Competition, Loan Rates and Information Dispersion in Microcredit Markets

Guillermo Baquero* & Malika Hamadi** & Andréas Heinen §¶

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Abstract

We study the effects of competition on loan rates and portfolio-at-risk in microcredit markets using a new database from rating agencies, covering 379 microbanks located in 67 countries between 2002 and 2008. Our study reveals different competitive effects in nonprofit and for-profit microbanks. We find that for-profit microbanks charge significantly lower rates and exhibit improved portfolio-at-risk in less concentrated markets. In particular, the effect of concentration on loan rates is nearly three times the one reported in previous studies in banking. In contrast, nonprofit microbanks are relatively insensitive to changes in concentration. We control for interest rate ceilings, which very significantly reduce rates in for-profit microbanks. Our study also uncovers a competitive interplay between for-profit and nonprofit microbanks. Finally, we find evidence consistent with dispersion of borrower-specific information among competing microbanks in the for-profit sector, even after controlling for the presence of credit registries.

Keywords: Bank Competition, microfinance, information dispersion, portfolio quality.

JEL Classification: D4, G21, L1, O1

*European School of Management and Technology - ESMT. Address: Schlossplatz 1, 10178 Berlin, Germany. Email: baquero@esmt.org. Phone (Office) +49 30 212 31 1287.

**Luxembourg School of Finance - LSF. Address: LSF- 4, rue Albert Borschette, L-1246 Luxembourg. Email: malika.hamadi@uni.lu. Phone (Office): +352 46 66 44 6834

§THEMA, Université de Cergy-Pontoise. Address: 33 Boulevard du Port, 95011 Cergy-Pontoise, France. Email: Andreas.Heinen@u-cergy.fr. Phone (Office) +33 1 34 25 62 54.

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1 Introduction

Microbanks (microfinance banks) provide very small loans and deposit services to clients who are predominantly poor and excluded from the formal banking sector. Since poor borrowers lack collateral, microbanks typically rely on innovative lending mechanisms based on joint liability, such as group lending and village banking, while targeting mostly female borrowers. Traditionally, microbanks have been established as nonprofit organizations that rely on capital from donors and development agencies. Increasingly, however, microbanks try to achieve a self-sustainable model, that relies more on profits and is less dependent on donations and subsidies. In recent years, microbanks have been subject to intense competitive pressures, with both for-profit and nonprofit microbanks entering the sector. The effects of competition between lenders have been widely studied in the banking industry. Yet, there is little empirical evidence about the actual effects of competition on both nonprofit and profit-oriented microbanks and the mutual competitive pressures that arise between them.

This paper fills this gap by investigating the impact of competition on the loan rates charged by microbanks and their portfolio quality, using a wide-reaching cross-country sample. The first question we address in this paper is whether concentration matters for microbanks lending rates. The classical competition paradigm in banking is the structure-conduct-performance hypothesis. It predicts that in more concentrated markets, banks engage in anticompetitive behavior, charging high loan rates and thus earning higher profits (see Bain, 1956). In general, the empirical literature in banking finds a positive relation between concentration and loan rates (for an overview, see e.g. Gilbert and Zaretsky, 2003). We extend this literature to the rapidly changing microbank environment, motivated by the apparent insensitivity of lending rates to reduced concentration in several countries, which has often resulted in the imposition of interest rate ceilings (see e.g. Helms and Reille, 2004; Porteous, 2006).

Our second question is whether concentration matters for microbank portfolio quality. In general, the theoretical literature predicts that portfolio quality deteriorates as a result of asymmetric information in multi-lender markets (see e.g. Broecker, 1990). A further prediction is that, with more competing lenders, information on borrowers becomes more disperse, which reduces lenders' screening abilities (see e.g. Marquez, 2002). A main concern is that these effects are exacerbated by the absence of institutionalized information sharing mechanisms in microfinance. McIntosh and Wydick (2005) provide a theoretical

model where competition reduces the ability of a microbank to cross-subsidize within its pool of borrowers. Further, in their model competition increases asymmetric information between lenders about borrower quality, which creates an incentive for the most impatient borrowers to obtain multiple loans. As a result, overindebtedness increases and repayment rates decrease, which creates less favorable credit conditions for all borrowers. The model of McIntosh and Wydick (2005) is supported by anecdotal evidence in several markets that borrowers obtain multiple loans as interest rates and portfolio quality of microbanks decrease.

The empirical evidence on the effects of competition in microfinance is relatively scant due to the lack of information about the market structure in this sector so far. Existing papers typically use proxies for the intensity of competition at a given point in time, collected from survey data. For example Cull, Demirgüç-Kunt and Morduch (2009) study competition between banks and microbanks using data on bank branch penetration collected in 2003/2004 by Beck, Demirgüç-Kunt and Martinez Peria (2007). Their proxy for the competitive pressure exercised by banks on microbanks is the number of bank branches in a country per geographical area or population. They do not, however, measure the intensity of competition among microbanks. Hartarska and Nadolnyak (2007) study the impact of regulation on microbank performance in 62 countries and use as a control variable the number of microbanks reporting to the Microcredit Summit Campaign in 2002, that serve clients below official poverty lines. However this variable of concentration is an unweighted measure, that does not account for the potential market power of larger microbanks in each country. Further, it's not feasible to reliably obtain the actual number of microbanks in most markets. McIntosh, de Janvry and Sadoulet (2005) study the effects of competition in Uganda between 1998 and 2002 using survey data collected in 2002 from group-members of one of the largest microbanks in Uganda. They use three alternative competition measures: the number of competitors, an indicator for the presence of a competitor, and the distance to the closest one.

In contrast to the studies above, in this paper we characterize the changing competitive environment in microfinance by constructing a Herfindahl Hirschman Index (HHI) for every year and every country that captures not only cross-sectional variation but also time-variation in the organization of the industry. To this effect, we have carefully constructed a data set of market shares of microbanks in each country by combining recently updated information from the Microfinance Information Exchange (MIX), with data from several

rating agencies. Together, these data sets provide a comprehensive picture of the size and number of the largest and most important players, which is crucial to construct reliable measures of market share and HHI. Our combined data set of market shares contains a total of 7243 observations, corresponding to 1335 microbanks for the countries in our study. Our paper also considers other dimensions of competition beyond industry structure. First, our empirical approach is designed to identify the mutual competitive pressures between for-profit and nonprofit microbanks. We capture this effect by calculating a variable that accounts for the share of microfinance loans issued by profit-oriented microbanks in each country and period. Second, we allow for the possibility that different environments with varying levels of institutional development affect competitive conditions differently. Finally, as a robustness check, we use measures of market penetration from the Financial Access Survey to control for a potential competitive pressure of main-stream banks. More specifically, we use the two measures employed by Cull et al. (2009), the number of commercial bank branches per 1000 km^2 and the number of commercial bank branches per 100000 adults.

We estimate two separate models explaining the determinants of loan rates and portfolio quality. We measure loan rates as the spread between the yield charged by a microbank and the average yield prevailing in a country in a given period. Our paper is the first in the microbank literature to incorporate as a control variable the interest rate ceilings imposed by regulators in specific countries and periods, depending on microbank status. In our second model, we capture portfolio quality with a measure of delinquent loans known as portfolio-at-risk (PAR), which is the portion of outstanding loans of a microbank with payments overdue by, typically, 30 days or more. Methodologically, our study is close to several recent studies in banking that conduct international comparisons of the effects of competition (see e.g. Beck et al., 2007; Beck, Demirgüç-Kunt and Maksimovic, 2004; Claessens and Laeven, 2004; Demirgüç-Kunt, Laeven and Levine, 2004).

We introduce a unique data set of microbanks obtained from three main rating agencies, containing 379 microbanks located in 67 countries over the period 2002 to 2008. This allows us to cover an unusually large number of microbanks with high-quality data, that has been subject to a due diligence process, in the course of on-site visits by rating analysts. We carry out the necessary adjustments to guarantee consistency and comparability between the three data sets. This results in a total of 1452 microbank-year observations.

Our paper makes four main contributions to the literature. First, we provide a com-

prehensive picture of the competitive environment of microbanks worldwide and over time. Second, we find remarkably different competitive effects in nonprofit and for-profit microbanks. In general, loan rates and portfolio-at-risk (PAR) of nonprofit microbanks are insensitive to changes in concentration. In contrast, with increased competition, for-profit microbanks charge significantly lower rates and exhibit improved PAR. In particular, the effect of concentration on loan rates is nearly three times the one reported in previous studies in banking, even after controlling for interest rate ceilings. Third, our study reveals a competitive interplay between for-profit and nonprofit microbanks. Most notably, we find a deterioration of the PAR of nonprofit microbanks when there is a higher proportion of profit-oriented microbanks in the market. And fourth, we find evidence suggesting an information-based competitive mechanism at work in the microfinance sector. Both for-profit and nonprofit microbanks with a large pool of borrowers appear to enjoy an information monopoly in concentrated markets, which allows them to charge higher rates while experiencing reduced PAR compared to smaller microbanks. However, this informational advantage is apparently not sustainable in more competitive markets in the for-profit sector. This is consistent with low switching costs for borrowers and a dispersion of information among competing profit-oriented microbanks. Our results are robust to the inclusion of variables accounting for public and private credit registries across countries, which have not been considered previously in the literature.

This paper is organized as follows. Section 2 describes our data and variables. Section 3 describes the competitive environment in the microfinance sector worldwide and over time. Section 4 presents our model specification. Section 5 shows our empirical results. In Section 6 we present a number of robustness tests. Finally, Section 7 concludes.

2 Data description

We use an original data set collected from three global rating agencies of microfinance institutions, Planet Rating, MicroFinanza Rating and Microrate[1]. The combination of these three sources results in a sample of 379 microbanks from 67 countries around the world between 2002 and 2008. Rating agencies offer evaluation services of risk profile, financial and social performance of microbanks wishing to attract new funding from donors or investors. This evaluation is based on an analysis of financial statements, portfolio

[1]Data are obtained from the rating agencies under confidentiality agreements.

quality reports and interviews with the different stakeholders (i.e. clients, credit officers, staff, board members, management team, etc) conducted by rating analysts during the course of on-site visits. Thus, each rating report contains financial, social and managerial information that has been verified at its source[2]. We carry out the necessary adjustments and recalculate all financial ratios to guarantee consistency and comparability between the three data sets. The very high quality of the information differentiates our data set from other samples used in previous studies, typically based on self-reported information of the Microfinance Information Exchange (MIX). In addition, our dataset contains 316 observations from 140 microbanks that do not disclose to the MIX, but are covered by rating agencies. Our sample is one of the largest used in microfinance empirical studies to date.[3] Furthermore, one major advantage of our database is that we track the changes in microbank legal status over time from rating reports. These changes are ignored in other studies using MIX data, since the legal status available on the MIX website is the last updated one.

The rating report of each microbank includes the financial statements over at least two and up to seven years. The initial year in our database contains 81 microbanks. By the end of 2004 the database contained about 255 microbanks, and by 2006 nearly 290 microbanks were available, which illustrates the increasing importance of the sector and demand for reliable information. Figure 1 shows the composition per region of our sample. The large majority of observations in our data set are in Latin America (43%), followed by Africa (26%), and Eastern Europe (19%).

Microbanks constitute a heterogenous group in terms of mission (for-profit vs nonprofit), legal status (NGO, bank, cooperative, etc), services they provide (e.g. deposit-taking or not) and lending technologies. As stated above we track these characteristics over time for each microbank. Our sample reflects the heterogeneity of this industry. Overall, NGOs represent the most common organizational form in our sample, around 40% of observations, followed by non-bank financial institutions (NBFI, 39%), cooperatives (15%) and banks (5%). One third of observations in our database correspond to for-profit organizations, from which

[2]In their reports, rating agencies document and correct errors they find in the accounts of microbanks. For example, a rating report states: *"The rating team found errors in aging of overdues and portfolio-at-risk during their visits to the branch offices."* . For a few microbanks no rating was given due to suspicious or unreliable data; we eliminate such microbanks from our sample.

[3]For example Hartarska and Nadolnyak (2007) use 114 microbanks from the MIX, while Cull, Demirgüç-Kunt and Morduch (2007) use data from the Microbanking Bulletin (MBB), a subsample of 124 microbanks of the MIX that has been adjusted by MBB staff or a local partner to help ensure comparability across countries. Cull et al. (2009) uses 342 observations from 238 microbanks in MBB.

only 16% have a bank status (Table 1, Panel A). The proportion of for-profit microbanks in our sample varies across regions. For example, most microbanks in Asia are for-profit institutions (around 61%), while we have none in the Middle East and North Africa. Their presence in other regions remains around 30% of the total (Table 1, Panel B). One question is whether this variation reflects differences in regulation or entry barriers preventing for-profit organizations from entering the microfinance sector. Regarding nonprofit microbanks, a large majority of observations -56%- are NGOs, 23% are NBFIs and 20% are cooperatives. Nonprofit institutions are significantly smaller, reflecting the fact that they are in general not regulated and therefore are constrained in the use of leverage, which limits their growth opportunities (Table 1, Panel C). Further, 44% of them in our sample are allowed to take deposits, see Panel D. Nonprofit microbanks clearly focus on more financially disadvantaged clients by offering an average loan size of $866 which is small compared to $1403, or more, offered by for-profit, see Table 2 for a definition of our variables and Table 3 for descriptive statistics.

Our sample is also representative of the wide variation of microbanks in terms of age and size. It contains some of the oldest and largest microbanks in most countries, with assets above USD 500 million and more than one million borrowers. Yet, our sample also includes relatively small microbanks with a few dozens of borrowers, as well as young microbanks, many of which have started operations during our sample period. The average microbank in our sample is 10.3 years old, has total assets of about 18$ million, and serves about 21300 active borrowers. Also, our average microbank charges a real interest rate of approximately 20% above the country rate. Finally, the average portfolio-at-risk in our sample is 5%. Microbanks adopt specific lending technologies that differentiate them from traditional banks. Namely, they institute joint liability mechanisms and strong relations between borrowers and credit officers, the latter having the responsibility of monitoring in-situ the individuals or groups that apply for credit. This is different from the traditional lending methodology of banks, based on credit scoring and distance monitoring. As a result, microbanks enjoy lower portfolio-at-risk and have proven to be profitable. Table 4 shows the distribution of microbanks across status and lending technologies. Note that a microbank may use more than one lending technology. Only few NGOs and NBFIs engage exclusively in village or group lending, while the vast majority of microbanks have at least a fraction of their portfolio lent to individuals (1279 observations). Microbanks that combine individual and group lending are the most prevalent.

Finally, Table 5 (Panels A and B) shows the number of observations in our sample over time by legal and profit status.

3 The competitive environment of microfinance across countries

To assess the intensity of competition in the microfinance sector in each country, we rely on a second source of information, the Microfinance Information Exchange (MIX). The MIX operates since 2002, but collects self-reported information from microbanks back from 1995. The MIX has become the largest source of public information in the microfinance sector, although many microbanks that report to the MIX are not audited. Between 2002 and 2006 the number of microbanks tracked by the platform grew very rapidly, reaching a stable number of about 1160 microbanks in 2006[4]. The platform's growth partly reflects the fact that microbanks compete actively for scarce funding. Reporting to the MIX gives microbanks visibility and signals transparency, which helps them attract potential donors or investors. In this respect, the MIX mirrors the competitive environment and the structure of the industry across countries. It certainly contains a representative sample in each country which includes the total number and size of the largest and most important players. These two pieces of information -number and size- allow us to construct a Herfindahl-Hirschman concentration index (HHI) for each year and for each country[5]. We also calculate the market share, in terms of gross loan portfolio, of each individual microbank in our sample with respect to all microbanks in the MIX in the same country and period to capture the degree of market power.

We implement two adjustments prior to the calculation of the concentration index. First, in 42 countries we correct the number of microbanks present in the MIX by adding 316 microbank-year observations, corresponding to 140 microbanks from our database from rating agencies that do not report to the MIX. Second, we correct the number of microbanks in the MIX by adding those microbanks in existence in the years prior to the first reporting date. For those years, we make an estimation of their size by linear extrapolation of the

[4]These numbers correspond to a download of the MIX of December 2010.

[5]The Herfindahl-Hirschman Index (HHI), is a measure of industry structure defined as the sum of the squares of the market shares of the firms within the industry, where the market shares are expressed as fractions. Thus, it ranges from 0 to 1, where 0 indicates a large number of very small firms and 1 indicates a single monopolistic producer. An increase in the Herfindahl index generally indicates a decrease in competition and an increase of market power.

Gross Loan Portfolio between their inception year and the year in which they first report to the MIX. Likewise we interpolate gaps in reporting in the 2002 to 2008 period. After these adjustments we obtain a total of 7243 market share observations, corresponding to 1335 microbanks, which is the sample we use to construct our concentration measures (see Table 5, Panel C).

Figures 2 and 3 show the structure of the MIX for the countries in our data set in 2002 and 2008. The figures reveal wide variation of the degree of development of the microfinance industry in the cross-section and over time. The MIX reflects the fact that countries with a long tradition of microfinance, like Philippines, Peru, Brazil and Bolivia, have more mature markets, with hundreds of microbanks, while in countries like Tunisia, The Gambia, Yemen and Chile, the industry is less developed, with only few important participants, due to different reasons. In the case of Yemen, for example, the fact that the country had no tradition of money lending and that people in rural areas in particular had no experience with credit, represented a significant barrier to the development of microfinance (see Lyman, Mahieux and Reille, 2005). Chile also has a slim industry partly because it is one of the richest developing countries. Figures 4 and 5 show the HHI per country in 2002 and 2008. Market shares are calculated in terms of microbanks' gross loan portfolio, as in previous studies in the banking literature. The average HHI across countries in our database is 0.40 and the average market share is 7%. There is wide variation in market structure across countries, even among countries with a longer tradition of microfinance. Typically, in less concentrated markets we observe a few large microbanks that are clear market leaders, and dozens of smaller microbanks that follow their lead. This is the case of Vietnam. Other countries, like Bolivia, Peru and Nicaragua have instead very fragmented markets, with no clear market leader. The two figures also reveal increasingly competitive conditions over time in most countries, for example Mexico (from 0.75 in 2002 to 0.3 in 2008), Guatemala (from 0.3 in 2002 to 0.15 in 2008) and Ecuador (from nearly 0.4 in 2002 to 0.12 in 2008). Remarkably, in Russia, the sector has experienced a consolidation which resulted in an increase in Herfindahl from 0.55 in 2002 to about 0.70 in 2008.

