Financial Performance and Outreach: A Global Analysis of Leading Microbanks

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Abstract

Microfinance promises to reduce poverty by employing profit-making banking practices in low-income communities. Many microfinance institutions have secured high loan repayment rates, but, so far, relatively few earn profits. We examine why this promise remains unmet. We explore patterns of profitability, loan repayment, and cost reduction with unusually high-quality data on 124 institutions in 49 countries. The evidence shows the possibility of earning profits while serving the poor, but a trade-off emerges between profitability and serving the poorest. Raising fees to very high levels does not ensure greater profitability, and the benefits of cost-cutting diminish when serving better-off customers.

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Running banks in low-income communities is not easy. One of the great accomplishments of the economics of information, after all, has been to show how information asymmetries undermine credit markets in places where potential customers have few assets to offer as collateral (e.g., Besley, 1995). Microfinance providers, though, have specialized in making uncollateralized loans in low-income communities. Through innovative contracts and new microfinance management practices, institutions are generating high loan repayment rates in contexts as diverse as the slums of Dhaka, war-torn Bosnia, and rural Senegal. In doing so, microfinance providers have forced economic theorists to re-think pessimistic views of the scope for improving credit markets.[1] But microfinance would be a grand failure if securing high repayment rates was all there was to it.

Meeting the full promise of microfinance—to reduce poverty without ongoing subsidies—requires translating high repayment rates into profits, a challenge that remains for most microbanks.[2] The overall equation linking capital and labour inputs into profits and social change still proves difficult to master.

We take a close look at this equation with unusually high-quality financial information on 124 institutions in 49 countries; the institutions are united by claiming strong commitments to achieving financial self-sufficiency and a willingness to open

[1] A great deal has been written on microfinance theory within the past fifteen years (e.g., Stiglitz, 1990; Banerjee, Besley, and Guinnane, 1994; Besley and Coate, 1995; Conning, 1999; Ghatak and Guinnane, 1999; Laffont and Rey, 2003; Rai and Sjöström, 2004). Armendáriz de Aghion and Morduch (2005) provide a critical guide to the economics literature on microfinance, and Ahlin and Townsend (2006) test leading models with Thai data.

[2] We take this goal on face value, although we recognize the case for subsidized microfinance when social benefits sufficiently outweigh social costs and subsidies do not undercut non-subsidized firms. The goal of profit-making microfinance is discussed by Robinson (2003). Armendáriz de Aghion and Morduch (2005) discuss subsidy and sustainability in their chapter 9.

their accounts to careful scrutiny.[3] The institutions thus represent some of the best hopes for achieving poverty reduction with profit (or at least without ongoing subsidy). Still, the average share of funding (total liabilities plus total equity) made up of subsidy exceeds 20% in this sample.

The data do not allow us to answer the big (and controversial) question: can such ongoing subsidy be justified? Answering that would require reliable data on social impacts, and the evidence is scant. The data, though, allow us to illuminate other important questions for the first time in a large comparative survey. Does raising interest rates exacerbate agency problems as detected by lower loan repayment rates and less profitability? Is there evidence of a trade-off between the depth of outreach to the poor and the pursuit of profitability? Has "mission drift" occurred—i.e., have microbanks moved away from serving their poorer clients in pursuit of commercial viability? The questions are at the heart of debates within academic economics, as well as being of immediate relevance for policymakers and practitioners.

As with other cross-country analyses, the aim is to describe patterns in the data. There is insufficient exogenous variation in key variables to reliably estimate causal impacts, so we focus on associations that help to illuminate and frame key debates. Since the institutions in the survey are more focused on financial performance than typical microbanks, we expect that the trade-offs described below are even starker for institutions that did not participate in the survey.

[3] The Microfinance Information eXchange, Inc. (MIX) kindly provided the data (with confidentiality safeguards) through an agreement with the World Bank Research Department. The MIX is a non-profit company dedicated to improving the information infrastructure of the microfinance industry by promoting standards of financial and operational reporting and providing data. The data we use were collected as part of the MIX's *MicroBanking Bulletin* project. Summary statistics on the institutions are available in the *Bulletin* (www.mixmarket.org).

