correlation is posited. First, if financial firms wish to finance their variable costs, a bigger loan size could be correlated with lower interest rates. On the other hand, if bigger loans were received by more experienced borrowers, then credit risk would decline and so could interest rates: $I_4 < 0$. With respect to competition, the standard theory is followed, and it is assumed it has a negative correlation with the dependent variable. Further, some control variables were included, among them dummies capturing the different organizational structures of the financial entities and other dummies that consider differences across countries and years.

Many of the variables that could explain the behavior followed by the lending interest rate are endogenous. In particular, the profitability rate and the size of loans are two variables that the financial institution seeks to influence. Thus, managers of these organizations may have a profitability goal that allows them, for example, to enlarge the portfolio and/or increase the number of borrowers and/or create more branches and/or recruit more loan officers, etc. The profit target and the characteristics of the market niche results in an optimal pricing policy comprising a loan size within a time-scale. We believe the loan transaction may be described in three steps.

First, the financial firm decides how much to charge and the optimal loan size in order to reach its profitability goal. Once known the value of the lending interest rate and the average loan size the financial institution offers, a potential customer decides whether she/he wants to request a loan. Taking into account the credit history of the potential borrower and its income-expenditure stream, the financial institution builds a risk profile of the individual. With this at hand, managers decide where to lend or not. While for first time customers the typical MFI does not allow any kind of negotiation related to the loan size, for repeated customers some sort of negotiation is possible, but it is the financial institution that decides on the loan size, taking into account its goals. With this description, it could be more reasonable to estimate simultaneously the following three equations:

$$Iloan = F(Ifund, effic, ROA, Avgloan, competition,...); \quad (1)$$

whereas: $I_1 > 0,\ I_2 < 0,\ I_3 > 0,\ I_4 < 0,\ I_5 < 0.$

$$ROA = G(Iloan, Ifund, effic, provisions, outreach,...); \quad (2)$$

whereas: $ROA_1 > 0,\ ROA_2 < 0,\ ROA_3 > 0,\ ROA_4 < 0,\ ROA_5$ with an ambiguous sign.

$$Avgloan = H(effic, age, competition, Iloan,...); \quad (3)$$

whereas: $Avgloan_1 < 0,\ Avgloan_2 > 0,\ Avgloan_3 < 0,\ Avgloan_4 < 0.$

With respect to the profitability rate, Equation 2 suggests it will be explained by the lending interest rate, the cost of funds, the efficiency of MFIs, their loan loss ratio, and its market niche. As shown by Equation 2, profitability will be raised when the lending interest rates and/or efficiency increases or when the cost of funds declines. Because holding loan loss *provisions* imply an expected loss and an opportunity foregone, a negative correlation between the variable denoted as *provisions* and the profitability rate is expected.

Finally, with regard to *outreach*, the correlation could go either way. Assuming poorer people receive smaller loans, a positive correlation between *outreach* and the profitability ratio (*ROA*) could be expected because the incentive to default among this population is smaller: This population wants to avoid informal moneylenders. However, if smaller loans imply higher average operational costs, the *outreach* could be correlated negatively with the profitability rate. Finally, Equation 3 describes the behavior followed by the average loan size. As MFIs become more efficient, they could offer smaller loans: $Avgloan_1 < 0$. Regarding *age*, which works as a proxy for experience of the financial institution, it may affect both the supply and the demand for bigger loans.

On the one hand, when MFIs start operating they usually offer loans of small amounts because they do not have much capital or experience, and debtors tend to be people without credit records. If the supply of loans has dynamic incentives, in other words, the services offered by the institution increase as the debtor builds his/her credit history, it is very likely the loan size will increase through time. On the other hand, if loans have a positive effect on wealth, it is possible to assume the demand for bigger loans will rise. Given these assumptions, finding a positive correlation between the average loan size and *age* ($Avgloan_2 > 0$) is expected.

With respect to competition, the credit card interest rate literature is followed and that competition leads MFIs to search for new markets assumed. The sign of the correlation could be ambiguous because it depends on whether they start lending to relatively non-poor people ($Avgloan_3 > 0$) or moving to poorer neighborhoods and offer smaller loans ($Avgloan_3 < 0$). Given their technology and stated mission, that the latter effect is more likely to dominate is assumed. Finally, if a higher lending rate is being charged, a smaller loan size being demanded ($Avgloan_4 < 0$) could be expected.