Besides considering the structure of the industry as a proxy for the intensity of competition, we also take into account the possibility that competitive pressures arise between nonprofit and profit-motivated microbanks. To capture this effect, we calculate for each country and each period, the share of the total dollar amount of loans issued by profit-motivated institutions relative to the total issued by all microbanks. For this calculation

we consider the same sample of microbanks used to construct the concentration index. We obtain an average for-profit share in our sample of 53%. Put differently, for-profit institutions issue the large majority of loans in dollar value, although nonprofit microbanks outnumber those for-profits by almost two times (see previous section). There is, though, large variation across countries and over time. Figures 6 and 7 show the distribution of for-profit share across countries for 2002 and 2008. In most countries the for-profit share increases during the sample period, which may represent a growing competitive pressure on nonprofit microbanks. For example, in Philippines the for-profit share increases from nearly 48% in 2002 to 58% in 2008. In El Salvador it increases from 81% to 90%. In Kenya, from 72% to 92%. In Bolivia, from 68% to 82%. There are a few exceptions, like Mexico, Ecuador and Peru, where the for-profit share was 70% or above in 2002, and declines to less than 60% in 2008. Finally, as explained in the previous section, we have a few countries where the for-profit share is constant over time. In one extreme, in countries like Moldova, Cambodia, Montenegro and Mongolia only for-profit microbanks operate over the sample period. At the other extreme, only nonprofit microbanks operate in countries like Egypt, Morocco, Jordan or Benin. The question that we address in the remainder of the paper is how these varying competitive conditions, in terms of industry structure or in terms of relative presence of profit-motivated institutions, affect the pricing strategies of both for-profit and nonprofit microbanks and the quality of their portfolios.

4 Model specification

We estimate two separate regressions, explaining yield spread and portfolio-at-risk (PAR) from a number of microbank and country specific characteristics. We estimate our models separately for the subsamples of for-profit and nonprofit microbanks, to allow for the possibility that these two categories of microbanks respond differently to competitive conditions. This distinction speaks directly to the debate on financial self-sufficiency vs subsidized models. We pool all observations and use robust standard errors.

4.1 Yield spread

We estimate the following specification:

$$\begin{aligned}\text{Yield Spread}_{ijt} &= \alpha_0 + \alpha_1 \text{HHI}_{jt} + \alpha_2 \text{Market Share}_{ijt} + \alpha_3 \text{FP Share}_{jt} + \alpha_4 \text{X-Eff}_{jt} \\ &\quad + \alpha_5 \text{S-Eff}_{it} + \alpha_6 \text{Ceiling}_{it} + \sum_k \gamma_k X_{k,ijt} + \varepsilon_{ijt}, \end{aligned} \tag{1}$$

where Yield Spread$_{ijt}$ is the difference between the loan rate charged by microbank i at time t in country j and the average loan rate prevailing in the same country and period. HHI$_{jt}$ is the Herfindahl Hirschman Index, a measure of gross loan portfolio concentration in country j at time t. Market Share$_{ijt}$ is the gross loan portfolio market share of microbank i at time t in country j. FP Share$_{jt}$ is the share of loans issued by for-profit microbanks and accounts for the relative presence of for-profit microbanks in country j at time t. X-Eff$_{it}$ and S-Eff$_{it}$ are the measures of efficiency of microbank i at time t derived from the cost function. We explain how we derive these two variables later in Section 4.4. Ceiling$_{it}$ is a dummy variable for the presence of interest ceilings that apply to microbank i in country j at time t. $X_{k,ijt}$ is a vector of K control variables that may affect loan rates and that account to some extent for differences in lending risk and loan maturity across categories of microbanks.

We compute the loan rate charged by a given microbank as the fraction of interest received on total loan amount outstanding. We obtain the average loan rate per country and per period from the World Bank Development Indicators. While the microfinance literature usually considers unadjusted rates (see e.g. Cull et al., 2007; Ahlin, Lin and Maio, 2011), we follow the practice of cross-country studies in the banking literature such as Corvoisier and Gropp (2002) of adjusting the rates. We want to make sure that we capture differences in interest rates that are related to the microfinance industry and not to other country-specific factors, and we believe that this adjustment is made all the more relevant by the great disparity in macroeconomic conditions of the countries in our sample. We cut the very extremes of the distribution of yield spread at the 1% and 99% to handle outliers.

Descriptive statistics for our dependent variable yield spread appear in Table 3. The average microbank in our sample charges a premium of 20% above the average loan rate in a given country and period. We find no significant difference between nonprofit and for-profit microbanks. However portfolio yields vary widely across countries, and may be particularly affected by legislated interest rate ceilings, which we discuss below in Section

4.6.

4.2 Portfolio-At-Risk (PAR)

We estimate the following specification:

$$\begin{aligned} \text{PAR}_{ijt} &= \alpha_0 + \alpha_1 \text{HHI}_{jt} + \alpha_2 \text{Market Share}_{ijt} + \alpha_3 \text{FP Share}_{jt} + \alpha_4 \text{X-Eff}_{jt} + \alpha_5 \text{S-Eff}_{it} \\ &\quad + \sum_k \gamma_k X_{k,ijt} + \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where PAR_{ijt} represents the portfolio-at-risk for microbank i at time t in country j and the other variables are defined in the previous section. Portfolio-at-risk captures the quality of a microbank's portfolio and is the preferred measure of risk-exposure in microfinance. Portfolio-at-risk is calculated as the total dollar value of outstanding balance of loans in arrears by 30 days or more as a percentage of total value of loans outstanding. The average microbank in our sample has a 5% of outstanding loans overdue (see Table 3), while a few microbanks exhibit very high levels of PAR, up to 65%. Nonprofit organizations have a higher PAR than for-profit ones. The difference is about 2% and it is statistically significant. We also find wide dispersion in the average PAR per country[6], it can be as a high as 6.8% in Palestine and as low as 0% in countries like Afghanistan, Argentina, Burkina Faso or Yemen.

4.3 Concentration

A primary objective in the present paper is to estimate the effects of concentration on yield spread and PAR. To capture the impact of market concentration, we use a Herfindahl Hirschman index (HHI). There is a long tradition in the banking literature of studying the effects of concentration on interest rates within the structure-conduct-performance (SCP) paradigm, see Bain (1956). The SCP contends that in more concentrated environments, banks engage in non-competitive conduct, charging higher loan rates, which leads to higher profits. Increased competition, instead, should have a positive effect from a welfare perspective, as it forces firms to reduce prices, which favors consumer surplus. In general these papers find a positive relation between concentration and loan rates using different

[6]The country average PAR is computed as an average, weighted by Gross Loan Portfolio using MixMarket data, for the subset of microbanks that report PAR in the MIX.

specifications, periods and markets (see e.g. Berger and Hannan, 1989; Hannan, 1991; Hannan, 1997; Cyrnak and Hannan, 1999; Sapienza, 2002). Thus, a first question we address in this paper is whether concentration matters for microbank lending rates, given the diversity of institutional environments, the rapidly changing competitive conditions and the coexistence of profit-oriented and nonprofit institutions.

The second question we address is whether concentration matters for microbank portfolio quality. The competitive mechanism can be distorted by several market failures resulting from the specific nature of banking, characterized by asymmetric information. For example, an adverse selection problem may arise as a result of borrower heterogeneity in their ability to repay loans and banks' independent but imperfect screening on borrower quality. Some banks will end up charging higher loan rates than their competitors while accepting only low quality borrowers that have been refused credit by other banks and are willing to accept more unfavorable rates. Thus, this adverse selection problem leads to a reduction in the average credit worthiness of borrowers as the number of banks increases (see Broecker, 1990). McIntosh and Wydick (2005) also provide a theoretical model of asymmetric information, applied to the microfinance sector. Asymmetric information between lenders about borrower quality creates an incentive for the most impatient borrowers to obtain multiple loans. As a result overindebtedness arises and repayment rates decrease, which creates less favorable credit conditions for all borrowers. Finally, another possibility is that as a result of intense competition and the consequent lower rates, banks' ability and incentives to invest in screening resources reduces, as a result of which portfolio quality decreases (see e.g. Gehrig, 1998; Hauswald and Marquez, 2006).

The empirical evidence on the relation between concentration and portfolio risk in the loan market offers conflicting results. For example, Dick (2006), Keeley (1990), Rhoades and Rutz (1982) find a positive relation between increased competition and different proxy measures of banks' risk profile (like loan loss provisions, write-offs, leverage). Jayaratne and Strahan (1998) find instead a negative relation. In a cross-country setting De Nicolo, Bartholomew, Zaman and Zephirin (2004) and Beck, Demirgüç-Kunt and Levine (2006) find opposite results for the relation between competition and the probability of a banking crisis, taken as an indicator of bank fragility. In the microfinance sector, the only empirical evidence to date is provided by McIntosh et al. (2005), who find evidence from a case study in Uganda that borrowers obtain multiple loans as interest rates and portfolio quality decrease. Yet, the question of the extent to which concentration is detrimental to portfolio

quality is of major relevance for microfinance, as exemplified by recent repayment crises (e.g. Morocco, Bosnia and Andhra Pradesh).

4.4 Market share and efficiency

An alternative theory to the structure-conduct-performance (SCP) is the efficiency-structure hypothesis. The efficiency-structure hypothesis contends that the relation between concentration and prices or profits is spurious because concentration is endogenously determined by firms gaining market shares as a result of their superior efficiency (see e.g. Peltzmann, 1977). A number of studies account for this potential endogeneity in the profit-structure relation by controlling for market share (Smirlock, 1985) and for measures of efficiency (e.g. Berger, 1995; Frame and Kamerschen, 1997). Typically these control variables substantially reduce the effect of concentration on profits, which supports the efficiency hypothesis. Thus, in this paper we use a similar approach to examine instead the relation between concentration and loan rates, although loan rates and market shares may be endogenously determined if microbanks gain market shares by offering more favorable loan rates (see Berger and Hannan, 1989).

In a recent paper, Caudill, Gropper and Hartarska (2009) estimate a cost function for a sample of about one hundred Eastern European microbanks. They find evidence for the fact that half the microbanks in their sample are becoming more efficient over time. We follow the banking literature in estimating a translog specification:

$$\begin{aligned}\log C = \quad & \alpha_0 + \textstyle\sum_i \alpha_i \log(q_i) + \sum_{ij} \alpha_{ij} \log(q_i) \log(q_j) + \sum_i \beta_i \log(p_i) \\ & + \textstyle\sum_{i,j} \beta_{ij} \log(p_i) \log(p_j) + \sum_{ij} \gamma_{i,j} \log(q_i) \log(p_j) + \varepsilon, \end{aligned} \tag{3}$$

where C is total operational cost, q_i are the outputs and the p_i are input prices. The inputs we use are physical capital and labor. This allows us to derive two measures of cost efficiency: X-Efficiency, which accounts for an optimal use of factors of production and S-Efficiency, an indicator of how close our microbanks are to producing at the cost-effective scale, which corresponds to the level of output that minimizes average cost.

We impose homogeneity of degree one of the cost function in prices by subtracting off the log of the price of physical capital for all price variables, including cost. We estimate a specification with Gross Loan Portfolio (GLP) and the number of loans as outputs, see

Table 16 in the Appendix. Like Berger (1995) we compute X-Efficiency as the ratio of average residual for a microbank, leaving out the current period, to the average residual for all microbanks for that year.

Scale-efficiency can be computed in the (possibly) multi-output case by considering the ratio of the ray average cost function to the actual average cost.[7] It can be computed in closed-form in the case of the translog cost function as S-Eff $= \exp\left(-\frac{(1-\varepsilon(q,p))^2}{2\alpha}\right)$, where $\varepsilon(q,p) = \sum_i \frac{\partial \log C}{\partial \log(q_i)}$ is the sum of the elasticities of cost with respect to all outputs and $\alpha = \sum_{ij} \alpha_{ij}$(see Balk, 2001, Section 10).

Table 3 shows descriptive statistics for X-Efficiency and S-Efficiency. Nonprofit microbanks exhibit higher scores of X-Efficiency than profit-oriented ones by 3%. However, for-profit microbanks exhibit superior S-Efficiency, by about 5%.

4.5 For-Profit share

Our methodological approach also takes into account the possibility that for-profit and nonprofit microbanks exert different competitive pressures. These differences cannot be captured by the concentration index, which treats them equally under the assumption that both markets are fully integrated. Under this hypothesis, any mutual competitive effects between both groups are symmetric. Instead, in our model we add a variable that accounts for the relative presence of for-profit microbanks among all microbanks in a given country for a given year. This allows for more complex spillover effects, as documented in the nonprofit literature. For example Hirth (1997; 1999) offer a theoretical model in which competition from nonprofits raises the quality of competing for-profit firms. There is a very large empirical literature mainly concerned with the market for hospitals and nursing homes, that identifies complex spillover effects. For instance, Grabowski and Hirth (2003) find that the quality of for-profit nursing homes improves with the share of nonprofits present in the market, as does overall quality in the market. Santerre and Vernon (2005) find that the presence of nonprofits improves the quality of for-profits, while the presence of for-profits leads nonprofits to improve efficiency. Also Martinez Peria and Mody (2004) use a similar variable (i.e. the share of foreign banks) to study the mutual competitive effects between foreign and domestic banks.

[7] The ray average cost function is the smallest average cost attainable for a given mix of outputs, where the minimum is obtained by varying the scale of production. This assumes that the outputs are kept in the same proportion and only the scale varies.

4.6 Interest rate ceiling

Some countries have imposed interest rate ceilings, that may affect the rates charged by microbanks. They may apply differently to banks, NBFIs, NGOs or cooperatives and they are intended partly to protect borrowers from predatory lenders. In some cases, ceilings are part of specific microfinance laws, as is the case for instance in Honduras, while in other countries, they are specified in usury laws or more general banking laws. We hand-collected information on interest rate ceilings from a variety of sources, including rating reports, country reports from rating agencies, the World Bank, CGAP, Economist Intelligence Unit, national microfinance associations and usury laws from different countries. We construct a dummy variable indicating the presence or not of interest rate ceilings in every country and sector (banks, NGOs, NBFI, etc) over time. We include this variable as a control in our yield spread regressions. In countries like Jordan or Niger, there is a ceiling on interest rates by law but it has never been applied in practice. In this case we consider that there are no interest rate ceilings. In some cases, interest rate ceilings are in place but specific microbanks are exempted for a certain period, in which case our dummy equals zero. As a result, we have 444 year microbank observations that are subjected to an interest rate ceiling, of which a large majority of 393 observations correspond to nonprofit microbanks (see Table 1, Panel E). The average yield spread of for-profit microbanks subject to an interest rate ceiling is 14%, while for nonprofit microbanks it is 19%. When interest rate ceilings do not apply these averages are 20% and 21% respectively.

4.7 Other microbank characteristics

We include the size and age of the microbank, loan size, number of borrowers, a dummy for deposit institutions, two dummies for lending technology, four dummies accounting for different world regions and four dummies accounting for legal status. The latter capture the possibility that microbanks in a particular category experience loan rates significantly different from other categories.

4.8 Country-specific and other controls

Finally, following Demirgüç-Kunt et al. (2004), we include measures of institutional development in a country, such as indicators of property rights protection and the degree of economic freedom, which potentially may restrict microbank activity or entry. We use

the World Bank Governance Indicators constructed by Kaufmann, Kraay and Mastruzzi (2009) (i.e. KKM indicators), and the Heritage Foundation Freedom Indicators. We only report the results for those indicators that appear to be most relevant, namely Regulatory Quality, Governance Effectiveness, Political Stability and the Heritage Foundation overall Score. [8] We also control for GDP growth and time effects by including seven time dummies to capture economy-wide shocks determining differences in lending rates and PAR across years.

5 Empirical results

5.1 Concentration and loan rates

The results of estimating Equation (1) are shown in Tables 6 and 7. We confirm that lending rates are sensitive to the degree of microbank concentration in a country and that this effect is mostly driven by for-profit organizations. Let us first consider Table 6, where we report different specifications using the entire sample. When country-specific variables are not taken into account, we find evidence that ceteris paribus, microbanks in more concentrated environments charge higher lending rates (Column 1). When we control for different World Bank and Heritage Foundation indicators, the effect reduces, but remains highly significant. The indicator for government effectiveness has the strongest effect (Column 3), an indication that the degree of concentration in a given country is determined to a large extent by the strength of its institutions.

In Table 7, we report similar regressions for the subsamples of for-profit and nonprofit organizations. Remarkably, we find evidence that the concentration index has a significantly higher effect on loan rates of for-profit organizations, even after controlling for country-specific indicators. For example, let us consider our regression reported in Column 3, where we control for government effectiveness. Moving from a country with an HHI equal to 0.25, which is close to the median HHI in our sample, to a higher-concentration country in the top decile of the distribution, with HHI equal to 0.75, would imply that for-profit organizations increase the yield spread with respect to the average lending rate in the country by 8.7%. The magnitude of this effect is nearly three times the one reported in

[8] Our regressions that include the remaining indicators from KKM namely Rule of Law, Voice and Accountability, Control of Corruption, and those from the Heritage Foundation namely Labor Freedom, Business Freedom, Freedom from Corruption, Fiscal Freedom, Monetary Freedom, Government Spending, Property Rights, Investment Freedom, Trade Freedom and Financial Freedom are available upon request.

several studies in the banking sector. For instance Sapienza (2002) analyzes the Italian market and her results indicate that a similar change in the HHI of 0.5 would increase the loan rate by 2.9%. Similarly, Cyrnak and Hannan (1999) in the US market report a 1% to 2.7% increase. However, the impact of HHI varies widely across studies and its magnitude is often much lower (see e.g. Kim, Kristiansen and Vale, 2005; Degryse and Ongena, 2008). The table also indicates that the impact of concentration on lending rates could be seriously overestimated (by nearly two times) if we do not control for the level of development of institutions and markets in a country (Column 1). Admittedly, both competition and lower interest rates are jointly favored by improved quality of regulation, government effectiveness and the level of business freedom.

The effect of concentration reduces substantially for nonprofit microbanks. The magnitude of the effect is between 30% and 40% of the effect on for-profits (Columns 6 to 10). It remains significant, except when controlling for government effectiveness. The fact that lending rates of nonprofit institutions are less sensitive to changes in the concentration index indicates that yields might already be depressed due to donor restrictions, limiting the pressure for further rate reductions. Also, the concentration index may not capture well the market structure of nonprofit microbanks, since these are likely to have a different objective function than their profit-oriented counterparts. Finally, there might be more opportunities for product differentiation in the nonprofit sector in terms of loan size, loan type, deposit products, etc., which makes this segment less susceptible to price competition (see e.g. Porteous, 2006).

Beyond the concentration index, for-profit share captures a different dimension of competition. It allows for a differential competitive pressure between for-profit and nonprofit microbanks. The null hypothesis is that both for-profit and nonprofit markets are fully integrated, in which case any mutual competitive effects are symmetric, and the for-profit share has no effect. Our regression results in Table 7 indicate that, ceteris paribus, a 10% increase in the relative presence of for-profit microbanks in a country, triggers a reduction in the loan rates charged by these microbanks of 1.8% to 2.2%, depending on our model specification (Columns 1 to 5). We also find some evidence that the loan rates of nonprofit microbanks react to the increased presence of for-profit institutions, but in the opposite direction: they increase by nearly 30 to 40 basis points (Columns 6 to 10), although this effect is only significant when we effectively control for institutional development indicators such as regulatory quality. This is consistent with the idea stated above that nonprofit

microbanks have a limited capacity to compete with further price reductions. Thus, in the presence of increased competition from for-profit microbanks, nonprofits might be forced to concentrate on niche markets, where they have increased flexibility to adjust their prices. This ability to shift to other markets and circumvent competitive pressures may also explain why nonprofit institutions are less sensitive to the concentration index. The higher lending rates of nonprofit microbanks might also be a response to higher operational costs, which are sensitive to increased competition from profit-oriented microbanks as documented by Baquero, Hamadi and Heinen (2011). In contrast, increased competitive pressure disciplines for-profit microbanks in terms of costs, which may partly explain why they charge lower interest rates.