Our results bring some good news for microfinance advocates. First, over half of the institutions in the survey were profitable after accounting adjustments were made (although the average return on assets is negative overall). Others are approaching profitability and should be able to soon achieve financial self-sufficiency. Second, simple correlations show little evidence of agency problems, outreach-profit trade-offs, or mission drift. The correlations thus attest to the possibility of raising interest rates without undermining repayment rates, achieving both profit and substantial outreach to poorer populations, and staying true to initial social missions even when aggressively pursuing commercial goals.

Disaggregating by lending type, though, uncovers trade-offs and tensions, even among these leading institutions. The patterns of profitability and the nature of customers vary considerably with the design of the institutions and their contracts. Microfinance lenders use a variety of approaches to lending, and we focus on three main categories.

The best-known approach is "group lending," made popular within microfinance by the Grameen Bank of Bangladesh and BancoSol in Bolivia. The method uses self-formed groups of customers that assume joint liability for the repayment of loans given to group members. The joint liability contract can, in principle, mitigate moral hazard and adverse selection by harnessing local information and enforcement possibilities and putting them to use for the bank. (Ahlin and Townsend, 2006; Cassar et al., 2006 provide theoretical perspectives and empirical tests of group mechanisms.)

Another method is village banking, based on larger groups but a similar notion of joint liability (the focus of Karlan, 2006). The third main method is "individual-based

lending," which draws on traditional banking practices and involves a standard bilateral relationship between the bank and customer—and, absent other interventions, is most vulnerable to problems imposed by information asymmetries and weak enforcement capacities.

The data set contains institutions representative of each approach: 20 institutions based on village banks, 56 individual-based lenders, and 48 group-based lenders. Our findings on the latter two groups are generally robust across specifications.

We find some institutions that have both achieved profitability and meaningful outreach to the poor, but disaggregation by lending-type reveals trade-offs between the two objectives. Individual-based lenders as a group have the highest average profit levels, but they perform least well on measures of outreach. Taking average loan size as a proxy for the poverty level of customers (smaller loans indicate poorer customers), individual-based institutions lend with an average size of $1220, while village banks (the most subsidy-dependent category of institutions) lend with an average loan size of $148. Village banks also serve a much larger fraction of women (88%) relative to individual-based lenders (46%).

The economics of information yields a series of predictions that are explored here. First is the hypothesis that raising interest rates will undermine portfolio quality due to adverse selection (Stiglitz and Weiss, 1981) and moral hazard. Evidence consistent with the hypothesis emerges (up to a point) in the sub-sample of banks that do not use group-based methods to address information problems. Specifically, the fraction of the loan "portfolio at risk" rises with interest rates for most of the institutions that employ individual-based lending methods. With respect to profitability, raising interest rates

helps—but only up to a point. Beyond an interest rate equivalent to 60% per year, higher rates are associated with lower profits for individual-based lenders. The evidence is consistent with falling demand (and thus reduced scale economies) at higher rates, coupled with limits on the ability to leverage assets.

Theory predicts that individual-based lenders must invest relatively more in staff costs to achieve higher levels of profit since these lenders cannot rely on the customers themselves to help with screening and monitoring (as under a group method). The evidence is consistent with this hypothesis, and, as predicted, neither of these relationships (regarding higher interest rates or staff costs) holds in this sample for group lenders.[4]

These results generate a preliminary puzzle: Why then is the individual-based approach ever favoured over either of the group-based methods? The puzzle is sharpened by knowledge that two pioneers of group-based lending (the Grameen Bank of Bangladesh and BancoSol of Bolivia) have now switched to individual-based models. One clue is that the individual-based lenders here provide substantially larger-sized loans, as noted above. Taking loan size as a proxy for poverty levels, the evidence suggests that the group methods become cumbersome for customers who are less poor and who are willing and able to invest in larger businesses. Working with customers able to use larger loans can be an important path to financial self-sufficiency for lenders. Taking this path veers from the traditional focus of microfinance (with its emphasis on making smaller loans at as wide a scale as possible), but the shift could improve overall welfare: it is not just the poorest that demand and can take advantage of better access to finance.

[4] Increasing labour costs are associated with greater profitability for the 20 village banks as well, which, relative to the pattern of other results, is not consistent with predictions.