Results

Individual Estimates

The first approach consists of estimating Equation 1. As Table 4 shows, the lending interest rate (*Iloan*) follows a behavior in all three continents that is consistent with the hypothesis: The dependent variable responds positively to changes in the cost of funds (*Ifund*) and the return of assets (*ROA*), and negatively to the proxy for efficiency (*effic*)[6] and the average loan size (*Avgloan*). With regard to *competition*, we find that it only has an impact in Asian markets.

Table 4
Dependent Variable: *Lending Interest Rates*

		Africa	America	Asia	Three continents
	Ifund	+1.26***	+1.11***	+0.87***	+1.04***
	effic	-0.24***	-0.17***	-0.16***	-0.18***
	ROA	+0.76***	+0.71***	+0.73***	+0.72***
	Avgloan	-0.02**	-0.03***	-0.04***	-0.03***
	competition	+0.04	+0.007	-0.14*	-0.09
R-square	within	+0.34	+0.45	+0.44	+0.39
	between	+0.66	+0.76	+0.54	+0.64
	overall	+0.65	+0.74	+0.54	+0.63
	N	1 066	1 420	2 082	4 568

Note. (a) * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (b) Estimation method: generalized least squares. Taking into account the results provided by the Hausman test, all estimations were conducted with fixed effects. (c) Dummies for each year were not included for African and Asian countries because a joint test rejected the need for them; for America and the world wide sample, the omitted year was 2000. We included a constant and five dummies to account for the type of institutions: NGO, rural bank, credit union or cooperative, bank, non-bank financial institution. The category "other" was the omitted category. Finally, we also included variables to describe the statute of the country's legal rights and credit information. The parameters of these dummies are not reported here.

Given the heterogeneity in the size of the financial institutions that comprise the sample, next whether the parameters reported in Table 4 are sensitive to the initial size of these financial institutions was analyzed[7]. Since a learning curve regarding the appropriate use of techniques to mitigate information asymmetries may exist, age could also be a factor that may lead to heterogeneous impacts. For this purpose, new variables were added to the set of explanatory variables listed in Table 4 and created by multiplying such set by the initial value of each institution's asset.

As results in Table 5 show, the impact of each independent variable over the lending rate varies according to the initial size of an MFIs and its age. Notwithstanding such heterogeneity, on average, the sign of the estimated parameters of all independent variables are consistent with the hypothesis stated in Equation 1: The cost of funds, efficiency, quest for profits, and average loan size help explain the behavior followed by the lending interest rate. Furthermore, once interactions are considered, the impact of efficiency on the lending interest rates is higher the bigger the initial size of MFIs for the overall sample.

Table 5
Dependent Variable: *Lending Interest Rates*

		Africa	America	Asia	Three continents
	Ifund	+1.78	+1.07***	+0.68**	+0.86***
	*Ifund * initial assets*	-0.04	+0.01	+0.01	+0.02
	effic	+0.05	-0.38***	-0.02	-0.08***
	*effic * age*	-0.01*	+0.01***	-0.01***	-0.0003
	effic initial assets*	-0.04***	+0.02***	-0.02***	-0.01***
	*effic*initial assets*age*	+0.003**	-0.001***	+0.002***	+0.0007***
	*initial assets*age*	-0.006***	+0.002***	-0.006***	-0.002***
	ROA	+0.43	+0.19	+0.51***	+0.49***
	*ROA*initial assets*	+0.04	+0.070**	+0.02	+0.03**
	age	+0.05**	-0.02***	+0.05***	+0.01***
	Avgloan	- 0.01	-0.02***	-0.05***	-0.03***
	competition	+0.59	-0.02	-0.20**	-0.11
	within	+0.37	+0.47	+0.46	+0.40
R-square	between	+0.35	+0.63	+0.31	+0.51
	overall	+0.34	+0.61	+0.36	+0.52
	N	1 053	1 410	2 053	4 516

Note. (a) * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (b) Estimation method: generalized least squares. In all regressions, a constant was included. Taking into account the results provided by the Hausman test, all estimations were conducted with fixed effects. (c) Dummies for each year were not included for African and Asian countries because a joint test rejected the need for them; for America and the worldwide sample, the omitted year was 2000. We included a constant and five dummies to account for the type of institution: NGO, rural bank, credit union or cooperative, bank, non-bank financial institution. The category "other" was the omitted category. Finally, variables to describe the statute of the country's legal rights and credit information were included. The parameters of these dummies are not reported here.