Interest rate ceilings significantly reduce yield spreads by 4.2% to nearly 6%, in our estimations for the entire sample (see Table 6). However, the effect is particularly striking for profit-oriented microbanks (Table 7), which reduce their interest rates by about 10%, when ceilings are imposed. To put this number in perspective, this means that imposing interest rate ceilings has the same effect on profit-oriented microbanks as a change in concentration of 38% to 67% of the way from monopoly to perfect competition, depending on the specification. In contrast, the effect of interest rate ceilings on nonprofits is substantially smaller at about 3%, yet significant in all specifications.

The deposit dummy has a negative impact on loan rates, reflecting the fact that deposits are a low cost source of funding for microbanks. Ceteris paribus, deposit-taking institutions in the nonprofit sector charge lending rates that are about 2% lower, compared to lending-only microbanks. We do not find this effect in the for-profit sector. This suggests that nonprofit microbanks that do not take deposits will find it hard to achieve self-sustainability in competitive environments, where loan rates face further downward pressure.

Other control variables in our model are also statistically significant. Large nonprofit microbanks, in terms of total assets, charge lower rates. Nonprofit institutions specialized in either group or village lending are able to charge substantially higher lending rates, by 3.5% and 6.9% respectively, compared to microbanks that only lend to individuals. This result partly reflects the fact that borrowers face higher switching costs in group or village lending (see Porteous, 2006). Furthermore, group lending microbanks and specially village banking microbanks serve the poorest, they are in general the least profitable and are heavily subsidized (see Cull et al., 2007). Thus high yields partly compensate the large average costs of serving very small loans.

Finally, the coefficient for market share is not significant and thus our results do not support the market power hypothesis stated above. Most notably, however, the coefficient for the number of borrowers is positive and highly significant for both nonprofit and for-profit institutions. If a microbank doubles its borrower base, this implies an increase in yield spread by 5.5% to 7.7%. This effect cannot be the result of a larger cost structure, since we already control for lending technology and loan size. Our interpretation of this result is that a microbank with a large customer base has gathered more information about the market and over time and is more effective in its screening than a bank with few customers. Therefore, such a microbank enjoys an information monopoly from which it can extract rents (see e.g. Dell'Ariccia, 2001; Marquez, 2002). However, a microbank may lose its information monopoly as competition increases, particularly if switching costs are sufficiently low. We will explore the combined effects of information and concentration later in a separate section. Below we first analyze the effects of concentration on portfolio quality of microbanks.

5.2 Concentration and portfolio-at-risk

Our results so far support the hypothesis that increased competition has a positive effect overall, as it forces the average microbank to reduce rates, which favors borrower surplus. In this section we are primarily interested in the effects on portfolio-at-risk (PAR), as an indicator of the allocative efficiency of microbanks, while taking into account the competitive interplay between for-profit and nonprofit microbanks.

Table 8 summarizes our estimation results of Equation (2) explaining the determinants of portfolio-at-risk for the entire sample. In Columns 2 to 5 we control for different country-specific measures of institutional development. In all our specifications, we find that there is no evidence that the concentration index affects PAR. However, the coefficient of for-profit share is positive and highly significant and is robust across specifications. For example in Column 4, ceteris paribus, a 10% increase in the relative presence of for-profit institutions in a given country entails an increase in PAR of 0.23% for the average microbank in the country. Several control variables in our model offer a description of the conditions under which portfolio quality worsens or improves in the microfinance industry. We find that older microbanks and microbanks with more assets experience a significant deterioration in portfolio quality, while we find significant evidence of improved PAR for microbanks with larger numbers of borrowers. This supports the argument we made in the previous

section that a microbank with a large borrower base has an informational advantage, as it has more information about the market gathered over time, which improves its screening effectiveness. We will explore the implications of this hypothesis in a separate section below. We find no significant differences in PAR between microbanks with different lending technologies. Our results also suggest differences in portfolio quality across regions. African microbanks exhibit significantly higher PAR compared to other regions, while microbanks in Eastern Europe exhibit the best portfolio quality, followed by those in Latin America. Further, ceteris paribus, microbanks enjoy portfolios of better quality if they are located in countries where GDP is growing more rapidly. Finally our results show that NGOs and cooperatives have lower portfolio quality than institutions with a bank status.

In Table 9 we explore the possibility that the drivers of portfolio quality are different for nonprofit and for-profit institutions. Remarkably, the coefficient for the concentration index becomes significant in most specifications for the subsample of for-profit institutions (Columns 1 to 5), while the effect remains absent in nonprofit microbanks (Columns 6 to 10). Although controlling for some institutional development indices (e.g. government effectiveness, in Column 3) takes away most of the effect, there is some evidence that competition has a positive impact on PAR in profit-oriented microbanks. A decrease in HHI from 0.75 to 0.25 results in a decrease of portfolio-at-risk by 1.5 to 3.5% (specifications in Columns 3 and 4). Put differently, our results do not support the notion that asymmetric information distorts the competitive mechanism by reducing the screening abilities of microbanks (see e.g. McIntosh et al., 2005) or by inducing an adverse selection of borrowers (e.g Broecker, 1990). We rather get the opposite result. On average, for-profit microbanks appear to worsen their allocative efficiency and to finance lower quality borrowers in more concentrated environments. In fact, this supports the argument of Boyd and De Nicolo (2005) that an increase in concentration leads banks to charge higher loan rates, which increases the bankruptcy risk of their borrowers. This decline in banks' portfolio quality is further enhanced by moral hazard on the side of borrowers, who adapt their own investment strategies towards more risk in response to these higher interest rates. Also for-profit share captures a notable competitive effect on nonprofit microbanks, since a 10% increase in for-profit share results in an increase in PAR of up to 52 basis points, which rejects the hypothesis that for-profit and nonprofit markets are fully integrated. This, together with our finding in the previous section, that nonprofit loan rates increase with the share of for-profits in the market, supports the conjecture that nonprofit institutions might be

forced to focus on niche markets where the trust-worthiness of borrowers decreases.

5.3 Competition, information dispersion and switching costs

One effect that needs further analysis is the highly significant impact of the number of borrowers on both yield spread and portfolio quality in for-profit and nonprofit institutions. Our results above indicate that microbanks with large numbers of borrowers exhibit higher yield spreads and portfolios of better quality than those with small numbers of borrowers. We argue that microbanks with large numbers of borrowers have an informational advantage over smaller microbanks for two reasons. First, the information on borrowers is less disperse, particularly in very concentrated markets (see e.g. Marquez, 2002). Second, a microbank with a large pool of borrowers has enhanced its relation with its clients by acquiring information about them over time. These two factors together not only improve a microbank's screening efficiency but also increase switching costs for borrowers. Therefore, microbanks with large numbers of borrowers enjoy an information monopoly, which allows them to extract rents.

An information monopoly is also likely to deter competition from new entrants, who will attract the least trust-worthy borrowers (see Dell'Ariccia, 2001), while decreasing the loan rates to remain competitive. New entrants will find it hard to build a clientele unless switching costs for borrowers are sufficiently low. In this case, increased competition may result in information dispersion and a loss of the information monopoly, as borrower turnover intensifies (see e.g. Marquez, 2002). We can then expect a deterioration of portfolio-at-risk and a loss of market power of microbanks with large numbers of borrowers in more competitive environments. To test this hypothesis, we estimate Equations (1) and (2) by including an interaction term between the number of borrowers and HHI. As before, we estimate these models separately for the subsamples of for-profit and nonprofit microbanks. The results are shown in Table 10.

In the yield spread regressions (Panel A), the coefficient of the interaction term is positive and significant in all specifications in the for-profit sector (Columns 1 to 5). To better understand this interaction in for-profit microbanks, we plot the specification in column (3) in Figure 8. The interaction effect supports our argument that the number of borrowers is a proxy for market power, particularly in concentrated markets, presumably as a result of an informational advantage. Larger for-profit microbanks are able to exert market power in concentrated markets, while small for-profit microbanks are forced to compete

with lower rates (line L1-S1). Our evidence in Figure 8 is also consistent with a loss of this informational advantage in less concentrated markets, where large microbanks charge lower interest rates compared to concentrated markets (line L1-L0). The consequence of this reduced market power of large microbanks is that smaller ones are able to increase the interest rates they charge with respect to more concentrated markets (line S1-S0). Hence, in more competitive environments, interest rates of large and small microbanks tend to converge: the shape of the relation between number of borrowers and loan rates is nearly flat when HHI is equal to zero (line L0-S0). On average, the interest rate reduces with competition, indicating that the loss of market power by large microbanks is the dominant effect, as evidenced by the coefficient of HHI in the non-interacted regressions in Table 7.

Meanwhile, in the PAR regressions (Table 10, Panel B), the interaction term in the for-profit sector is negative and significant in all specifications (Columns 1 to 5). The coefficients of HHI is also significant. We plot this interaction for the specification of column (3)in Figure 10. Again, our results support the notion of an informational advantage of for-profit microbanks with many borrowers, as they exhibit much better PAR in concentrated markets (point L1). With increased competition, however, they lose their informational monopoly (point L0). Further, while the portfolio quality worsens for large microbanks, it improves for small ones (line S1-S0). This is consistent with low switching costs and high borrower turnover, as a result of which information becomes more disperse in the market, allowing small microbanks to capture some of the good-type borrowers. The net effect is that the PAR of large and small microbanks converges in more competitive markets (line L0-S0 in Figure 10 is almost flat), while the average PAR tends to reduce significantly, as can be seen from the coefficients of HHI in the non-interacted regressions, in Table 9.

We find a very different pattern in the nonprofit sector. It seems that nonprofits overall are less reactive to concentration, but that the number of borrowers has a larger impact, compared to for-profits. The interactions are less significant than in for-profits, especially for PAR (Columns 6 to 10 in Table 10, Panel B). We plot this interaction for the specification in column (8) in Figure 11. Nonprofit microbanks with a large pool of borrowers have much better PAR, irrespective of the level of concentration, (line L1-L0 in Figure 11). Put differently, they do not lose their informational advantage with competition at the expense of small microbanks. This suggests the presence of higher switching costs in the nonprofit sector, which reduces borrower turnover and prevents information dispersion between microbanks.

Also in the yield-spread regressions we find evidence consistent with high switching costs among nonprofit microbanks. The interaction term in the nonprofit sector in Table 10, Panel A, is negative and significant (Columns 6 to 10). The coefficients of number of borrowers and HHI are also significant, although the sign of HHI is reversed compared to the for-profit sector. We plot this interaction for the specification in column (8) in Figure 9. The relation between number of borrowers and loan rates is always positive, irrespective of the level of concentration (lines S0-L0 and S1-L1), suggesting once again the presence of an informational monopoly that benefits large microbanks. Furthermore, nonprofit microbanks with a large customer base seem to be relatively insensitive to the level of concentration (line L1-L0). They apparently succeed in retaining their informational advantage in less concentrated environments, consistent with high switching costs and low borrower turnover. As their proprietary information is not dispersed among competing microbanks, they are still able to extract rents from their clients.

Overall, our results are consistent with an information-based competitive mechanism, particularly in the for-profit sector, which seems to be characterized by low switching costs. Under competitive pressure, large for-profit microbanks lose their informational advantage as information dilutes among competing microbanks, which results in lower interest rates and worsened PAR. The nonprofit sector instead behaves very differently, and our results are consistent with high switching costs which prevent a deterioration of PAR as competition increases. High switching costs coupled with a monopoly of information represent a huge competitive advantage for large nonprofit microbanks.

6 Robustness tests

6.1 Commercial bank branch penetration

We perform several robustness checks on our results. A first concern is that also large banks enter the microfinance industry and exercise some competitive pressure on microbanks. To capture this effect, we add measures of market penetration from the Financial Access Survey to the set of variables accounting for the competitive environment. More specifically, we use the number of commercial bank branches per 1000 km^2 and per 100000 adults. These indicators of geographic and demographic penetration were constructed by Beck et al. (2007) to measure financial sector outreach across countries. Since these variables are only available for a subset of 41 countries of our sample, the number of observations in these

robustness checks is reduced to about half our sample. Our estimations with these variables are shown in Tables 11 and 12 for yield spread and Tables 13 and 14 for PAR.

Although geographic and demographic penetration have a significant impact on some specifications for loan rates and PAR, they don't take away the effect of HHI and for-profit share, discussed in the previous section. For instance, demographic penetration has a significant negative impact on loan rates of for-profit microbanks (Table 11, Panel B). An increase by 10 branches per 100000 people triggers a reduction of 1% to 4% in interest rates of for-profit microbanks. Yet, our main results in this paper, namely the effects of HHI and for-profit share discussed in the previous section are robust to this alternative specification and to a reduced sample. It also remains clear that it is mostly the for-profit microbanks that are affected by increased competition from mainstream banks, while the loan rates of nonprofit microbanks are relatively insensitive. This is consistent with the findings of Cull et al. (2009) that bank penetration mostly affects microbanks that are commercially funded and that engage in individual lending.

6.2 Alternative measures of concentration

We check the robustness of our results using an alternative indicator of concentration, the 3-firm concentration (CR3), which is the total market share of the three largest firms in the market[9]. The results with this variable are qualitatively and quantitatively very similar to the ones obtained with HHI, except for the interactions with number of borrowers, that are not significant in the case of the yield spread of nonprofits (Table 10, Panel A, Columns 6 to 10). This again suggests that nonprofits are maybe not that responsive to competitive conditions in their pricing. We also considered using the inverse of the number of players in the market. Arguably, this indicator is less prone to endogeneity problems, as it reflects entry and exit, which are less influenced by changes in market shares. However in our case, it is not feasible to reliably construct such an indicator, since it is impossible to obtain the actual number of microbanks in the market, some of which might be very small.

6.3 Credit bureaus and public credit registries

We test the robustness of our estimates in the PAR regression to the presence of institutional information-sharing mechanisms in a country. Public and private credit information

[9]These results are not shown due to space constraints, but they are available from the authors upon request.

registries (i.e. credit bureaus) are in place in many countries with the purpose of reducing adverse selection and moral hazard problems arising from asymmetric information between lenders and borrowers. On the one hand, they are meant to provide incentives to borrowers for timely repayments. On the other hand, they should help to reduce the information monopoly that lenders have over their clients. However, since credit bureaus offer a safety net, they may actually induce lenders to take on more risks and to overlend (see e.g. McIntosh and Wydick, 2009). Our tests focus primarily on the effects of credit registries on the information dispersion mechanism documented in the previous section. We obtain data on credit registries from the World Bank data set on Doing Business, which offers information on the degree of coverage of public and private credit registries per country (as a percentage of the adult population above age 15). Given the possibility that public and private registry coverage overlap in a given country, we take the one that provides the highest coverage. Data on credit registries is only available from 2004 onwards and for all countries from 2005, thus our sample reduces significantly.

Table 15 shows the estimates of our model of PAR with an interaction term between the number of borrowers and HHI, controlling for the coverage of credit registries. The number of observations reduces by 32 and 40% for profit-oriented and nonprofit microbanks, respectively, compared to Table 10 (Panel B). Notably, the coverage of credit registries has a significant and positive impact on PAR of for-profit microbanks. We find that a 50% increase in population coverage increases PAR by nearly 3%. There is no impact on nonprofit institutions. Put differently, ceteris paribus, institutionalized credit information-sharing mechanisms have a deteriorating effect on the average portfolio-at-risk of profit-oriented microbanks. Yet, our previous results are robust to this alternative specification and the reduced sample size. The interaction effect between the number of borrowers and HHI increases slightly compared to Table 10 (Panel B), as does the coefficient for HHI. The coefficient for the number of borrowers increases tenfold and becomes significant. The most apparent change with respect to Figure 10 is that line S0-L0 is now significantly upward sloping. We can speculate that part of the PAR convergence of large and small microbanks that we observe in our previous regression is actually due to the presence of credit registries and not only to information dispersion. When we control for credit registries, a full convergence is no longer achieved.

In an alternative specification (not reported) we control for the Depth of Credit Information Index. This is an indicator of the scope and accessibility of credit information

distributed by credit registries (i.e. Depth of Credit Information Index). This indicator takes values from 0 to 6, where higher values represent broader availability of credit information. This variable significantly increases PAR only in the non-interacted regression, but its effect disappears when an interaction between number of borrowers and Herfindahl is included. We also construct a dummy for the presence of a credit registry from a number of sources, including rating reports, the World Bank, CGAP, Economist Intelligence Unit and a number of press documents, among others. Yet this dummy has no significant impact. All in all, our main results concerning PAR and the information dispersion mechanism are robust to these additional tests.

6.4 Exclusion of market share and loan size

We also reran the yield spread regressions leaving out market share, due to concerns that this variable might be endogenous. This was pointed out by Berger and Hannan (1989) who note that the inclusion of market share in a price regression can be problematic if banks charging lower rates tend to get higher market shares. Our results (not reported) are hardly affected when we leave out market share, which is not surprising given the low level of significance of this variable overall. Another variable that might be endogenous to yield spread is loan size. Again, leaving out this variable does not alter the impact of HHI and For-Profit share on yield spread and PAR.

7 Concluding remarks

In this paper we investigate the effects of competition on loan rates and portfolio-at-risk of microbanks in 67 countries from 2002 to 2008. We analyze in particular two sources of competitive pressure. The first is the decreasing overall market concentration, resulting from entry into the sector of both for-profit and nonprofit microbanks; the second is the overall increase in the share of profit-oriented institutions attracted by the success of microfinance lending technologies.

We find indeed remarkable differences in the competitive conditions for nonprofit and profit-oriented microbanks. Loan rates and PAR of nonprofit microbanks are mostly insensitive to changes in concentration. In contrast, our results show that with increased competition, for-profit microbanks reduce their loan rates, favoring consumer surplus. According to our most conservative estimate, a change in HHI of 0.5 implies an increase in

the yield spread by 8.7% which is about three times the effect reported in several studies in the banking literature. In particular, we control for interest rate ceilings, which very significantly reduce rates in for-profit microbanks by about 10%. This is equivalent to the effect of a reduction in concentration of 38% to 67% of the way from monopoly to perfect competition, depending on the specification. In contrast, interest rate ceilings have a substantially smaller effect on nonprofits. We also find that for-profit microbanks are more sensitive to competition from other for-profit microbanks. A 10% increase in for-profit share in a country induces a reduction in for-profit loan rates of 1.8% to 2.2%. Finally, for-profit microbanks exhibit improved portfolio-at-risk in more competitive environments. A decrease in HHI of 0.5 results in a decrease of portfolio-at-risk by 1.5 to 3.5%. Overall, we conclude that competition matters in the for-profit sector and that it has a positive effect from a welfare perspective, both in terms of yields and portfolio quality.

Our PAR regressions also capture a mutual effect between for-profit and nonprofit microbanks. A 10% increase in for-profit share results in an increase in PAR of nonprofit institutions of 52 basis points. One possible explanation is that nonprofit microbanks circumvent competition from profit-oriented microbanks by moving to new markets where they have less experience and information about borrowers.