We find some evidence of "reverse mission drift" for individual-based lenders as a class: i.e., once an institution is established, pursuing higher profits and focusing on poorer customers can go hand in hand. At the same time, the data show that larger microbanks on average have lower measures of outreach. This last finding is consistent with an important trade-off between the *breadth* of outreach (scale) and the *depth* of outreach (reaching the poor). The question remains open as to whether larger institutions serve an absolutely greater number of the very poor – a question that can only be answered with disaggregated data.

1. Data and empirical approach

Empirical progress on understanding the trade-offs in microfinance has been held back by the lack of variation in prices and program elements necessary for identification of key parameters. Most financial institutions offer their clients a uniform set of products and they seldom change the product mix, price, or design—or institutions change policies in ways that make it difficult for researchers to disentangle patterns of product changes versus other contemporaneous changes.[5] The cross-country data here, however, provide substantial variation in contractual types, prices, institutional sizes and locations, and target markets. The variation provides a means to describe the nature and trade-offs of lending relationships.

The data on 124 microfinance institutions (MFIs) in 49 developing countries were collected by the Microfinance Information Exchange (or the MIX), a not-for-profit private organisation that aims to promote information exchange in the microfinance

[5] New work using field experiments (e.g., Karlan and Zinman, 2005) or natural experiments (e.g., Dehejia, Montgomery, and Morduch, 2005) shows promise in ways to either exploit the variation that exists or to create variation as part of a research program.

industry. The database contains one observation per institution from 1999 to 2002; 70% of the observations are from 2002. These data, collected for publication in the *MicroBanking Bulletin* (MBB), have been adjusted to help ensure comparability across institutions. The adjustments, which are summarized in Appendix A, include an inflation adjustment, a reclassification of some long-term liabilities as equity, an adjustment for the cost of subsidized funding, an adjustment for current-year cash donations to cover operating expenses, an in-kind subsidy adjustment for donated goods and services, loan loss reserve and provisioning adjustments, some adjustments for write-offs, and the reversal of any interest income accrued on non-performing loans.

The institutions were selected based in large part on the quality and extent of their data. The data set is thus not representative of all microfinance institutions. They do, however, collectively serve a large fraction of microfinance customers worldwide. A sense of the skewed size distribution of microfinance is given by a recent analysis of data provided by the Microcredit Summit organisation, a data set whose top end largely overlaps the data here. Honohan (2004, p. 3) finds that "the largest 30 microfinance firms account between them for more than 90 per cent of the clients served worldwide by the 234 top firms (and hence for more than three-quarters of those served by all of the 2572 firms reporting to the Microcredit Summit)." While we cannot make a similar comparison here, Honohan's evidence suggests that during the sample period the banks here served over half of all microfinance customers worldwide.

An important feature of our data is qualitative information on the lending style employed by the MFI, the range of the services it offers, its profit status, ownership

structure, and sources of funds. These detailed data enable us to offer a more complete analysis of MFI performance by lending type than has been possible before.

Lending methods vary across regions, as shown in Table 3 (classifications and acronyms are those employed by the World Bank). There are no village banks in East Asia in the sample, for example. Individual-based lending predominates in East Asia and the Pacific, while institutions in South Asia and Sub-Saharan Africa tend to lend through group mechanisms. Institutions in Eastern Europe and North Africa do not strongly favour either individual-based or group lending.

Summary statistics at the bottom of Table 1 indicate that, with the possible exception of Latin America and the Caribbean (LAC), our sample is reasonably balanced across regions. 17% of the institutions come from Eastern Europe and Central Asia (ECA), another 17% from Sub-Saharan Africa (AFR). South Asian (SA) institutions comprise 10% of the sample, while institutions from East Asia and the Pacific (EAP) and the Middle East and North Africa (MENA) comprise 9% and 7%, respectively. Institutions from Latin America and the Caribbean comprise 40% of the sample.

Although we include regional dummy variables in the regressions that follow, the regional preferences for certain lending types should be kept in mind when interpreting results. For example, cultural factors could tip countries or regions in the direction of one lending type over another, and it could be these social factors that are ultimately driving the relationships we find rather than lending methods. To address this concern we have re-run our models using data from institutions located in LAC, the region with the greatest number of institutions to study. Of the fifty MFI's from LAC in our sample, there are 32 individual-based lenders, 10 solidarity group lenders, and eight village

banks. The base results that follow on financial performance (Table 7), operating costs/loan size trade-offs (Table 10), and mission drift (Table 11) are quite similar to those for the LAC sub-sample. To conserve space, we do not report the LAC results below, but the results are available from the authors.