Simultaneous Estimates

Results reported in Tables 4 and 5 may be misleading if reality is better described by a system of equations in which interest rates, loan size, and profitability are jointly determined. From informal interviews, it was learned managers of MFIs have a profitability goal that enables them to increase the loan portfolio and/or the number of borrowers and/or expand the number of branches and/or the number of loan officers, etc. Whatever the objectives, profitability and the characteristics of their market niche are essential for adopting an appropriate pricing policy and loan size within the time-scale.

As explained before, the loan transaction may be described with several steps. First, the financial firm decides how much to charge and the optimal loan size in order to reach its profitability goal. Once known the value of the lending interest rate and the average loan size the financial institution offers, a potential customer decides whether she/he wants to request a loan. Taking into account credit reports of the potential borrower and its income-expenditure stream, the financial institution builds a risk profile of the individual. With this at hand, they decide whether to lend or not.

To consider such an approach, the parameters of Equations 1, 2, and 3 were simultaneously estimated with a three stage least squares regression.

Table 6
Simultaneous Estimations

Dependent variable	Africa	America	Asia	Three continents
Iloan				
Ifund	+0.71***	+1.30***	+0.42***	+0.86***
effic	-0.21***	-0.10**	-0.07***	-0.12***
ROA	-0.11	-0.89***	+0.10***	-0.20**
Avgloan	+0.09***	-0.02*	-0.08***	-0.03***
competition	-1.27	+0.39	-0.43***	-0.56***
ROA				
Iloan	+0.59***	+1.03***	+0.45***	+0.77***
Ifund	-0.79***	-0.95***	-0.50***	-0.76***
effic	+0.22***	+0.25***	+0.11***	+0.19***
outreach	+0.0001***	-0.000***	-0.000***	-0.000
provisions	-0.89***	-1.13***	-1.03***	-0.95***
Avgloan				
effic	+0.92***	+0.96***	+0.0004	+0.60***
age	+0.01***	+0.004***	+0.008**	+0.01***
competition	-5.65	-2.91**	-2.26**	-1.60**
Iloan	+2.73***	+0.11	-5.32***	-0.52
N	1 053	1 419	2 049	4 511

Note. (a) * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (b) Estimation Method: three stage least squares. (c) A constant and a dummy for each year and for each country were included. The omitted categories were the year 2000, Benin (Africa), Argentina (America), and Afghanistan (Asia). Similar to the last table, the equation that had the lending interest rate as dependent variable, five dummies to account for the type of institutions and two variables to describe the statute of the country's legal rights and credit information were included. (d) For the three continents estimation a constant, a dummy for each year, a dummy for each country, being Afghanistan, the omitted category, and a dummy for each continent with Africa as the omitted one, were included.

As Table 6 shows, once interest rates, loan sizes, and profitability are assumed as jointly determined, only two of the parameters of Equation 1 have the expected sign across all subsamples and are consistent with the results reported in Table 4. Thus, a positive correlation with the cost of funds and a negative correlation with efficiency are found regardless of the subsample considered. Further, similar to the results reported in Table 4, only a correlation between competition and the lending interest rate for Asian markets is detected, and the correlation is negative as indicated by conventional theory. In all other markets, there were no correlations from a statistical point of view.

With regard to the other two dependent variables, return on assets and average loan size, the results are consistent with Equations 2 and 3. Three results are worth mentioning. First, taking for granted MFIs were truly trying to reach poorer people, a negative correlation between efficiency and average loan size was expected. However, with the exception of Asian markets where no correlation is found, so the opposite was true: An increase in efficiency leads to higher average loan size. Because greater efficiency leads to lower lending rates, a higher efficiency may be the result of having a more appropriate lending technology that enables MFIs to choose better customers. In choosing better customers, MFIs are able to offer lower lending rates and higher loan sizes, and because of their improved technology, show greater profitability. Thus, such a correlation does not imply, necessarily, a mission drift.