Further, our study also uncovers an information-based competitive mechanism at work in the microfinance sector. Microbanks with large numbers of borrowers in concentrated markets appear to enjoy an information monopoly, which allows them to charge higher rates while experiencing reduced PAR compared to smaller microbanks. In a competitive environment, however, large for-profit microbanks exhibit lower interest rates and worsened PAR compared to concentrated markets, while small microbanks improve their PAR and are able to charge higher rates. This is consistent with low switching costs for borrowers in the for-profit sector, resulting in dispersion of information among competing microbanks and thus in a loss of the informational advantage of large microbanks. The nonprofit sector instead behaves very differently. Our results are consistent with high switching costs in this sector, which prevent a deterioration of PAR of large nonprofit microbanks as competition increases. High switching costs coupled with a monopoly of information appear to be a major competitive advantage for nonprofit microbanks with large numbers of borrowers.

Finally, our results are robust to alternative specifications using different measures of market concentration, controls for bank penetration, country-specific measures of institutional development, as well as variables accounting for public and private credit registries.

While previous studies suggest that PAR might be compromised by overborrowing as a result of competition, our paper shows that the effects of competition on PAR and loan rates are largely dependent on whether a microbank is for-profit or nonprofit, whether or not it holds a large enough pool of borrowers, and crucially, on whether it can maintain its informational advantage.

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8 Tables

Table 1: Legal Status, Region, Regulation Deposit Taking and Interest rate ceilings, according to Profit Status (microbank-years)

	Profit status		
	For-profit	Nonprofit	Total
Panel A: Legal status			
NBFI	324	238	562
NGO	0	588	588
Cooperative	0	211	211
BANKS	73	0	73
OTHER	8	10	18
Total	405	1047	1452
Panel B: Region			
AFRICA	113	262	375
ASIA	52	33	85
ECA	81	193	274
LAC	159	462	621
MENA	0	97	97
Total	405	1047	1452
Panel C: Regulation			
Regulated	350	437	787
Non-Regulated	55	610	665
Total	405	1047	1452
Panel D: Deposit			
Take Deposits	235	464	699
Non-Deposits	170	583	753
Total	405	1047	1452
Panel E: Interest rate ceiling			
Interest rate ceiling	51	393	444
No interest rate ceiling	354	654	1008
Total	405	1047	1452

This table shows the distinction between for-profit and nonprofit microbanks in our sample according to different characteristics. According to their status, we distinguish between non-bank financial institution (NBFI), non-governmental organization (NGO), cooperative, bank, or other. Second, we distinguish them according to Region. Third, we distinguish them according to whether they are regulated or not. Fourth we classify them into deposit-taking and non deposit-taking institutions. Finally we distinguish the microbanks according to whether they are subjected to interest ceilings or not.

Table 2: Variable Definition

Variable name	Explanation
Yield spread	Yield spread is adjusted real portfolio yield minus real lending interest rate.
PAR	Portfolio-at-risk is the portion of outstanding loans of a microbank with payments overdue by 30 days or more.
N. Borrowers	Log of total number of borrowers.
Loan Size (% of GNI)	Average loan size as % of p.c. Gross National Income (GNI).
Market Share	Market Share based on gross loan portfolio.
X-Eff	X-Efficiency accounts for an optimal use of factors of production.
S-Eff	S-Efficiency is an indicator of how close the microbanks are to producing at the cost-effective scale, which is the level of output that minimizes average cost
Size	Log of total assets
Age	Log of age
Individual Lending	Dummy for microbanks where Individual Lending makes up the largest fraction of Gross Loan Portfolio (GLP)
Group Lending	Dummy for microbanks where Group Lending makes up the largest fraction of Gross Loan Portfolio (GLP)
Village Banking	Dummy for microbanks where Village Banking makes up the largest fraction of Gross Loan Portfolio (GLP)
Deposit	Dummy for deposit-taking microbanks
Bank	Dummy for banks
Cooperative	Dummy for cooperatives
NBFI	Dummy for non-bank financial institutions (NBFI)
NGO	Dummy for NGOs
Africa	Dummy for Africa
ECA	Dummy for Eastern Europe and Central Asia
LAC	Dummy for Latin America
MENA	Dummy for Middle East and North Africa
Herfindahl	Herfindahl Hirschman index, based on Gross Loan Portfolio (GLP) in a given country.
For-Profit Share	This is the share of for-profit microbanks in GLP in a given country to total country GLP.
Interest rate ceiling	Is a dummy variable which equals one if there are limitations on interest rates and zero otherwise.
Private or Public Registry	Coverage of public and private credit registries per country as a percentage of the adult population above age 15.
GDP	GDP Growth rate per country.
Geo. penetration	Geographic penetration is the number of commercial bank branches per 1000 km2 in a given country.
Dem. penetration	Demographic penetration is the number of commercial bank branches per 100000 adults in a given country.

Table 3: Descriptive Statistics

Panel A: Microbanks specific variables (Microbank/year observations)

	Whole Sample N=1452		For-profit N=405		Nonprofit N=1047		Difference (t test)
Variable	Mean	Median	Mean	Median	Mean	Median	p-value
Yield Spread	0.20	0.17	0.20	0.15	0.20	0.18	0.45
PAR	0.05	0.02	0.04	0.01	0.06	0.02	<.01
N. Borrowers (not in log)	21317	7215	35063	9778	16000	6336	<.01
Loan Size	1016	580	1403	808	866	525	<.01
Loan Size (% of GNI)	0.33	0.18	0.41	0.19	0.29	0.16	<.01
Market Share	0.07	0.02	0.09	0.02	0.06	0.02	<.01
X-Eff	0.18	0.18	0.16	0.15	0.19	0.18	<.01
S-Eff	0.64	0.63	0.69	0.70	0.62	0.60	<.01
Size (not in log)	18081	4383	29915	8542	13504	3538	<.01
Age (not in log)	10.26	8.00	8.47	7.00	10.95	9.00	<.01
Individual	0.63	0.84	0.70	0.97	0.60	0.70	<.01
Group Lending	0.27	0.03	0.23	0.01	0.28	0.03	0.03
Village Lending	0.11	0.00	0.07	0.00	0.13	0.00	<.01

Panel B: Country specific variables (Country/year observations)

	Whole Sample N=369	
Variable	Mean	Median
Herfindahl	0.40	0.33
For-Profit Share	0.53	0.61
GDP	0.06	0.06
Rule of Law	-0.61	-0.60
Political Stability	-0.54	-0.49
Voice and Accountability	-0.37	-0.26
Regulatory Quality	-0.33	-0.36
Control of Corruption	-0.56	-0.61
Government Effectiveness	-0.48	-0.52
HF Overall Score	57.24	56.80
Business Freedom	57.30	55.00
Trade Freedom	66.12	67.00
Fiscal Freedom	77.09	78.55
Government Spending	77.68	81.50
Monetary Freedom	75.15	77.05
Investment Freedom	48.17	50.00
Financial Freedom	50.17	50.00
Property Rights	35.00	30.00
Freedom Corruption	27.83	27.00
Labor Freedom	58.60	59.70
Geographic Penetration	5.83	2.07
Demographic Penetration	10.55	6.08
Private or Public Registry	0.13	0.01

Yield spread is adjusted real portfolio yield minus real lending interest rate. Financial Revenue is expressed as a fraction of total assets. PAR is portfolio-at-risk for 30 days. N. Borrowers is the number of borrowers. Loan size is the average loan size disbursed by microbanks. Loan Size (% of GNI) is average loan size disbursed expressed as a percentage of Gross National Income (GNI) per capita. Market share is the gross loan portfolio market share of a microbank. X-Eff is X-Efficiency. S-Eff is scale efficiency. Size is total assets in thousands of USD. Age is the age of microbanks. Individual, Group Lending and Village Lending are lending technologies expressed as percentages of GLP. Herfindahl is Herfindahl Hirschman concentration index. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. GDP is the growth rate of Gross Domestic Product. The variables from Rule of Law to Government Effectiveness are KKM governance indicators. The variables from HF Overall Score to Labor Freedom are the Heritage Foundation economic freedom indicators. Geographic penetration is the umber of commercial bank branches per 1000 km2. Demographic penetration is the number of commercial bank branches per 100000 adults. Geographic and Demographic Penetration are from Financial Access Survey. Private or Public Registry is the coverage of public and private credit registries per country as a percentage of the adult population above age 15.

Table 4: Legal Status and Lending Methodology

Legal Status	Individual Lending only	Group Lending only	Village Lending only	Individual & Group Lending	Individual & Village Lending	Group & Village Lending	Individual, Groups Village Lending	Total
NBFI	219	40	19	243	5	4	32	562
NGO	146	65	38	194	52	0	93	588
Cooperative	119	3	0	79	0	0	10	211
Bank	37	0	0	33	0	0	3	73
Other	6	4	0	8	0	0	0	18
Total	527	112	57	557	57	4	138	1452

This table shows the distinction between microbanks according to their legal status and to the different lending methodology they use. The different legal status are non-bank financial institution (NBFI), non-governmental organization (NGO), cooperative, bank, or other. The lending methodologies are individual lending, joint liability group lending, or village banking. Note that a microbank can adopt more than one lending methodology.

Table 5: Legal and For-Profit vs. Nonprofit Status per year

Panel A: Legal Status of microbanks

	Year							Total
Legal Status	2002	2003	2004	2005	2006	2007	2008	
NBFI	26	63	82	96	119	113	63	562
NGO	48	99	111	109	102	81	38	588
Cooperative	6	27	49	45	48	27	9	211
Bank	1	7	9	13	17	15	11	73
Other	0	3	4	4	3	3	1	18
Total	81	199	255	267	289	239	122	1452

Panel B: For-Profit vs. Nonprofit Status from our Sample

	Year							Total
Profit Status	2002	2003	2004	2005	2006	2007	2008	
For-profit	11	39	53	71	89	91	51	405
Nonprofit	70	160	202	196	200	148	71	1047
Total	81	199	255	267	289	239	122	1452

Panel C: For-Profit vs. Nonprofit Status in the Combined Data Set of Market Shares (MIX Data and Rating Agencies Data Combined)

	Year							Total
Profit Status	2002	2003	2004	2005	2006	2007	2008	
For-profit	194	244	285	339	375	376	366	2179
Nonprofit	619	708	760	790	779	738	670	5064
Total	813	952	1045	1129	1154	1114	1036	7243

Panel A of this table shows total number of observations per legal status for each year of the sample. Legal status of microbanks are non-bank financial institution (NBFI), non-governmental organization (NGO), cooperative, bank, or other. Regions of location are Eastern Europe and Central Asia (ECA), Middle East and North Africa (MENA), Africa, Latin America and the Caribbean (LAC) and Asia. Panel B shows For-Profit vs. Nonprofit Status from the sample we use in this study. For the sake of comparison, Panel C shows number of observations of For-Profit vs. Nonprofit Status over time from our combined data set of market shares (MIX data and rating agencies combined).

Table 6: The effect of concentration on yield spread

	Yield Spread				
Governance controls	(1)	Regulatory Quality (2)	Government Effectiveness (3)	Political Stability (4)	HF Overall Score (5)
Herfindahl	0.155***	0.096***	0.065**	0.144***	0.140***
	(0.029)	(0.029)	(0.031)	(0.029)	(0.029)
Market Share	-0.107**	-0.065	-0.070	-0.112**	-0.096*
	(0.053)	(0.052)	(0.047)	(0.053)	(0.054)
For-Profit Share	-0.062***	-0.040**	-0.039**	-0.058***	-0.063***
	(0.021)	(0.020)	(0.020)	(0.021)	(0.021)
Interest Ceiling	-0.057***	-0.042***	-0.049***	-0.059***	-0.052***
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
X-Eff	-0.279**	-0.329***	-0.346***	-0.278**	-0.265**
	(0.110)	(0.106)	(0.104)	(0.109)	(0.109)
S-Eff	-0.236**	-0.270***	-0.282***	-0.247**	-0.221**
	(0.103)	(0.103)	(0.103)	(0.104)	(0.104)
Governance controls		0.064***	0.084***	0.014	0.002***
		(0.010)	(0.014)	(0.009)	(0.001)
Size	-0.029***	-0.032***	-0.033***	-0.030***	-0.030***
	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)
Age	-0.014*	-0.017**	-0.015*	-0.014*	-0.014*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Loan Size (% of GNI)	-0.025***	-0.013	-0.008	-0.023**	-0.025***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
N. Borrowers	0.060***	0.064***	0.066***	0.062***	0.058***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)
Deposit	-0.034***	-0.023*	-0.023*	-0.034***	-0.030**
	(0.013)	(0.012)	(0.012)	(0.012)	(0.013)
Group Lending	0.033**	0.041***	0.034***	0.031**	0.038***
	(0.013)	(0.012)	(0.012)	(0.013)	(0.013)
Village Lending	0.062***	0.057***	0.056***	0.059***	0.065***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)
GDP	-0.425***	-0.468***	-0.426***	-0.411***	-0.465***
	(0.109)	(0.108)	(0.106)	(0.109)	(0.112)
Africa	0.038*	0.024	0.013	0.041*	0.034
	(0.021)	(0.020)	(0.020)	(0.022)	(0.021)
ECA	0.034	0.042**	0.042**	0.038*	0.047**
	(0.022)	(0.020)	(0.020)	(0.022)	(0.023)
LAC	0.066***	0.050**	0.053**	0.069***	0.051**
	(0.024)	(0.022)	(0.021)	(0.024)	(0.024)
MENA	0.019	0.022	0.005	0.024	0.010
	(0.027)	(0.025)	(0.025)	(0.027)	(0.028)
NBFI	-0.088***	-0.091***	-0.077***	-0.087***	-0.091***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.025)
NGO	-0.083***	-0.081***	-0.070***	-0.081***	-0.083***
	(0.026)	(0.025)	(0.025)	(0.026)	(0.027)
Cooperative	-0.089***	-0.095***	-0.083***	-0.087***	-0.095***
	(0.026)	(0.025)	(0.025)	(0.026)	(0.027)
Other	-0.147***	-0.160***	-0.147***	-0.148***	-0.180***
	(0.045)	(0.045)	(0.046)	(0.046)	(0.051)
Constant	0.361***	0.413***	0.440***	0.362***	0.245*
	(0.124)	(0.123)	(0.123)	(0.122)	(0.133)
Observations	1289	1289	1289	1289	1264
R^2	0.263	0.285	0.290	0.264	0.267

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Yield Spread is adjusted real portfolio yield minus real lending interest rate. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Interest ceiling is a dummy variable which equals one if there are limitations on interest rates and zero otherwise. X-Eff is X-Efficiency and S-Eff is scale efficiency. Governance controls are KKM country governance indicators and are Regulatory Quality, Government Effectiveness, and Political Stability in Columns (2), (3), (4) respectively, in Column (5) it is the Heritage Foundation economic freedom overall score. Size is the log of total assets. Age is the log of the age of the microbank. Loan Size (% of GNI) is average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. The variable N. Borrowers is the log of total number of borrowers. Deposit is a dummy for deposit-taking by microbanks. Group and Village Lending are dummy variables for solidarity groups and village banking lending methodologies, respectively. GDP is the growth rate of Gross Domestic Product. Africa, ECA, LAC and MENA are dummy variables for Africa, Eastern Europe and Central Asia, Latin America and Middle East and North Africa, respectively. Others is a dummy for microbanks, which are neither banks, nor NBFIs, nor NGOs or cooperatives. Time dummies are included but not reported to save space.

Table 7: The effect of concentration on yield spread. For-profit vs. nonprofit microbanks

	For-profit					Nonprofit				
Governance controls		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Herfindahl	0.302***	0.207***	0.173***	0.263***	0.257***	0.105***	0.074**	0.055	0.104***	0.101***
	(0.060)	(0.061)	(0.055)	(0.068)	(0.062)	(0.034)	(0.034)	(0.037)	(0.033)	(0.034)
Market Share	0.061	0.116	0.054	0.027	0.085	-0.072	-0.048	-0.049	-0.072	-0.066
	(0.091)	(0.100)	(0.094)	(0.092)	(0.099)	(0.061)	(0.060)	(0.056)	(0.061)	(0.062)
For-Profit Share	-0.224***	-0.180***	-0.180***	-0.216***	-0.207***	0.030	0.040*	0.038	0.031	0.030
	(0.056)	(0.057)	(0.055)	(0.057)	(0.060)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Interest Ceiling	-0.117***	-0.094***	-0.115***	-0.120***	-0.106***	-0.033***	-0.023*	-0.028**	-0.033***	-0.032***
	(0.032)	(0.031)	(0.032)	(0.032)	(0.031)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
X-Eff	-0.551*	-0.593**	-0.588**	-0.567**	-0.556*	-0.261**	-0.303***	-0.308***	-0.261**	-0.257**
	(0.282)	(0.278)	(0.266)	(0.288)	(0.286)	(0.108)	(0.105)	(0.103)	(0.108)	(0.109)
S-Eff	-0.155	-0.193	-0.133	-0.180	-0.056	-0.188	-0.213*	-0.223*	-0.190	-0.174
	(0.193)	(0.180)	(0.179)	(0.191)	(0.192)	(0.120)	(0.122)	(0.123)	(0.124)	(0.124)
Governance controls		0.098***	0.143***	0.029	0.008***		0.039***	0.048***	0.002	0.000
		(0.022)	(0.029)	(0.023)	(0.002)		(0.012)	(0.016)	(0.010)	(0.001)
Size	-0.045**	-0.054***	-0.064***	-0.045**	-0.052***	-0.037***	-0.039***	-0.039***	-0.037***	-0.038***
	(0.020)	(0.019)	(0.020)	(0.020)	(0.019)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
Age	0.016	0.002	0.010	0.014	0.011	-0.021**	-0.022**	-0.021**	-0.021**	-0.022**
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Loan Size (% of GNI)	-0.003	0.012	0.020	0.001	0.003	-0.027	-0.010	-0.008	-0.026	-0.031
	(0.018)	(0.018)	(0.019)	(0.019)	(0.019)	(0.017)	(0.017)	(0.017)	(0.017)	(0.022)
N. Borrowers	0.059***	0.072***	0.077***	0.063***	0.055***	0.063***	0.066***	0.067***	0.064***	0.062***
	(0.018)	(0.018)	(0.019)	(0.019)	(0.019)	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)
Deposit	-0.030	0.004	-0.006	-0.027	-0.010	-0.022*	-0.020*	-0.019	-0.022*	-0.024**
	(0.022)	(0.024)	(0.022)	(0.022)	(0.023)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Group Lending	0.046	0.052	0.031	0.051	0.056	0.035***	0.041***	0.038***	0.035**	0.034**
	(0.035)	(0.034)	(0.034)	(0.036)	(0.034)	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)
Village Lending	0.094**	0.093**	0.070	0.095**	0.110**	0.069***	0.066***	0.066***	0.068***	0.067***
	(0.043)	(0.042)	(0.043)	(0.044)	(0.047)	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)
GDP	-0.734***	-0.880***	-0.765***	-0.690**	-0.914***	-0.384***	-0.420***	-0.394***	-0.382***	-0.403***
	(0.280)	(0.282)	(0.268)	(0.277)	(0.295)	(0.109)	(0.110)	(0.109)	(0.109)	(0.112)
Africa	0.032	0.023	-0.013	0.041	0.048	-0.018	-0.030	-0.022	-0.018	-0.024
	(0.029)	(0.029)	(0.031)	(0.031)	(0.029)	(0.039)	(0.037)	(0.035)	(0.039)	(0.039)
ECA	0.017	0.024	0.023	0.029	0.039	-0.004	0.002	0.012	-0.005	-0.007
	(0.035)	(0.035)	(0.034)	(0.038)	(0.036)	(0.040)	(0.038)	(0.036)	(0.040)	(0.041)
LAC	0.098***	0.065*	0.047	0.105***	0.071*	0.006	-0.001	0.012	0.006	-0.002
	(0.036)	(0.034)	(0.033)	(0.038)	(0.039)	(0.040)	(0.038)	(0.036)	(0.040)	(0.041)
MENA	0.000	0.000	0.000	0.000	0.000	0.017	0.017	0.017	0.017	0.006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.039)	(0.036)	(0.035)	(0.039)	(0.040)
Constant	0.508**	0.610***	0.757***	0.505**	0.159	0.346**	0.377***	0.385***	0.347**	0.346**
	(0.240)	(0.232)	(0.239)	(0.234)	(0.245)	(0.135)	(0.138)	(0.136)	(0.135)	(0.152)
Observations	362	362	362	362	355	927	927	927	927	909
R^2	0.340	0.374	0.390	0.345	0.370	0.295	0.303	0.304	0.295	0.294

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the yield spread, which is adjusted real portfolio yield minus real lending interest rate. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Interest ceiling is a dummy variable which equals one if there are limitations on interest rates and zero otherwise. X-Eff is X-Efficiency and S-Eff is scale efficiency. Governance controls are KKM country governance indicators and are Regulatory Quality in Columns (2) and (7), Government Effectiveness in Columns (3) and (8), and Political Stability in Columns (4) and (9). In Columns (5) and (10) it is the Heritage Foundation economic freedom overall score. Size is the log of total assets. Age is the log of the age of the microbank. Loan Size (% of GNI) is average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. The variable N. Borrowers is the log of total number of borrowers. Deposit is a dummy for deposit-taking by microbanks. Group and Village Lending are dummy variables for solidarity groups and village banking lending methodologies, respectively. GDP is the growth rate of Gross Domestic Product. Africa, ECA, LAC and MENA are dummy variables for Africa, Eastern Europe and Central Asia, Latin America and Middle East and North Africa, respectively. Time dummies are included but not reported to save space.