Dependent variables

The key dependent variable in our analysis of profitability is the financial self-sufficiency (FSS) ratio, a measure of an institution's ability to generate sufficient revenue to cover its costs.[6] Values below one indicate that it is not doing so. The financial self-sufficiency ratio bests other measures of financial performance because the data are adjusted as described above and because it offers a more complete summary of inputs and outputs than standard financial ratios such as return on assets or equity. For robustness, however, we also use as dependent variables an unadjusted measure of operation self-sufficiency (OSS) and a measure of adjusted return on assets (ROA).[7]

Table 2 shows that the correlations between financial outcomes (FSS, OSS, and ROA) are positive and significant, but not perfect (ranging from .59 to .90). The three measures are also significantly positively correlated with the age and size of institutions. Regression analyses allow us to investigate the strength of those correlations after controlling for region, lending type, and other relevant covariates.

[6] The financial self-sufficiency ratio is adjusted financial revenue divided by the sum of adjusted financial expenses, adjusted net loan loss provision expenses, and adjusted operating expenses. It indicates the institution's ability to operate without ongoing subsidy, including soft loans and grants. The definition is from *MicroBanking Bulletin* (2005), p. 57.

[7] The operational sustainability ratio is financial revenue divided by the sum of financial expenses, net loan loss provision expenses, and operating expenses. Unlike the financial self-sufficiency ratio, OSS is not adjusted. Return on assets is measured as adjusted net operating income (net of taxes) divided by adjusted average total assets. Definitions are from *MicroBanking Bulletin* (2005), p. 57.

2. The microfinance landscape

Fig. 1 shows basic patterns across the three main institutional types identified in the survey:

1. *"Individual-based lenders":* institutions that use standard bilateral lending contracts between a lender and a single borrower. Liability for repaying the loan rests with the individual borrower only, although in some cases another individual might serve as a guarantor;
2. *"Solidarity group lenders":* institutions that employ contracts based on joint liability implemented with "solidarity groups" (in the spirit of contracts used initially at the Grameen Bank in Bangladesh and at BancoSol in Bolivia). Loans are made to individuals, but the group, which has between 3 and 10 members depending on the institution and location, shoulders responsibility for a loan if a member cannot repay, and
3. *"Village banks,"* where each branch forms a single, large group and is given a degree of self-governance (this kind of arrangement was pioneered by FINCA and is now employed by organisations like Pro Mujer and Freedom from Hunger).

Fig. 1 shows that patterns of average revenues and costs vary systematically by lending type. The village banks in the survey charge the highest average interest rates and face the highest average costs. The measure of interest rates we use, the real gross portfolio yield, captures both direct interest charges and any additional fees charged by

lenders. The total expense ratio gives the ratio of total expenses (including labour and capital costs) to assets.

Costs outweigh interest revenues, though, and the result is that the average return on assets for village banks is negative (–0.08). The microbanks using solidarity groups charge lower interest rates and face lower costs, but again costs exceed revenues and the average return on assets is –0.05. Only for the individual-based lenders in the survey is the average return on assets positive, though small (0.01).

These patterns reflect differences in social mission, target customers, and location as much as management strategies. The summary statistics suggest, for example, that one reason that costs are so much higher for village banks and group lenders (relative to individual-based lenders) is that they make smaller-sized loans and serve poorer populations. The data in Table 4 show that village banks, the least profitable lending type as a class, serve the poorest customers (as proxied by loan size) and their clients are more likely to be women. The customers of village banks and group lenders, for example, are largely women: 88% and 75%, respectively. In comparison, just under half of the customers of individual-based lenders are women (46%).