Second, as explained, the correlation between profitability and *outreach* (average loan size divided by gross domestic product per capita) could have had a positive or negative sign. Assuming smaller loans go to poorer people, a negative correlation may be expected if default rates among this population are smaller. However, if smaller loans imply higher average operational costs, *outreach* could be correlated positively with the profitability rate. The results suggest the latter argument holds only for the African subsample.

Third, *competition* could have an impact on the lending interest rate and loan size. However, the results suggest it is only in Asian markets where a negative impact in both variables can be detected. For other markets, results are mixed: In Latin America, *competition* only has an effect on the loan size, and in Africa, it has no effect from a statistical point of view.

Following the results of Tables 4 to 6, a reduction in the funding costs could help reduce the lending interest rates that MFIs charge. However, 90% of MFIs in the sample had an average cost of capital of 0% in real terms; thus, little room for further reductions exists. Regarding competition, economic theory suggests a stronger competition in credit markets could help reduce the lending interest rate. However, in markets where reputation and loyalty matters, it may happen that an increase in competition leads in the short run to changes in the loan size but not interest rates. The results suggest an increase in competition leads to a reduction in the lending interest rates in Asia and a reduction in the average loan sizes in Latin America.

Finally, with respect to efficiency, all the results suggest an increase in efficiency would lead to lower lending interest rates and higher profitability, which raises questions about how efficiency is increased. Technology use, management quality, and hard work are important but difficult to measure as well as endogenous because they may depend on how much capital financial firms are willing to invest, among other things. Taking into account the distinctive features of microfinance lending technologies, efficiency is not only a matter of better technology or management quality; the geographical characteristics of markets in which MFIs work may also have an effect on the operational costs of these institutions and on how efficient they can be.

To include some characteristics of the environment that may shape the value of the financial firms' efficiency, a biodiversity index[8] that captures the variability of a country's territory in terms of height and climate could be considered. A higher value of this index may signal greater geographical heterogeneity and may imply it is more costly to reach customers. Further, if economies of scale in lending were to exist, population density may also have an effect on the operational costs of MFIs. Data at a national level may help explain why, as Figure 1 suggests, Asian MFIs are the most efficient: The biodiversity index has an average value of 20.57 in America, 11.87 in Asia, and 4.75 in Africa, and the population density in 2007 was 85 people per square kilometer in Asia, 44 in Africa, and 28 in America. However, because countries are not homogenous, to find the potential of economic policy to increase efficiency and thereby reduce lending interest rates would require data on biodiversity and population density for all local markets where MFIs work. This is a quest for future work.

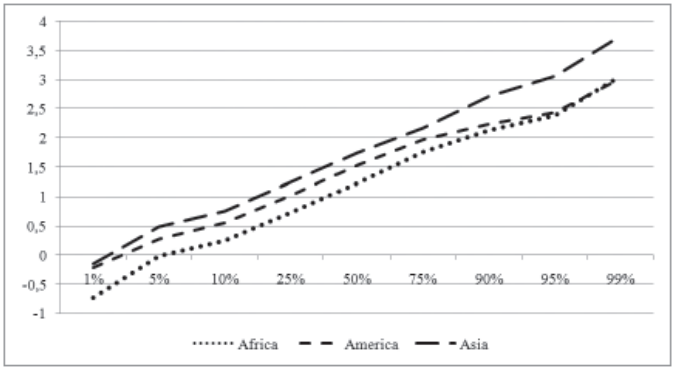

Figure 1. Average efficiency by size distribution of MFIs.

Conclusions

One of the reasons giving rise to this paper was the claim that the high interest rates MFIs charge is reducing the effect of their financing. Based on that claim, the objective was to discover how interest rates could be reduced. Through various empirical methods, three policies usually mentioned by policymakers were indirectly tested. The first policy considered is reducing the funding rate. Consistent with such recommendations, all estimations suggest a non-negative correlation between the funding rate and the lending interest rate. However,

because almost 90% of all MFIs in the sample had an average funding cost of 0% in real terms, not much room for market-driven reductions exists. Further, economic theory and economic history show government intervention to reduce the price of lending is likely to be a short-lived policy in lieu of the distortions it creates.