Table 8: The effect of concentration on PAR

	PAR				
Governance controls	(1)	Regulatory Quality (2)	Government Effectiveness (3)	Political Stability (4)	HF Overall Score (5)
Herfindahl	0.001	-0.001	0.002	0.016	0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Market Share	-0.014	-0.014	-0.016	-0.012	-0.014
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
For-Profit Share	0.034***	0.035***	0.034***	0.023***	0.029***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
X-Eff	-0.015	-0.018	-0.016	-0.022	-0.036
	(0.038)	(0.038)	(0.038)	(0.037)	(0.039)
S-Eff	-0.153**	-0.157***	-0.155***	-0.136**	-0.140***
	(0.061)	(0.061)	(0.060)	(0.059)	(0.054)
Governance controls		0.004	0.000	-0.019***	0.000
		(0.006)	(0.008)	(0.005)	(0.000)
Size	0.023***	0.023***	0.023***	0.024***	0.021***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Age	0.019***	0.019***	0.019***	0.019***	0.017***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Loan Size (% of GNI)	-0.007	-0.006	-0.006	-0.010	-0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
N. Borrowers	-0.020***	-0.019***	-0.019***	-0.023***	-0.017***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Deposit	-0.005	-0.005	-0.005	-0.005	-0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Group Lending	-0.010	-0.009	-0.010	-0.007	-0.008
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
Village Lending	-0.004	-0.005	-0.004	-0.001	-0.007
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
GDP	-0.128*	-0.128**	-0.126*	-0.151**	-0.065
	(0.066)	(0.065)	(0.066)	(0.067)	(0.043)
Africa	0.032***	0.031***	0.031***	0.031***	0.032***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
ECA	-0.063***	-0.063***	-0.063***	-0.066***	-0.061***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
LAC	-0.029***	-0.030***	-0.029***	-0.032***	-0.029***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
MENA	0.017	0.017	0.017	0.009	-0.016
	(0.014)	(0.014)	(0.015)	(0.013)	(0.012)
NBFI	0.015*	0.016*	0.016*	0.015*	0.013
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
NGO	0.031***	0.032***	0.032***	0.030***	0.031***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Cooperative	0.042***	0.044***	0.044***	0.041***	0.045***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Other	0.117***	0.118***	0.118***	0.119***	0.096***
	(0.029)	(0.029)	(0.029)	(0.028)	(0.034)
Constant	-0.073	-0.072	-0.076	-0.072	-0.089
	(0.066)	(0.067)	(0.066)	(0.066)	(0.059)
Observations	1403	1399	1399	1399	1370
R^2	0.295	0.296	0.295	0.308	0.299

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. PAR is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. X-Eff is X-Efficiency and S-Eff is scale efficiency. Governance controls are KKM country governance indicators and are Regulatory Quality, Government Effectiveness, and Political Stability are KKM country governance indicators in Columns (2), (3), (4) respectively, in Column (5) it is the Heritage Foundation economic freedom overall score. Size is the log of total assets. Age is the log of the age of the microbank. Loan Size (% of GNI) is average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. The variable N. Borrowers is the log of total number of borrowers. Deposit is a dummy for deposit-taking by microbanks. Group and Village Lending are dummy variables for solidarity groups and village banking lending methodologies, respectively. GDP is the growth rate of Gross Domestic Product. Africa, ECA, LAC and MENA are dummy variables for Africa, Eastern Europe and Central Asia, Latin America and Middle East and North Africa, respectively. Others is a dummy for microbanks, which are neither banks, nor NBFIs, nor NGOs or cooperatives. Time dummies are included but not reported to save space.

Table 9: The effect of concentration on PAR. For-profit vs nonprofit microbanks

	For-profit					Nonprofit				
Governance controls		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Herfindahl	0.054***	0.049**	0.031	0.070***	0.055***	-0.007	-0.010	-0.003	0.006	-0.001
	(0.019)	(0.020)	(0.019)	(0.020)	(0.019)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Market Share	-0.024*	-0.024	-0.028*	-0.014	-0.025*	0.001	0.004	-0.000	-0.006	0.009
	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)
For-Profit Share	0.010	0.011	0.015	0.009	0.008	0.052***	0.052***	0.052***	0.036**	0.044***
	(0.014)	(0.014)	(0.014)	(0.013)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)
X-Eff	0.009	0.003	-0.000	0.011	0.002	-0.040	-0.045	-0.036	-0.048	-0.067
	(0.046)	(0.046)	(0.045)	(0.046)	(0.048)	(0.050)	(0.052)	(0.051)	(0.049)	(0.054)
S-Eff	-0.189***	-0.195***	-0.179***	-0.195***	-0.198***	-0.136	-0.140*	-0.131	-0.104	-0.118
	(0.045)	(0.047)	(0.046)	(0.046)	(0.049)	(0.085)	(0.084)	(0.083)	(0.083)	(0.076)
Governance controls		0.006	0.032***	-0.013**	0.000		0.005	-0.005	-0.021***	0.001*
		(0.006)	(0.012)	(0.006)	(0.000)		(0.007)	(0.010)	(0.006)	(0.000)
Size	0.027***	0.027***	0.022***	0.028***	0.027***	0.019**	0.019**	0.019**	0.020**	0.017**
	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)	(0.007)
Age	0.008*	0.008*	0.007*	0.010**	0.008*	0.023***	0.023***	0.023***	0.022***	0.019***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Loan Size (% of GNI)	-0.012**	-0.011*	-0.006	-0.014**	-0.012**	0.003	0.005	0.002	-0.000	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
N. Borrowers	-0.017**	-0.015**	-0.012**	-0.018***	-0.016**	-0.021***	-0.021***	-0.022***	-0.025***	-0.020***
	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)
Deposit	-0.015*	-0.014*	-0.011	-0.017**	-0.015*	0.000	0.000	0.000	0.001	-0.000
	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Group Lending	0.005	0.005	0.003	0.002	0.004	-0.015*	-0.015*	-0.015*	-0.009	-0.013*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Village Lending	-0.006	-0.007	-0.013	-0.008	-0.010	-0.007	-0.008	-0.007	-0.004	-0.011
	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
GDP	-0.116	-0.118	-0.116	-0.140	-0.106	-0.149**	-0.154**	-0.148**	-0.171**	-0.075*
	(0.095)	(0.096)	(0.092)	(0.093)	(0.101)	(0.074)	(0.073)	(0.073)	(0.075)	(0.044)
Africa	0.047***	0.046***	0.037***	0.042***	0.046***	0.017	0.016	0.017	0.027**	0.012
	(0.012)	(0.011)	(0.010)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)
ECA	-0.059***	-0.059***	-0.058***	-0.064***	-0.061***	-0.087***	-0.086***	-0.088***	-0.080***	-0.089***
	(0.015)	(0.014)	(0.013)	(0.015)	(0.014)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
LAC	-0.024*	-0.026**	-0.035***	-0.027**	-0.024*	-0.042***	-0.043***	-0.043***	-0.037***	-0.047***
	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)
MENA	0.000	0.000	0.000	0.000	0.000	0.013	0.012	0.013	0.011	-0.028*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.017)	(0.017)	(0.017)	(0.017)	(0.015)
Constant	-0.145**	-0.139**	-0.082	-0.155**	-0.146**	0.021	0.025	0.019	0.022	-0.005
	(0.064)	(0.064)	(0.058)	(0.065)	(0.072)	(0.090)	(0.092)	(0.091)	(0.091)	(0.077)
Observations	392	388	388	388	382	1011	1011	1011	1011	988
R^2	0.455	0.457	0.474	0.464	0.454	0.257	0.258	0.258	0.269	0.264

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. X-Eff is X-Efficiency and S-Eff is scale efficiency. Governance controls are KKM country governance indicators and are Regulatory Quality in Columns (2) and (7), Government Effectiveness in Columns (3) and (8), and Political Stability in Columns (4) and (9). In Columns (5) and (10) it is the Heritage Foundation economic freedom overall score. Size is the log of total assets. Age is the log of the age of the microbank. Loan Size (% of GNI) is average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. The variable N. Borrowers is the log of total number of borrowers. Deposit is a dummy for deposit-taking by microbanks. Group and Village Lending are dummy variables for solidarity groups and village banking lending methodologies, respectively. GDP is the growth rate of Gross Domestic Product. Africa, ECA, LAC and MENA are dummy variables for Africa, Eastern Europe and Central Asia, Latin America and Middle East and North Africa, respectively. Time dummies are included but not reported to save space.

Table 10: The effect of concentration on yield spread and PAR, including interactions of HHI and Number of Borrowers

Panel A: Yield spread. Interaction of Herfindahl with Number of Borrowers

	For-profit					Nonprofit				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Herfindahl	-0.246	-0.423**	-0.609***	-0.276	-0.331	0.482***	0.428***	0.396***	0.481***	0.484***
	(0.203)	(0.190)	(0.190)	(0.200)	(0.204)	(0.152)	(0.147)	(0.144)	(0.153)	(0.153)
Market Share	-0.014	0.033	-0.052	-0.046	0.003	-0.063	-0.041	-0.042	-0.063	-0.057
	(0.097)	(0.106)	(0.100)	(0.095)	(0.105)	(0.061)	(0.060)	(0.056)	(0.061)	(0.062)
For-Profit Share	-0.202***	-0.152***	-0.143**	-0.194***	-0.178***	0.027	0.036	0.035	0.027	0.026
	(0.057)	(0.058)	(0.056)	(0.058)	(0.060)	(0.024)	(0.023)	(0.023)	(0.024)	(0.024)
Interest Ceiling	-0.110***	-0.085***	-0.105***	-0.113***	-0.100***	-0.030**	-0.021*	-0.026**	-0.030**	-0.030**
	(0.032)	(0.031)	(0.032)	(0.032)	(0.031)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
X-Eff	-0.542*	-0.585**	-0.580**	-0.558*	-0.542*	-0.282***	-0.321***	-0.324***	-0.282***	-0.278***
	(0.278)	(0.272)	(0.258)	(0.284)	(0.281)	(0.105)	(0.103)	(0.101)	(0.105)	(0.106)
S-Eff	-0.245	-0.297	-0.257	-0.268	-0.146	-0.166	-0.192	-0.201*	-0.167	-0.150
	(0.203)	(0.190)	(0.187)	(0.199)	(0.202)	(0.120)	(0.121)	(0.122)	(0.123)	(0.123)
N. Borrowers	0.031	0.041**	0.039*	0.036	0.025	0.076***	0.078***	0.078***	0.076***	0.075***
	(0.020)	(0.020)	(0.020)	(0.022)	(0.021)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
N. Borrowers*Herfindahl	0.063***	0.072***	0.088***	0.062***	0.067***	-0.043**	-0.040**	-0.038**	-0.043**	-0.043**
	(0.023)	(0.021)	(0.021)	(0.023)	(0.023)	(0.017)	(0.017)	(0.016)	(0.017)	(0.017)
Governance controls		0.103***	0.159***	0.028	0.008***		0.037***	0.044***	0.001	0.000
		(0.023)	(0.030)	(0.023)	(0.002)		(0.011)	(0.016)	(0.010)	(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	362	362	362	362	355	927	927	927	927	909
R^2	0.351	0.389	0.412	0.356	0.383	0.301	0.308	0.308	0.301	0.300

Panel B: PAR. Interaction of Herfindahl with N. Borrowers

	For-profit					Nonprofit				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Herfindahl	0.361***	0.352***	0.311***	0.355***	0.370***	0.002	-0.004	0.009	0.013	0.063
	(0.098)	(0.097)	(0.091)	(0.098)	(0.098)	(0.097)	(0.098)	(0.097)	(0.095)	(0.097)
Market Share	0.012	0.011	0.006	0.019	0.014	0.002	0.004	0.000	-0.005	0.012
	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)	(0.020)	(0.020)	(0.020)	(0.019)	(0.019)
For-Profit Share	0.001	0.002	0.006	0.001	-0.003	0.052***	0.052***	0.052***	0.036**	0.044***
	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
X-Eff	-0.005	-0.009	-0.011	-0.002	-0.014	-0.041	-0.046	-0.037	-0.049	-0.071
	(0.046)	(0.046)	(0.045)	(0.046)	(0.048)	(0.050)	(0.052)	(0.051)	(0.049)	(0.054)
S-Eff	-0.147***	-0.151***	-0.141***	-0.153***	-0.157***	-0.135	-0.140*	-0.130	-0.103	-0.114
	(0.045)	(0.046)	(0.047)	(0.045)	(0.048)	(0.085)	(0.085)	(0.084)	(0.083)	(0.076)
N. Borrowers	-0.001	-0.001	0.001	-0.003	0.000	-0.021***	-0.021***	-0.021***	-0.025***	-0.018***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
N. Borrowers*Herfindahl	-0.036***	-0.035***	-0.032***	-0.034***	-0.037***	-0.001	-0.001	-0.001	-0.001	-0.007
	(0.011)	(0.010)	(0.010)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Governance controls		0.004	0.027**	-0.011*	0.000		0.005	-0.005	-0.021***	0.001
		(0.006)	(0.011)	(0.006)	(0.000)		(0.007)	(0.010)	(0.006)	(0.000)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	392	388	388	388	382	1011	1011	1011	1011	988
R^2	0.486	0.486	0.499	0.491	0.485	0.257	0.258	0.258	0.269	0.264

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Yield spread, in Panel A, is adjusted real portfolio yield minus real lending interest rate. PAR, in Panel B, is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Interest ceiling is a dummy variable which equals one if there are limitations on interest rates and zero otherwise. X-Eff is X-Efficiency and S-Eff is scale efficiency. N. Borrowers is the log of the number of borrowers. N. Borrowers*Herfindahl is an interaction variable. Country governance variables are Regulatory Quality (in Columns (2) and (7)), Control of Corruption (in Columns (3) and (8)), Government Effectiveness (in Columns (4) and (9)) and Heritage foundation overall score (in Columns (5) and (10)). Control variables are: (1) Log of total assets for Size. (2) Log of age. (3) Average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. (4) Dummy for deposit-taking microbanks. (5) Group and Village Lending dummies for lending methodologies. (6) Growth rate of Gross Domestic Product. (7) Dummies for geographic regions (Africa, ECA, LAC, MENA). (8) Time dummies.

Table 11: The effect of concentration on yield spread including demographic penetration

Governance controls	(1)	Regulatory Quality (2)	Government Effectiveness (3)	Political Stability (4)	HF Overall Score (5)
Panel A: Whole sample					
Herfindahl	0.269***	0.182***	0.129**	0.243***	0.214***
	(0.056)	(0.052)	(0.050)	(0.057)	(0.056)
Market Share	-0.076	0.072	0.013	-0.081	0.040
	(0.057)	(0.068)	(0.060)	(0.057)	(0.070)
For-Profit Share	-0.137***	-0.169***	-0.141***	-0.136***	-0.183***
	(0.043)	(0.041)	(0.038)	(0.043)	(0.043)
Interest Ceiling	-0.081***	-0.071***	-0.123***	-0.087***	-0.087***
	(0.027)	(0.026)	(0.027)	(0.027)	(0.027)
X-Eff	-0.450**	-0.550**	-0.581***	-0.461**	-0.469**
	(0.226)	(0.221)	(0.212)	(0.228)	(0.226)
S-Eff	-0.068	-0.170	-0.195	-0.069	-0.105
	(0.170)	(0.170)	(0.165)	(0.171)	(0.168)
Dem. Penetration	-0.001**	-0.002***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Governance controls		0.161***	0.184***	0.026*	0.011***
		(0.023)	(0.021)	(0.014)	(0.002)
Observations	590	590	590	590	571
R^2	0.331	0.397	0.426	0.335	0.372
Panel B: For-profit sample					
Herfindahl	0.280***	0.257***	0.247***	0.246***	0.186**
	(0.089)	(0.086)	(0.082)	(0.088)	(0.093)
Market Share	0.082	0.303**	0.135	0.030	0.257*
	(0.107)	(0.147)	(0.114)	(0.106)	(0.148)
For-Profit Share	-0.168*	-0.201**	-0.153*	-0.175*	-0.057
	(0.091)	(0.097)	(0.088)	(0.100)	(0.088)
Interest Ceiling	0.050	-0.003	-0.107*	0.028	-0.034
	(0.057)	(0.057)	(0.059)	(0.058)	(0.059)
X-Eff	-0.749**	-0.735*	-0.814**	-0.748*	-0.716**
	(0.376)	(0.374)	(0.364)	(0.384)	(0.356)
S-Eff	-0.051	0.005	0.027	-0.068	0.019
	(0.294)	(0.275)	(0.262)	(0.284)	(0.300)
Dem. Penetration	-0.001	-0.003***	-0.004***	-0.001*	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		0.171***	0.239***	0.054	0.018***
		(0.043)	(0.038)	(0.033)	(0.003)
Observations	219	219	219	219	212
R^2	0.438	0.480	0.516	0.448	0.519
Panel C: Nonprofit sample					
Herfindahl	0.288***	0.216***	0.175**	0.282***	0.261***
	(0.082)	(0.082)	(0.085)	(0.082)	(0.090)
Market Share	-0.003	0.045	0.024	-0.002	0.052
	(0.064)	(0.066)	(0.067)	(0.065)	(0.075)
For-Profit Share	0.044	-0.014	-0.012	0.045	0.010
	(0.061)	(0.061)	(0.059)	(0.061)	(0.063)
Interest Ceiling	-0.104***	-0.083**	-0.114***	-0.105***	-0.101***
	(0.038)	(0.036)	(0.036)	(0.038)	(0.036)
X-Eff	-0.431*	-0.507**	-0.494**	-0.437*	-0.427
	(0.254)	(0.241)	(0.240)	(0.255)	(0.260)
S-Eff	-0.100	-0.173	-0.148	-0.098	-0.128
	(0.228)	(0.237)	(0.231)	(0.230)	(0.241)
Dem. Penetration	0.001	0.000	0.000	0.001	0.001
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Governance controls		0.103***	0.104***	0.007	0.004*
		(0.029)	(0.027)	(0.019)	(0.002)
Observations	371	371	371	371	359
R^2	0.420	0.443	0.447	0.421	0.435

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the yield spread, which is adjusted real portfolio yield minus real lending interest rate. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Interest ceiling is a dummy variable which equals one if there are limitations on interest rates and zero otherwise. X-Eff is X-Efficiency and S-Eff is scale efficiency. Dem. Penetration is demographic penetration and is the number of commercial bank branches per 100000 adults in a given country. Country governance variables are Regulatory Quality, Control of Corruption, Government Effectiveness and Heritage foundation overall score in columns (2), (3), (4), and (5) respectively. Control variables included but not reported are: (1) Log of total assets for Size. (2) Log of age. (3) Average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. (4) log of the number of borrowers. (5) Dummy for deposit-taking microbanks. (6) Group and Village Lending dummies for lending methodologies. (7) Growth rate of Gross Domestic Product. (8) Dummies for geographic regions (Africa, ECA, LAC, MENA). (9) Dummies for microbank legal status in Panel A. (10) Time dummies. Constant term is included but not reported.