The village banks in the survey also make the smallest-sized loans ($149 on average), followed by group lenders ($431). Individual-based lenders made far larger average loans on average ($1220). Average loan size is often taken to be a proxy for the poverty of customers, and these results are in line with anecdotal evidence about the depth of outreach across lending types. The loan size comparisons are made at official exchange rates, though, which can substantially distort the purchasing power of a given amount of money in local currency. Patterns are broadly similar, however, even if the

average loan sizes are deflated by gross national product per capita (a metric often preferred by microfinance donors) or deflated by the average income per capita of the bottom 20% in the country. For average loan size to GNP per capita, the ratio for village banks: solidarity group lenders: individual-based group lenders is 0.20: 0.54: 1.01. Where the deflator is the average income per capita of the bottom 20% in the country, the ratios are 0.63: 1.63: 4.80. These basic distinctions by lending type play out in important ways in the regression analyses below.

If predicted revenues fall short of costs, lenders are likely to lean on subsidies. It is unsurprising that village banks as a class take most advantage of subsidies. Table 5 shows that the average fraction of subsidies in funding (total liabilities plus total equity) is over one-third. For solidarity group-based institutions, the fraction is 28%, and for individual-based lenders the subsidized share of funding is just 11%.

Table 6 shows the correlation of subsidies and costs. The only statistically significant correlation is a positive 0.25 coefficient with respect to capital costs faced by institutions using solidarity groups (while the same correlation for village banks is near zero). The correlations are small and weak overall, suggesting a diversity of rationales for subsidization. The most striking result holds with respect to portfolio at risk, and it is a "non-result": in contrast to expert belief that increased subsidization weakens incentives to maintain high portfolio quality, no such evidence emerges in these correlations.

3. Regression approach

The aim of the benchmark regressions is to understand why some microbanks are more profitable than others. The base regressions describe the correlates of profitability,

focusing particularly on the roles of costs and interest rates charged on loans. We allow these factors to vary by lending type using the following reduced-form equation:

$$\mathbf{FSS}_i = \boldsymbol{\alpha} + \boldsymbol{\beta_1}\text{Yield}_i + \boldsymbol{\beta_2}\text{Yield}_i\text{*Lending Type}_i + \boldsymbol{\beta_3}\text{Labour Cost}_i + \boldsymbol{\beta_4}\text{Labour Cost}_i\text{*Type}_i + \boldsymbol{\beta_5}\text{Capital Cost}_i + \boldsymbol{\beta_6}\text{Capital Cost}_i\text{*Type}_i + \boldsymbol{\beta_7}\text{Lending Type}_i + \boldsymbol{\beta_8}\text{MFI History}_i + \quad (1)$$
$$+ \boldsymbol{\beta_9}\text{Orientation}_i + \boldsymbol{\beta_{10}}\text{Region}_i + \boldsymbol{\varepsilon}_i.$$

where *FSS* is the financial self-sufficiency ratio of microfinance institution *i*. As noted, we also use *OSS* and *ROA* as dependent variables. The construction of these measures and their summary statistics appear in Table 1. The means and medians for FSS, OSS, and ROA are all within the expected range, but the minimum and maximum values suggest a wide range for each variable, and thus outliers will be a concern in the analysis that follows, prompting the use of robust regression methods as a check on robustness to outliers.

Yield is the real gross portfolio yield, a measure of interest charges faced by customers described in Table 1. Because loan losses are not netted out of the revenues, this measure is intended to capture the ex-ante interest rate charged by the lender rather than the ex-post interest rate realized on the portfolio. The coefficient matrix $\boldsymbol{\beta_2}$ includes coefficients that show how the effects of *Yield* vary by lending type, described in greater detail below. In the results that follow, the omitted category is "individual-based lenders." Thus, there is one *Yield* coefficient for solidarity group lenders and another for village banks. Each of those coefficients measures the difference between that lending type and individual-based lenders with regard to the effect of yields. The coefficient

vector $\boldsymbol{\beta_1}$ thus summarizes the effect of yields on financial self-sufficiency for individual-based lenders.

The coefficient matrix $\boldsymbol{\beta_4}$ shows how the effects of labour costs vary across lending types, while $\boldsymbol{\beta_6}$ does the same for capital costs. The coefficient vectors $\boldsymbol{\beta_3}$ and $\boldsymbol{\beta_5}$ therefore summarize the effects of labour costs and capital costs on financial self-sufficiency for individual-based lenders. The lending type variables also enter the specification independently. Because they again are the omitted category, individual-based lenders do not have their own coefficient.[8] The matrix *MFI history* includes two variables, one for age and the other for size (as measured by total assets). The matrix *Orientation* contains three variables that describe the microfinance institution's business practices: the ratio of loans to assets, the average loan size (relative to GNP per capita), and a dummy variable indicating the institution's formal profit status (equal to one if the organisation is for-profit). Finally, *region* is a matrix of dummy variables for each main region of the developing world, with "Latin America and the Caribbean" as the omitted category.