Fostering competition is claimed to be the best public policy to reduce the lending interest rate. However, in markets where reputation and loyalty matter, it may happen that an increase in competition leads, in the short run, to changes in the loan size but not in the lending interest rate. Further, testing such policy is not easy because it is difficult to find a proxy for 1299 MFIs in 84 countries to properly measure the intensity of competition. In addition, because most financial entities do not work at the national level, such a proxy would need to be able to measure the intensity of competition in local markets through time. The necessary information was not available to build an appropriate proxy. Instead, a variable commonly used in the literature was used. The findings are that while an increase in competition leads to a reduction in the lending interest rates in Asia, in America, it leads to a reduction in the average loan size. While not being a panacea to reduce lending rates, results suggest fostering competition should continue to be a public policy objective.

The third mechanism to reduce the lending rate consists of policies that may help increase the efficiency of MFIs. All the results suggest higher efficiency leads to lower lending interest rates. To increase efficiency, technology use and management quality need to be considered. Further, because the effect of efficiency on lending rates increases with the initial size of MFIs, governments need to consider the possibility of fostering mergers and acquisitions in this sector. Given the lending technology that most MFIs use, how much public policy could help increase efficiency will depend on how difficult is for loan officers to reach their target clients.

The geographic characteristics of the territories and the distribution of their clients should matter. Data at a national level may help explain why MFIs are more efficient in Asia and less so in Africa. Of course, countries are not homogenous; therefore, the quest is to find data that could describe these features at the micro level. If such data were available, the natural rate of efficiency for each MFI could be estimated and the potential of public policy to increase efficiency and help reduce lending interests rates known.

Endnotes

1 These lenders usually lacked specialization in credit transactions, operated in small local markets, and were unable to reach economies of scale. Thus, they were unlikely to become a cheap source of funding. Leaders in the microfinance industry learned how informal lenders operated and thanks to the support of international organizations and governments, were able to build institutions with governance schemes that helped to minimize principal-agent problems and used technologies that allowed them to achieve economies of scope. As default rates declined and group lending and sequential loans were developed, the number of MFIs grew. Adding to these improvements, the introduction of credit bureaus and the development of an appropriate regulatory framework have helped to develop a very dynamic microfinance industry in many countries.

2 The MIX is considered the most important source for objective and unbiased microfinance data and analysis. The MIX provides unparalleled access to operational, financial, and social performance information about more than 1900 MFIs covering 92 million borrowers globally. Once collected, the data are reviewed for coherence and consistency and then reclassified to comply with International Financial Reporting Standards (IFRS).

3 Even though data for 2009 was available, it was not included because of the singularity of the economic and financial crisis that started in the second half of 2008.

4 There is a caveat to such a proxy. If an institution has put in place a growth strategy, it may happen that, in the short run, its costs may grow faster than its lending operations. This would not mean it is less efficient than other institutions.

5 Denoting efficiency as (*effic*), operational cost per peso lent as (*cop*), default rate as (*def*), and the relative size of loans of institution *i* in country *j* as (L_{ij} / L_j), it follows the efficiency of institution *i* in country *j* equals: $(1 / cop)(1 - def)(L_j / L_{ij})$.

6 Both proxies for efficiency were attempted and results improved when the inverse of operational cost without adjustments was used as proxy. The correlation between both proxies for each continent was about 0.6.

7 Table 7: The Log of Initial Assets had the following distribution:

%	Africa	America	Asia
1	4.489	5.136	4.437
10	6.169	7.627	5.961
25	7.540	8.516	7.397
50	8.696	9.679	8.589
75	9.868	10.781	9.690
90	11.178	12.031	10.853
99	12.460	13.691	13.761

[8] This index is a weighted with the average of terrestrial (80%) and marine (20%) characteristics of each country. The terrestrial features capture the distribution of species and threats to those species, as well as the variety of climates and ecological factors in their territory (World Bank, 2008).

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Authors Note

Pablo Cotler, Department of Economics, Universidad Iberoamericana, Paseo de la Reforma 880, México, DF, Mexico.

Deyanira Almazan, Department of Anthropology, University of Sussex, Brighton, Sussex, United Kingdom.

Correspondence concerning this article should be addressed to Pablo Cotler, Email: pablo.cotler@ibero.mx

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