Table 12: The effect of concentration on yield spread including geographic penetration

Governance controls	(1)	Regulatory Quality (2)	Government Effectiveness (3)	Political Stability (4)	HF Overall Score (5)
Panel A: Whole sample					
Herfindahl	0.239***	0.144***	0.093*	0.216***	0.178***
	(0.052)	(0.050)	(0.048)	(0.054)	(0.053)
Market Share	-0.063	0.067	0.020	-0.066	0.048
	(0.060)	(0.070)	(0.063)	(0.061)	(0.073)
For-Profit Share	-0.129***	-0.161***	-0.135***	-0.128***	-0.173***
	(0.042)	(0.041)	(0.038)	(0.043)	(0.043)
Interest Ceiling	-0.093***	-0.084***	-0.134***	-0.099***	-0.098***
	(0.029)	(0.027)	(0.027)	(0.029)	(0.028)
X-Eff	-0.416*	-0.500**	-0.537**	-0.422*	-0.441*
	(0.224)	(0.220)	(0.210)	(0.225)	(0.225)
S-Eff	-0.071	-0.157	-0.189	-0.072	-0.109
	(0.171)	(0.172)	(0.167)	(0.172)	(0.171)
Geo. Penetration	0.002	0.001	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		0.145***	0.176***	0.020	0.011***
		(0.022)	(0.020)	(0.014)	(0.002)
Observations	590	590	590	590	571
R^2	0.331	0.387	0.420	0.333	0.367
Panel B: For-profit sample					
Herfindahl	0.240***	0.201**	0.180**	0.199**	0.123
	(0.084)	(0.082)	(0.075)	(0.086)	(0.090)
Market Share	0.074	0.229	0.063	0.025	0.232
	(0.109)	(0.149)	(0.122)	(0.110)	(0.151)
For-Profit Share	-0.170*	-0.214**	-0.181**	-0.179*	-0.061
	(0.092)	(0.097)	(0.091)	(0.099)	(0.087)
Interest Ceiling	0.064	0.028	-0.056	0.053	-0.005
	(0.056)	(0.057)	(0.059)	(0.056)	(0.058)
X-Eff	-0.720*	-0.703*	-0.767**	-0.709*	-0.681*
	(0.373)	(0.372)	(0.365)	(0.377)	(0.350)
S-Eff	-0.026	0.047	0.081	-0.028	0.038
	(0.294)	(0.279)	(0.268)	(0.286)	(0.306)
Geo. Penetration	0.001	-0.002	-0.003**	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		0.147***	0.207***	0.043	0.017***
		(0.043)	(0.038)	(0.030)	(0.003)
Observations	219	219	219	219	212
R^2	0.436	0.469	0.497	0.443	0.514
Panel C: Nonprofit sample					
Herfindahl	0.304***	0.228***	0.179**	0.293***	0.267***
	(0.080)	(0.081)	(0.081)	(0.080)	(0.088)
Market Share	0.010	0.061	0.046	0.013	0.054
	(0.063)	(0.065)	(0.066)	(0.063)	(0.073)
For-Profit Share	0.059	0.010	0.007	0.063	0.031
	(0.060)	(0.058)	(0.058)	(0.061)	(0.065)
Interest Ceiling	-0.127***	-0.112***	-0.146***	-0.130***	-0.119***
	(0.041)	(0.040)	(0.042)	(0.042)	(0.041)
X-Eff	-0.411	-0.479**	-0.471**	-0.421*	-0.412
	(0.250)	(0.241)	(0.237)	(0.253)	(0.260)
S-Eff	-0.135	-0.216	-0.203	-0.133	-0.161
	(0.222)	(0.234)	(0.228)	(0.224)	(0.235)
Geo. Penetration	0.005*	0.004	0.005*	0.005*	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Governance controls		0.097***	0.111***	0.011	0.004*
		(0.027)	(0.026)	(0.019	(0.002)
Observations	371	371	371	371	359
R^2	0.436	0.457	0.467	0.436	0.445

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the yield spread, which is adjusted real portfolio yield minus real lending interest rate. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Interest ceiling is a dummy variable which equals one if there are limitations on interest rates and zero otherwise. X-Eff is X-Efficiency and S-Eff is scale efficiency. Geo. Penetration is geographic penetration and is the number of commercial bank branches per 1000 km2 in a given country. Country governance variables are Regulatory Quality, Control of Corruption, Government Effectiveness and Heritage foundation overall score in columns (2), (3), (4), and (5) respectively. Control variables included but not reported are: (1) Log of total assets for Size. (2) Log of age. (3) Average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. (4) log of the number of borrowers. (5) Dummy for deposit-taking microbanks. (6) Group and Village Lending dummies for lending methodologies. (7) Growth rate of Gross Domestic Product. (8) Dummies for geographic regions (Africa, ECA, LAC, MENA). (9) Dummies for microbank legal status in Panel A. (10) Time dummies. Constant term is included but not reported.

Table 13: The effect of concentration on PAR including demographic penetration

Panel A: Whole sample					
Governance controls		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.044	0.055**	0.049*	0.080***	0.067**
	(0.027)	(0.027)	(0.026)	(0.026)	(0.028)
Market Share	-0.056**	-0.079***	-0.060**	-0.047**	-0.056**
	(0.025)	(0.025)	(0.024)	(0.024)	(0.024)
For-Profit Share	0.039**	0.045**	0.040**	0.044**	0.033*
	(0.018)	(0.019)	(0.019)	(0.018)	(0.020)
X-Eff	0.023	0.035	0.025	0.024	-0.012
	(0.059)	(0.057)	(0.058)	(0.057)	(0.060)
S-Eff	-0.262***	-0.253***	-0.260***	-0.279***	-0.275***
	(0.098)	(0.096)	(0.097)	(0.103)	(0.098)
Dem. Penetration	-0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Governance controls		-0.022*	-0.007	-0.039***	-0.001
		(0.013)	(0.012)	(0.007)	(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	609	608	608	608	586
R^2	0.406	0.410	0.407	0.435	0.415
Panel B: For-profit sample					
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.100***	0.095***	0.086**	0.111***	0.096***
	(0.035)	(0.035)	(0.033)	(0.033)	(0.037)
Market Share	-0.073***	-0.058**	-0.087***	-0.047*	-0.080***
	(0.026)	(0.028)	(0.026)	(0.028)	(0.028)
For-Profit Share	0.026	0.019	0.020	0.036	0.034
	(0.028)	(0.026)	(0.026)	(0.028)	(0.033)
X-Eff	0.001	-0.002	-0.022	-0.006	-0.037
	(0.057)	(0.055)	(0.051)	(0.061)	(0.064)
S-Eff	-0.351***	-0.351***	-0.301***	-0.382***	-0.417***
	(0.095)	(0.094)	(0.086)	(0.099)	(0.106)
Dem. Penetration	-0.001*	-0.001**	-0.001***	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Governance controls		0.019	0.058***	-0.027***	0.001
		(0.017)	(0.018)	(0.009)	(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	228	227	227	227	219
R^2	0.572	0.579	0.613	0.595	0.580
Panel C: Nonprofit sample					
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.039	0.068	0.074*	0.077**	0.071
	(0.039)	(0.042)	(0.041)	(0.039)	(0.043)
Market Share	-0.033	-0.061*	-0.039	-0.039	-0.028
	(0.037)	(0.037)	(0.035)	(0.034)	(0.037)
For-Profit Share	0.068**	0.094**	0.091**	0.065**	0.068*
	(0.033)	(0.037)	(0.039)	(0.032)	(0.036)
X-Eff	-0.074	-0.036	-0.056	-0.050	-0.139
	(0.100)	(0.100)	(0.096)	(0.097)	(0.100)
S-Eff	-0.207	-0.183	-0.196	-0.242	-0.199
	(0.165)	(0.161)	(0.168)	(0.174)	(0.164)
Dem. Penetration	-0.000	0.000	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		-0.043**	-0.032*	-0.041***	-0.002
		(0.019)	(0.019)	(0.012)	(0.002)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	381	381	381	381	367
R^2	0.361	0.372	0.368	0.383	0.383

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. X-Eff is X-Efficiency and S-Eff is scale efficiency. Dem. Penetration is demographic penetration and is the number of commercial bank branches per 100000 adults in a given country. Country governance variables are Regulatory Quality, Control of Corruption, Government Effectiveness and Heritage foundation overall score in columns (2), (3), (4), and (5) respectively. Control variables are: (1) Log of total assets for Size. (2) Log of age. (3) Average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. (4) log of the number of borrowers. (5) Dummy for deposit-taking microbanks. (6) Group and Village Lending dummies for lending methodologies. (7) Growth rate of Gross Domestic Product. (8) Dummies for geographic regions (Africa, ECA, LAC, MENA). (9) Dummies for microbank legal status in Panel A. (10) Time dummies.

Table 14: The effect of concentration on PAR including geographic penetration

Panel A: Whole sample					
Governance controls		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.029	0.046*	0.038	0.074***	0.056**
	(0.025)	(0.025)	(0.024)	(0.024)	(0.027)
Market Share	-0.047*	-0.074***	-0.052**	-0.041*	-0.053**
	(0.024)	(0.025)	(0.023)	(0.024)	(0.024)
For-Profit Share	0.045**	0.053***	0.047**	0.049***	0.037*
	(0.018)	(0.019)	(0.019)	(0.018)	(0.021)
X-Eff	0.031	0.046	0.035	0.028	-0.009
	(0.059)	(0.057)	(0.057)	(0.057)	(0.060)
S-Eff	-0.275***	-0.265***	-0.271***	-0.289***	-0.282***
	(0.097)	(0.095)	(0.096)	(0.102)	(0.098)
Geo. Penetration	0.001**	0.002**	0.001**	0.001**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		-0.027**	-0.010	-0.038***	-0.001
		(0.012)	(0.012)	(0.007)	(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	609	608	608	608	586
R^2	0.412	0.419	0.413	0.439	0.415
Panel B: Profit sample					
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.082**	0.079**	0.067*	0.106***	0.078**
	(0.036)	(0.037)	(0.035)	(0.033)	(0.039)
Market Share	-0.079***	-0.073***	-0.102***	-0.050*	-0.086***
	(0.025)	(0.025)	(0.026)	(0.027)	(0.026)
For-Profit Share	0.024	0.017	0.013	0.034	0.034
	(0.028)	(0.026)	(0.026)	(0.028)	(0.033)
X-Eff	0.013	0.010	-0.006	-0.002	-0.024
	(0.057)	(0.056)	(0.052)	(0.062)	(0.064)
S-Eff	-0.344***	-0.344***	-0.290***	-0.378***	-0.414***
	(0.096)	(0.096)	(0.087)	(0.099)	(0.109)
Geo. Penetration	-0.000	-0.000	-0.001*	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		0.013	0.053***	-0.029***	0.001
		(0.016)	(0.018)	(0.009)	(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	228	227	227	227	219
R^2	0.568	0.572	0.602	0.594	0.576
Panel C: Nonprofit sample					
	(1)	(2)	(3)	(4)	(5)
Herfindahl	0.033	0.067	0.073*	0.075*	0.065
	(0.040)	(0.042)	(0.042)	(0.039)	(0.042)
Market Share	-0.020	-0.052	-0.030	-0.030	-0.025
	(0.036)	(0.035)	(0.034)	(0.033)	(0.036)
For-Profit Share	0.085**	0.109***	0.107***	0.078**	0.077**
	(0.034)	(0.037)	(0.040)	(0.033)	(0.038)
X-Eff	-0.076	-0.035	-0.056	-0.051	-0.140
	(0.104)	(0.103)	(0.099)	(0.100)	(0.100)
S-Eff	-0.257	-0.224	-0.239	-0.281	-0.221
	(0.165)	(0.161)	(0.167)	(0.173)	(0.167)
Geo. Penetration	0.003**	0.003**	0.003**	0.003**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Governance controls		-0.044**	-0.034*	-0.040***	-0.002
		(0.018)	(0.018)	(0.012)	(0.002)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Observations	381	381	381	381	367
R^2	0.377	0.388	0.384	0.398	0.385

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. X-Eff is X-Efficiency and S-Eff is scale efficiency. Geo. Penetration is geographic penetration and is the number of commercial bank branches per 1000 km2 in a given country. Country governance variables are Regulatory Quality, Control of Corruption, Government Effectiveness and Heritage foundation overall score in columns (2), (3), (4), and (5) respectively. Control variables are: (1) Log of total assets for Size. (2) Log of age. (3) Average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. (4) log of the number of borrowers. (5) Dummy for deposit-taking microbanks. (6) Group and Village Lending dummies for lending methodologies. (7) Growth rate of Gross Domestic Product. (8) Dummies for geographic regions (Africa, ECA, LAC, MENA). (9) Dummies for microbank legal status in Panel A. (10) Time dummies.

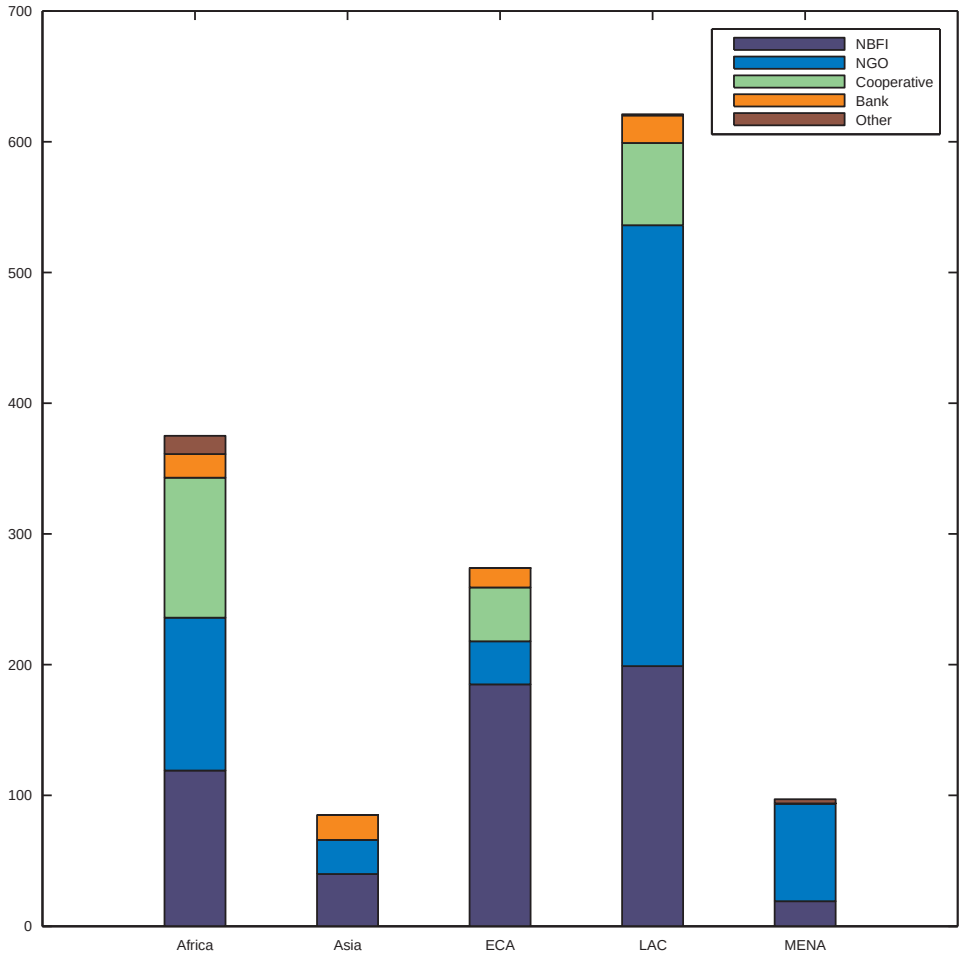
Table 15: The effect of concentration on PAR. For-profit vs. nonprofit microbanks (with interactions and Max of Priv. or Pub. registry)