Having summarized the correlates of profitability, the next set of regressions explores the relationship between interest rates and profitability for each lending type. Here, the interest is in evidence of declining profitability as interest rates rise to high levels. We first introduce a quadratic term for the gross portfolio yield variable in the profitability equations, allowing the quadratic effect to differ across lending types. The

[8] Within the group of individual-based lenders there are also sources of variation that we would ideally like to capture. For example, such lenders vary in the extent to which they require collateral to secure loans. Unfortunately, we lack the data necessary to capture finer distinctions between institutions that use the same lending type.

quadratic form can generate U-shaped patterns consistent with the prediction that agency problems become so severe that overall profitability eventually falls as interest rates rise.

This result is also consistent with falling demand for credit (and thus diminishing scale economies) at high interest rates. To shed further light on the specific hypothesis from agency theory, we then replace the profit measures with the share of the portfolio that is delinquent (portfolio at risk) to test directly whether high interest rates are associated with higher rates of non-repayment—and find some evidence that they are, but only for individual-based lenders. Moreover, according to one specification, individual-based lenders charging the highest interest rates in our sample enjoy better repayment performance than those charging intermediate rates. Yet, their lending volumes are substantially lower, a finding that is more consistent with falling demand for credit as rates push past threshold values than with predictions from agency theory.

4. Results

Financial sustainability

Table 7 gives the results from the estimation of equation 1 above. The results show that raising interest rates is associated with improved financial performance for individual-based lenders. The coefficient for real gross portfolio yield (the measure of average interest rates on loans to customers) is positive and significant across all three profitability indicators (financial self-sufficiency, operational sustainability, and return on assets), indicating that individual-based lenders tend to be more profitable when their average interest rates are higher.

The result, in itself, is not surprising. In addition, we cannot reject the hypothesis that the effects are similar for village banks and group lenders, since their coefficients are not statistically significant in either column (1) or (2). However, when we sum the coefficients for yield and the yield interactions, we also cannot reject the hypothesis that the effect is zero for those two lending types. In that sense, for both types of group lenders there is not a pronounced significant relationship between interest rates and profitability, even after controlling for costs.

In column 3, we examine returns on assets. Here, the village bank coefficient is large, negative, and significant: the relationship between interest rates and profitability is significantly different than for individual-based lenders. Raising interest rates has a much smaller impact on returns for village banks; the sum of the yield and yield*village bank coefficients are not significantly distinguishable from zero.

The specifications also show that labour costs are associated with improved profitability for individual-based lenders (for all three of our profitability measures). The labour cost interaction term for village banks is positive but not significant in any specification, indicating no significant difference between them and individual-based lenders. The labour costs and village bank*labour costs coefficients are also jointly significantly greater than zero in all specifications in Table 7. Thus, these two types of lenders (village banks and individual-based) tend to more than recoup the costs they devote to personnel. One possibility, which we explore below, is that identifying creditworthy borrowers is labour-intensive. Once identified, however, such borrowers receive relatively large loans, making this a cost-effective strategy.

Group lenders do not follow this strategy. The coefficient on their labour costs variable is negative, significant and of similar magnitude to the simple labour costs variable (corresponding to individual-based lenders). When summed, the labour costs and labour costs*solidarity group lender interaction coefficients are not significantly different from zero at the p=.05 level for any model in Table 7, indicating no strong relationship between labour costs and financial performance for group lenders. Not surprisingly, the benchmark regression shows that rising capital costs (which include rent, transportation, depreciation, office, and other expenses) reduce profitability for individual-based lenders. The coefficients on the capital costs variables also show differences in the way the three types of lenders generate profits. For village banks, rising capital costs are associated with an even sharper decline in profitability. The interaction term for village banks is negative and significant suggesting that high capital costs hurt their bottom line even more than that of individual-based lenders. When summed, the capital costs and village bank*capital costs coefficients are significantly less than zero (at the p=.01-.06 level) for all specifications in Table 7. The result suggests that village banks have less room to adjust in the face of rising costs.