	For-profit					Nonprofit				
Governance controls		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score		Regulatory Quality	Government Effectiveness	Political Stability	HF Overall Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Herfindahl	0.374***	0.386***	0.359***	0.374***	0.381***	-0.009	-0.017	-0.014	-0.003	0.003
	(0.104)	(0.104)	(0.106)	(0.101)	(0.104)	(0.110)	(0.113)	(0.110)	(0.109)	(0.109)
Market Share	-0.047*	-0.056*	-0.046*	-0.032	-0.053*	0.017	0.023	0.018	0.018	0.024
	(0.026)	(0.030)	(0.026)	(0.026)	(0.029)	(0.035)	(0.036)	(0.036)	(0.034)	(0.037)
For-Profit Share	0.015	0.012	0.017	0.013	0.015	0.064***	0.065***	0.064***	0.058***	0.061***
	(0.014)	(0.014)	(0.014)	(0.013)	(0.015)	(0.017)	(0.017)	(0.016)	(0.017)	(0.016)
Priv. or Pub. Registry	0.054***	0.060***	0.048**	0.058***	0.058***	0.027	0.014	0.020	0.032	0.020
	(0.020)	(0.022)	(0.021)	(0.020)	(0.022)	(0.031)	(0.031)	(0.029)	(0.030)	(0.031)
X-Eff	-0.063	-0.064	-0.061	-0.064	-0.082	-0.065	-0.076	-0.068	-0.076	-0.063
	(0.047)	(0.048)	(0.046)	(0.046)	(0.053)	(0.068)	(0.071)	(0.070)	(0.066)	(0.068)
S-Eff	-0.226***	-0.229***	-0.222***	-0.227***	-0.256***	-0.091	-0.095	-0.096	-0.084	-0.095
	(0.062)	(0.062)	(0.062)	(0.060)	(0.066)	(0.083)	(0.085)	(0.083)	(0.084)	(0.085)
N. Borrowers	0.012*	0.012*	0.012*	0.010	0.014**	-0.017*	-0.017*	-0.016*	-0.018**	-0.016*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
N. Borrowers*Herfindahl	-0.039***	-0.040***	-0.038***	-0.038***	-0.039***	0.002	0.002	0.002	0.002	0.001
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Governance controls		-0.008	0.007	-0.012*	-0.001		0.012	0.007	-0.007	0.001
		(0.007)	(0.009)	(0.007)	(0.001)		(0.008)	(0.009)	(0.007)	(0.001)
Size	0.017***	0.018***	0.016**	0.017***	0.017***	0.012	0.011	0.012	0.012	0.011
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Age	0.005	0.006	0.005	0.007	0.005	0.016**	0.016**	0.016**	0.016**	0.016**
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Loan Size (% of GNI)	-0.015**	-0.016**	-0.014**	-0.017***	-0.014**	0.009	0.011	0.011	0.007	0.011
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Deposit	0.005	0.003	0.005	0.003	0.003	0.015**	0.014*	0.015**	0.015**	0.015**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Group Lending	-0.002	-0.003	-0.003	-0.005	-0.004	-0.013	-0.012	-0.013	-0.011	-0.013
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
Village Lending	-0.019*	-0.020*	-0.020*	-0.021**	-0.028**	0.000	-0.003	-0.001	0.001	-0.002
	(0.011)	(0.011)	(0.011)	(0.010)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
GDP	-0.243***	-0.233**	-0.246***	-0.267***	-0.239**	-0.033	-0.049	-0.036	-0.040	-0.029
	(0.092)	(0.097)	(0.093)	(0.085)	(0.101)	(0.052)	(0.052)	(0.052)	(0.054)	(0.052)
Africa	0.030***	0.031***	0.029***	0.027**	0.028**	0.031**	0.029*	0.033**	0.034**	0.025
	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)
ECA	-0.042***	-0.042***	-0.042***	-0.045***	-0.045***	-0.079***	-0.079***	-0.076***	-0.076***	-0.082***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.022)	(0.022)	(0.022)	(0.023)	(0.023)
LAC	-0.047***	-0.046***	-0.047***	-0.051***	-0.045***	-0.033*	-0.031*	-0.029	-0.033*	-0.038*
	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)	(0.019)	(0.018)	(0.018)	(0.019)	(0.021)
MENA	0.000	0.000	0.000	0.000	0.000	0.015	0.011	0.015	0.014	0.008
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.018)	(0.018)	(0.018)	(0.019)	(0.020)
Constant	-0.163**	-0.178***	-0.148**	-0.159**	-0.132**	0.029	0.048	0.035	0.027	-0.015
	(0.065)	(0.068)	(0.068)	(0.064)	(0.066)	(0.093)	(0.099)	(0.094)	(0.094)	(0.099)
Observations	289	289	289	289	283	582	582	582	582	577
R^2	0.540	0.542	0.541	0.548	0.544	0.315	0.317	0.315	0.316	0.318

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is portfolio-at-risk and is the portion of outstanding loans of a microbank with payments overdue by 30 days or more. Herfindahl is Herfindahl Hirschman concentration index. Market share is the gross loan portfolio market share of a microbank. For-Profit Share is the share of for-profit microbanks in GLP in a given country to total country GLP. Private or public registry coverage. X-Eff is X-Efficiency and S-Eff is scale efficiency. N. Borrowers is the log of the number of borrowers. N. Borrowers*Herfindahl is an interaction variable. Country governance variables are Regulatory Quality (in Columns (2) and (7)), Control of Corruption (in Columns (3) and (8)), Government Effectiveness (in Columns (4) and (9)) and Heritage foundation overall score (in Columns (5) and (10)).Size is the log of total assets. Age is the log of the age of the microbank. Loan Size (% of GNI) is average loan size disbursed, expressed as a percentage of Gross National Income (GNI) per capita. The variable N. Borrowers is the log of total number of borrowers. Deposit is a dummy for deposit-taking by microbanks. Group and Village Lending are dummy variables for solidarity groups and village banking lending methodologies, respectively. GDP is the growth rate of Gross Domestic Product. Africa, ECA, LAC and MENA are dummy variables for Africa, Eastern Europe and Central Asia, Latin America and Middle East and North Africa, respectively. Time dummies are included but not reported to save space.

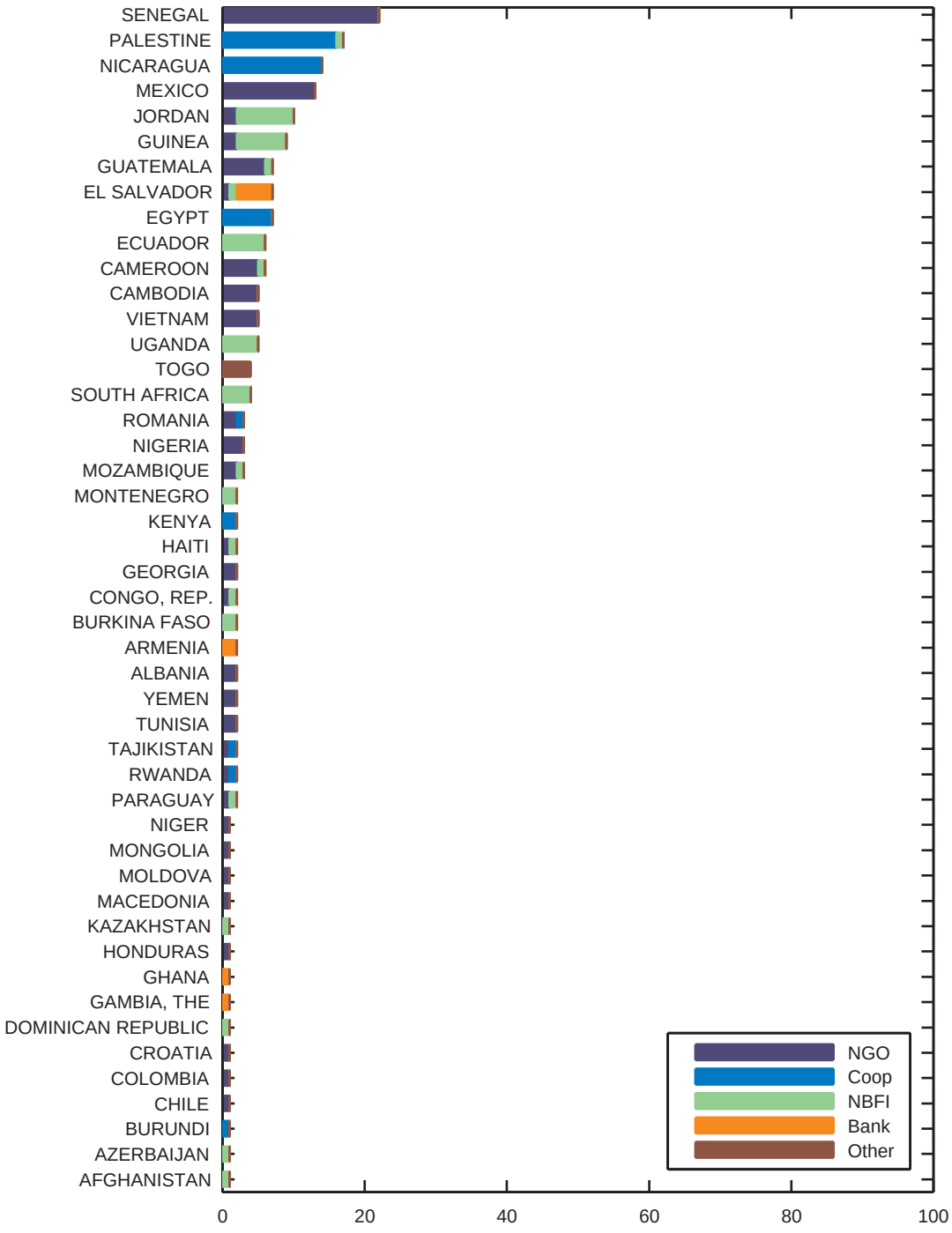
9 Figures

Figure 1: Microbanks by continent and legal status.



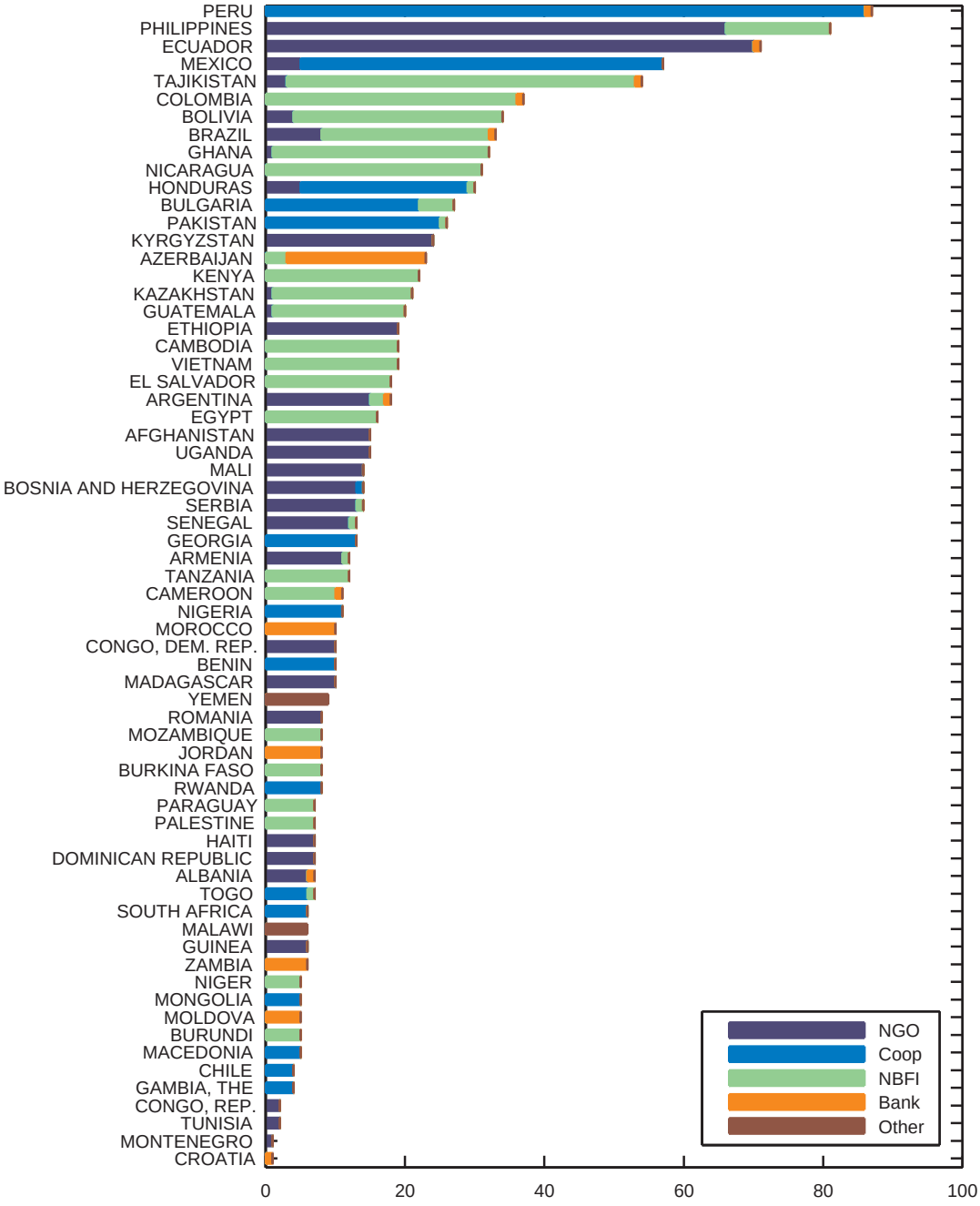
This figure shows the number of microbank-years per region in our sample: Eastern Europe and Central Asia (ECA), Middle East and North Africa (MENA), Africa, Latin America and the Caribbean (LAC) and Asia. According to their status, we distinguish between non-bank financial institution (NBFI), non-governmental organization (NGO), cooperative, bank, or other status, which is neither bank, nor NBFI, nor NGO or cooperative.

Figure 2: Total number of microbanks in MIX Market by country and legal status, in 2002.



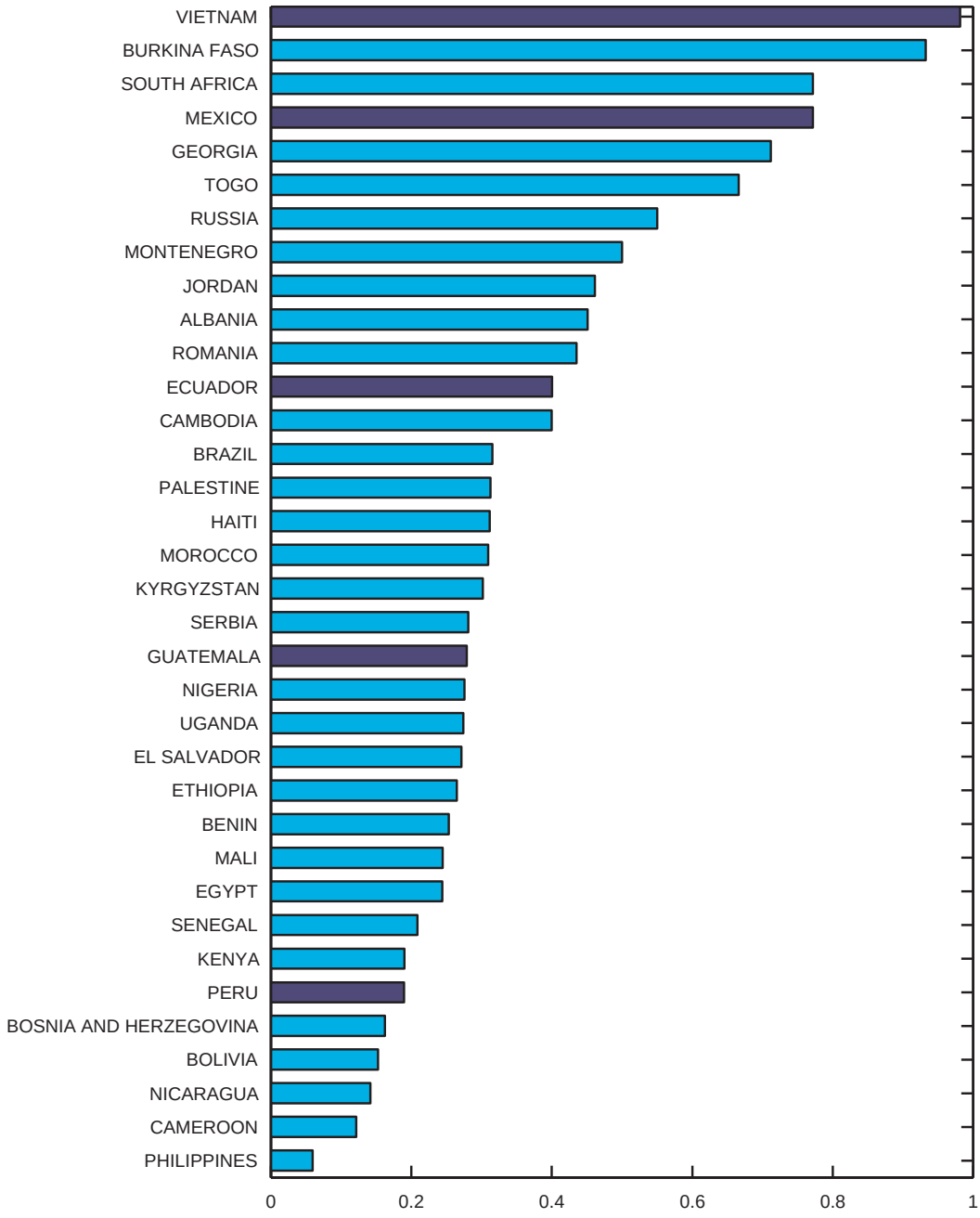
This figure shows the number of microbanks as reported to the Microfinance Information eXchange (MIX) Market by country and legal status in 2002. According to their status, we distinguish between non-governmental organization (NGO), cooperative, non-bank financial institution (NBFI), bank, or other status, which is neither bank, nor NBFI, nor NGO or cooperative.

Figure 3: Total number of microbanks in MIX Market by country and legal status, in 2008.



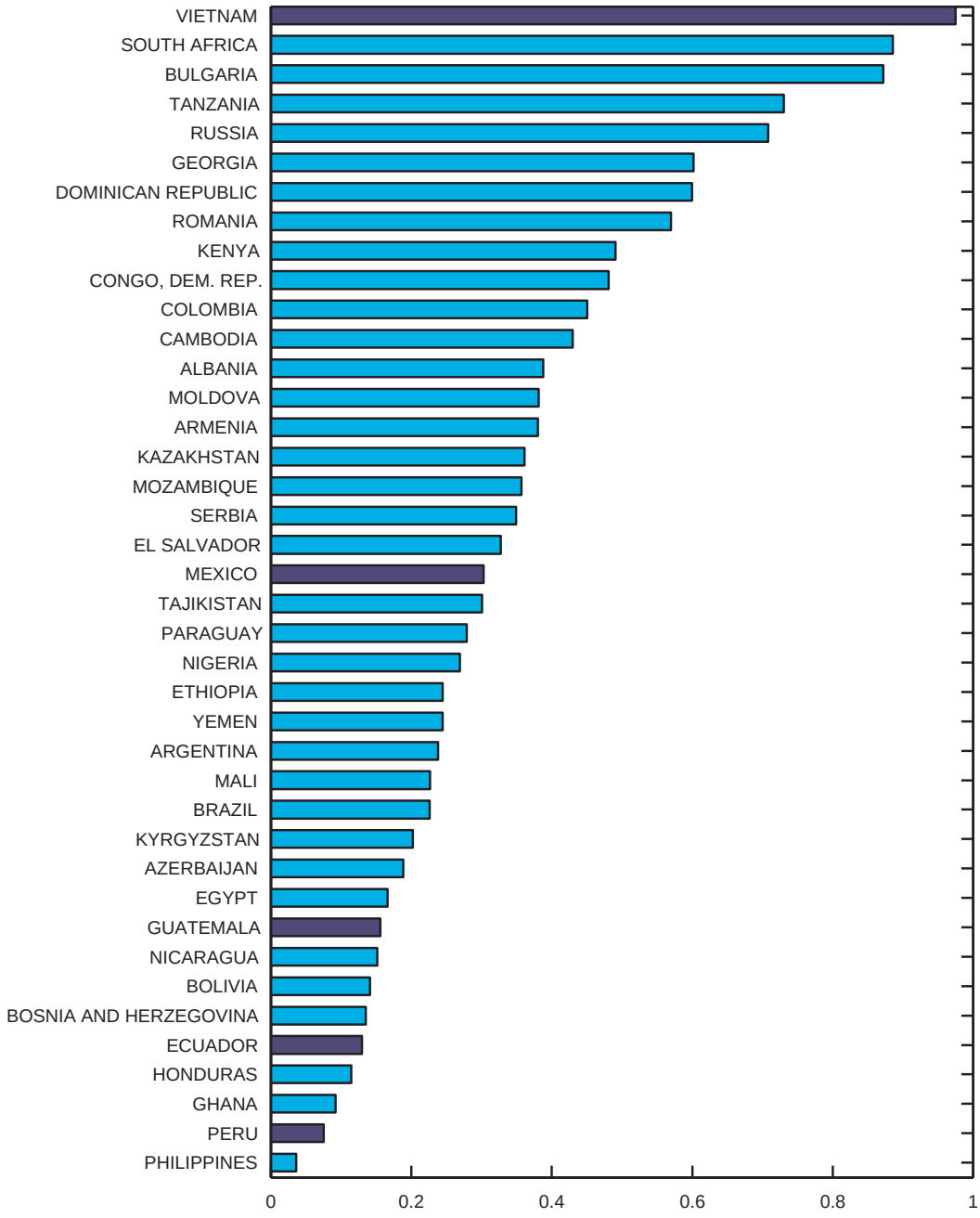
This figure shows the number of microbanks as reported to the Microfinance Information eXchange (MIX) Market by country and legal status in 2008. According to their status, we distinguish between non-governmental organization (NGO), cooperative, non-bank financial institution (NBFI), bank, or other status, which is neither bank, nor NBFI, nor NGO or cooperative.

Figure 4: Herfindahl index per country in 2002



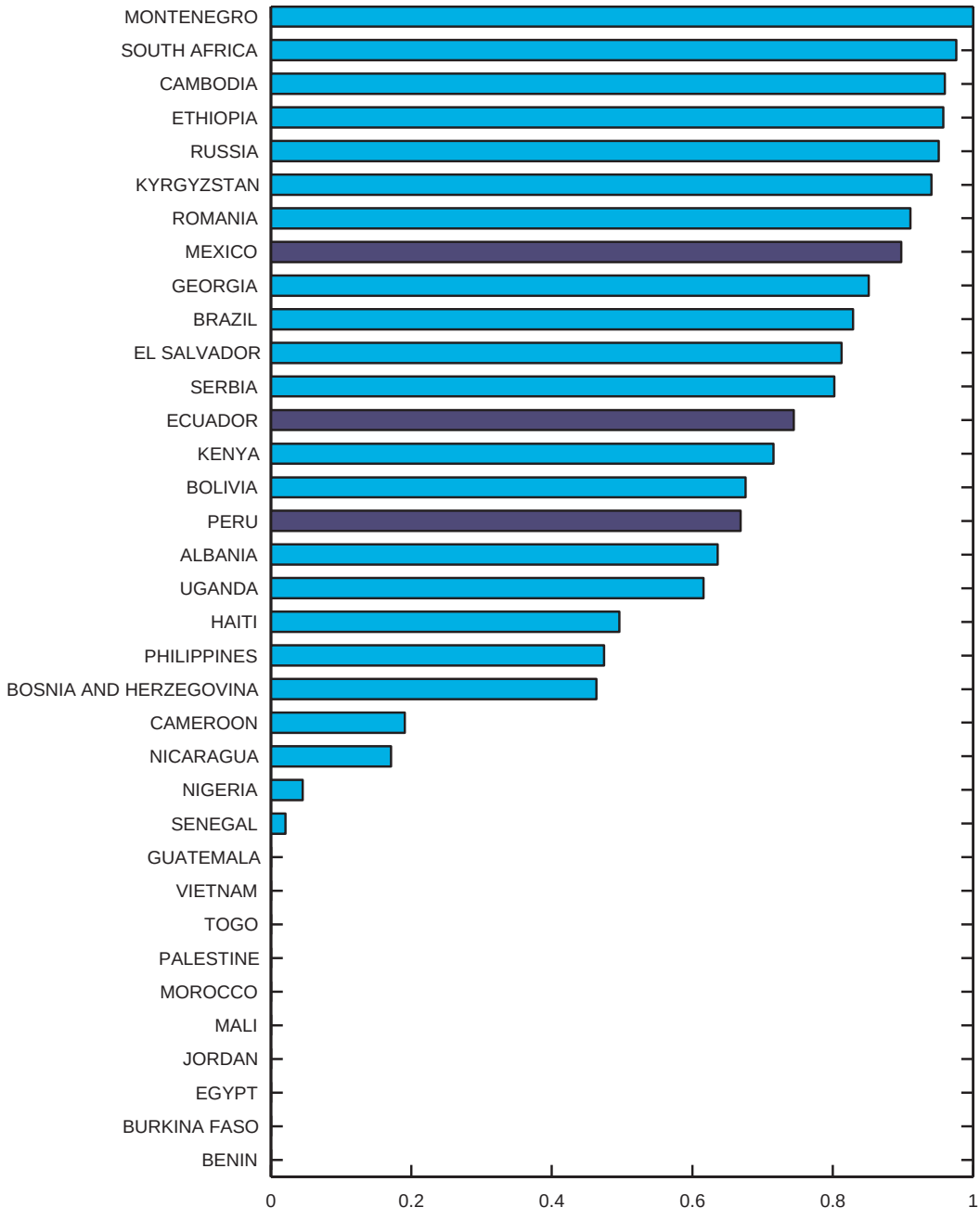
This figure shows the computed Herfindahl index in 2002 for the countries in our sample.

Figure 5: Herfindahl index per country in 2008



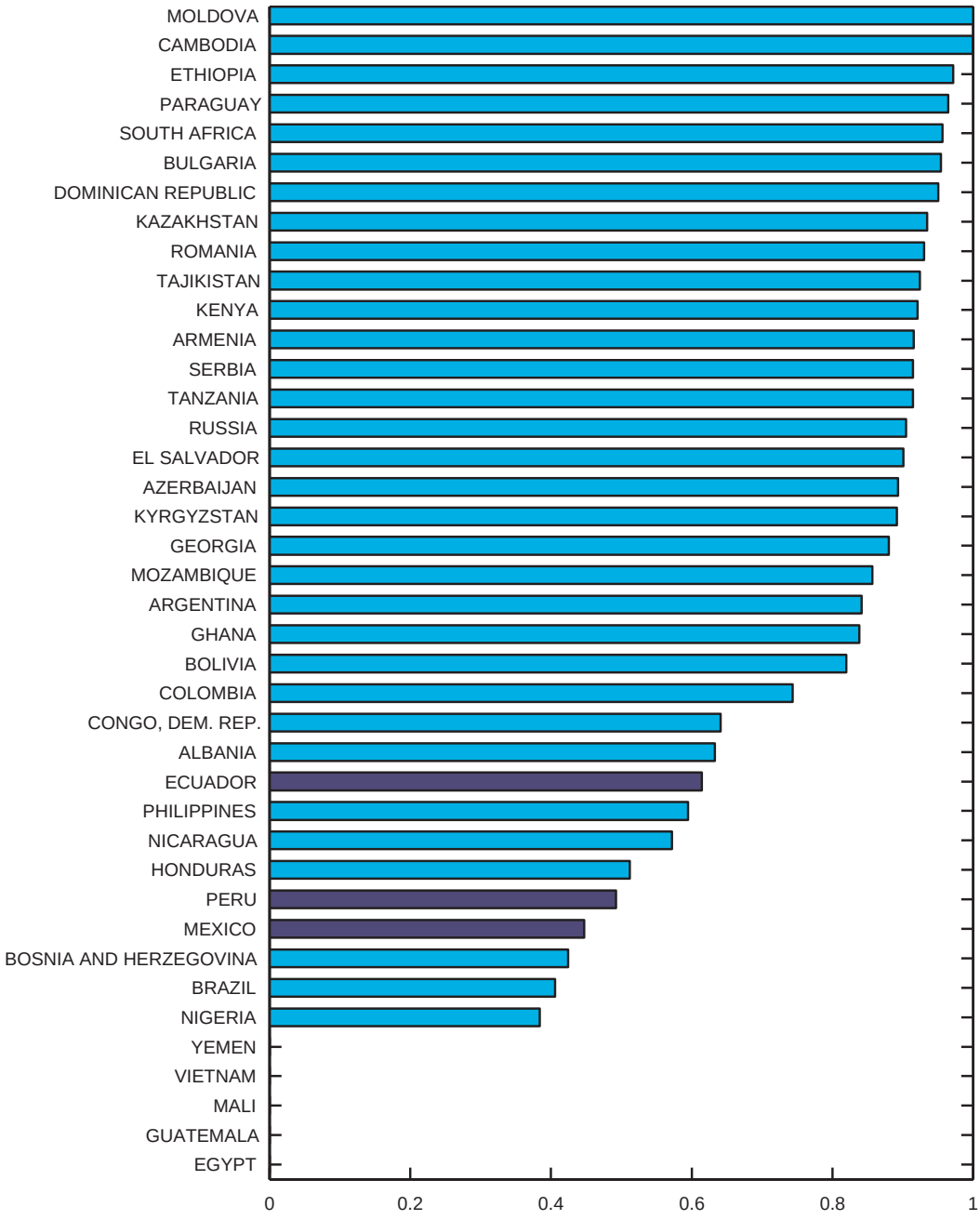
This figure shows the computed Herfindahl index in 2008 for the countries in our sample.

Figure 6: For-Profit Share index per country in 2002



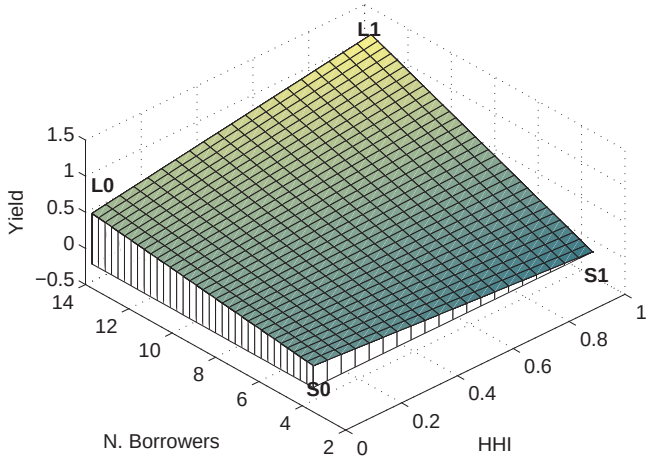
This figure shows the For-Profit Share in 2002 for the countries in our sample.

Figure 7: For-Profit Share index per country in 2008



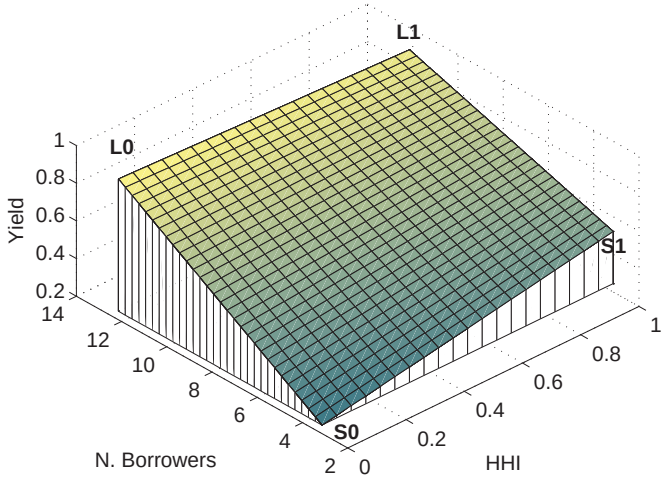
This figure shows the For-Profit Share in 2008 for the countries in our sample.

Figure 8: Effect of HHI and N. Borrowers on Yield Spread, For-Profit microbanks



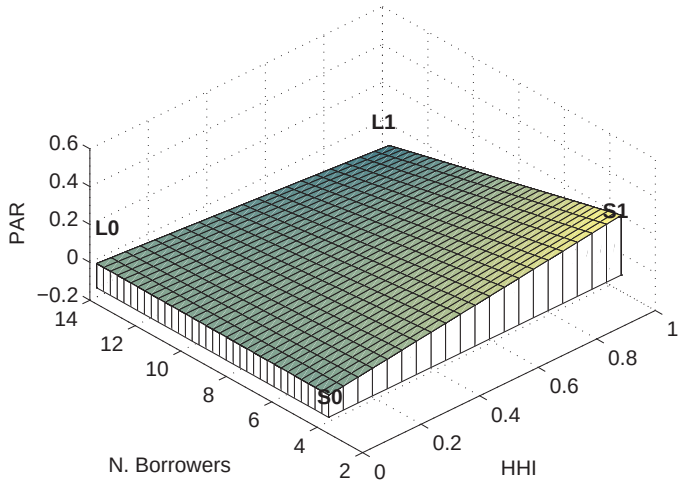
This figure shows the interaction between Herfindahl and N. Borrowers. It corresponds to the results in Table 10, Panel A, Column (3)

Figure 9: Effect of HHI and N. Borrowers on Yield Spread, Nonprofit microbanks



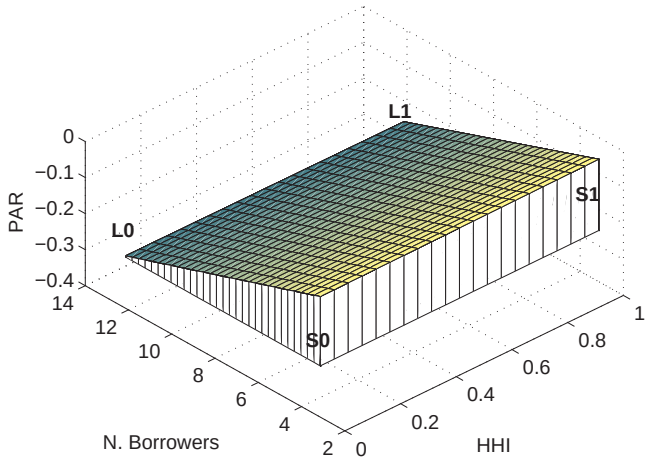
This figure shows the interaction between Herfindahl and N. Borrowers. It corresponds to the results in Table 10, Panel A, Column (8)

Figure 10: Effect of HHI and N. Borrowers on PAR, For-Profit microbanks



This figure shows the interaction between Herfindahl and N. Borrowers. It corresponds to the results in Table 10, Panel B, Column (3)

Figure 11: Effect of HHI and N. Borrowers on PAR, Nonprofit microbanks



This figure shows the interaction between Herfindahl and N. Borrowers. It corresponds to the results in Table 10, Panel B, Column (8)

10 Appendix: Cost Function

In order to compute our cost efficiency measures we estimate the following translog specification :

$$\begin{aligned}\log C = \quad & \alpha_0 + \alpha_1 \log(q_1) + \alpha_2 \log(q_2) + \alpha_{11}\log(q_1)^2 + \alpha_{12} \log(q_1)\log(q_2) + \alpha_{22}\log(q_2)^2 \\ & + \beta_1 \log(p_1) + \beta_{11}\log(p_1)^2 + \gamma_{11} \log(q_1)\log(p_1) + \gamma_{21} \log(q_2)\log(p_1) + \varepsilon,\end{aligned}$$

where C is operational cost, outputs are number of loans (q_1) and Gross Loan Portfolio (q_2), and inputs are physical capital and labor with price (p_1). The cost of physical capital is calculated as actual operating expense minus actual personnel expense divided by net fixed assets. The cost of labor is calculated as actual personnel expense divided by the number of employees. As is standard, we impose homogeneity of degree one in all prices by subtracting the log of the price of physical capital from the cost and the price of labor. This variable does therefore not appear explicitly in our equation. The estimation results in Table 16 reveal that even a simple cost function achieves a surprisingly good fit.

We compute X-Efficiency following Berger (1995) from the residuals ε_{it} of the cost function, where i denotes the microbanks and t is time. X-Efficiency compares the average residual for microbank i excluding the current year with the smallest residual over all microbanks for that year:

$$\text{X-Efficiency}_{it} = \exp\left(\frac{1}{n_s - 1}\sum_{s \neq t} \varepsilon_{is} - \min_j \varepsilon_{jt}\right).$$

The scale efficiency measure compares the actual average cost to the scale-efficient average cost, mentioned in Balk (2001), whose presentation we follow in the remainder of this Appendix. In the case where there is only one output, this corresponds simply to the quantity that minimizes average cost. When there is more than one output, this generalizes to the ray average cost

$$RAC(q,p) \equiv \min_\lambda \frac{C(\lambda q, p)}{\lambda} = \min_\lambda C\left(\frac{q}{\lambda}, \frac{p}{\lambda}\right).$$

The optimal scale λ^* satisfies the first order condition, which is equivalent to $\varepsilon(\lambda^* q, p) = 1$, where $\varepsilon(q,p) \equiv \sum_i \frac{\partial \log C}{\partial \log(q_i)}$ is the sum of the elasticities of cost with respect to all outputs.

In the case of the translog, one obtains

$$\varepsilon(\lambda^* q, p) = \varepsilon(q, p) + \alpha \log(\lambda^*),$$

where $\alpha = \sum_{ij} \alpha_{ij}$, and $\varepsilon(\lambda^* q, p) = 1$ is equivalent to $\lambda^* = \frac{1-\varepsilon(q,p)}{\alpha}$. Moreover

$$\log\left(RAC(q,p)\right) = \log C(q,p) + \log(\lambda^*)\left[\frac{1}{2}\alpha \log(\lambda^*) + \varepsilon(\lambda^* q, p) - 1\right].$$

Finally S-Efficiency is the ratio of the ray average cost to the cost and can be shown in for the translog to be

$$\text{S-Eff} = \frac{RAC(q,p)}{C(q,p)} = \exp\left(-\frac{(1-\varepsilon(q,p))^2}{2\alpha}\right).$$

Table 16: Translog Cost Function for Efficiency Measures

	Operating Expenses
Constant (α_0)	2.236**
	(0.905)
Number of Loans (α_1)	0.319**
	(0.158)
Gross Loan Portfolio (α_2)	-0.241
	(0.175)
Number of Loans^2 (α_{11})	0.035***
	(0.009)
Number of Loans*Gross Loan Portfolio (α_{12})	-0.033*
	(0.018)
Gross Loan Portfolio^2 (α_{22})	0.026**
	(0.011)
Labor Cost (β_1)	0.854***
	(0.131)
Labor Cost^2 (β_{11})	-0.016**
	(0.007)
Number of Loans*Labor Cost (γ_{11})	-0.008
	(0.012)
Gross Loan Portfolio*Labor Cost (γ_{21})	0.015
	(0.014)
OBS.	1433
R^2	0.903
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	