We find no significant relationship between capital costs and profitability measures for group lenders. That is, the sum of the capital costs and capital costs*solidarity group lending coefficients is not significantly different from zero. The positive significant coefficients on capital costs for solidarity group lenders do, however, indicate that the effect for them is significantly different than that for individual-based lenders.

Note that neither the village bank nor the solidarity group dummy variable is significant in Table 7, indicating that once the effects of costs and yields are permitted to vary by lending type, those types explain no additional variation in financial performance. The regional dummy variables do explain some variation in financial performance. Institutions from Eastern Europe and Central Asia and those from South Asia out-performed those from other regions in terms of financial self-sufficiency. An institution's age and size are significantly positively linked to financial performance across all three indicators.[9] Finally, neither the indicator for being constituted formally as a for-profit bank nor the average loan size variable is strongly linked to the financial performance indicators. The latter result shows that, even after controlling for region and other covariates, institutions that make smaller loans are not less profitable on average.

The basic pattern of results also holds when we control for regional variation in different ways. For example, in unreported specifications we allowed for correlation between observations from the same country using clustered standard errors. In another set of unreported specifications, we allowed for random effects at the country level. Given the small size of our dataset, we were not able to incorporate country fixed effects in our models.

Interest rates

We next extend the results to examine the implications of agency theory. Specifically, when lenders face informational asymmetry and borrowers lack collateral,

[9] In addition to controlling for age in the base regressions, we also ran models on subsets of MFIs of similar vintage (5-20 years old). Because the performance indicators for young MFIs are widely dispersed, our results are at least as strong when we restrict the sample in this way. See Appendix A for reasons why data from young MFIs might be most in need of adjustment.

charging interest above a certain threshold could aggravate problems of adverse selection and moral hazard. At high enough rates, only low-quality borrowers that do not expect to be able to repay would find it in their interest to borrow. If the conjecture is true, microbanks charging relatively high interest rates should expect to face lower repayment rates and profitability. The relationship with regard to profitability (but not portfolio quality) could also arise from demand forces: overly high prices may reduce demand and hence profits.

We begin by establishing the basic patterns in the data by including the square of portfolio yield in our base specifications. As in previous specifications, we allow the association between the squared yield variable and financial performance to vary by lending type. We have a relatively small dataset, so introducing the squared yield terms makes it difficult to separate labour and capital costs variables for each lending type. Therefore, those costs variables enter the specifications in Table 8 without lending type interactions. When the costs variables are collapsed in this way, the simple dummy variable for group lending becomes positive and significant across profitability indicators and the overall fit of these regressions is somewhat worse than for the base profitability regressions in Table 7.

The results follow the theoretical predictions for individual-based lenders. The main finding from Table 8 is that for individual-based lenders, financial self-sufficiency and operational sustainability are increasing in portfolio yield, but only up to the point at which the negative quadratic yield coefficient outweighs the positive linear coefficient.[10]

[10] Note that the models in Table 8 are run via OLS, with White's standard errors. Similar qualitative results were obtained for robust regressions, although significance levels were lower. Because we are trying to illustrate the effect of relatively extreme portfolio yields, the OLS models were more appropriate than robust techniques that were likely to downweight such observations. We thank David Roodman for

Both the linear and the squared yield variables are significant. Fig. 2 plots the estimated relationship between the financial self-sufficiency ratio and the yield ratio based on Table 8, column 1, for an individual-based lender assigned the median value for all other variables that enter the regression. As hypothesized, financial self-sufficiency is increasing in yield up to a point. That break point occurs within our sample values for portfolio yields for individual-based lenders (near 60% per annum), though there are only a few observations beyond that break point (Fig. 2). The paucity of rates above 60% is consistent with individual-based lenders adjusting in order to avoid potential incentive problems (or to avoid a loss of demand), and thus opting not to push interest rates beyond threshold values.

For village banks, coefficients on both the linear and squared yield variables are not statistically significant, but similar in magnitude to, and the opposite sign of, the simple yield variables (corresponding to effects for individual-based lenders). Summing the respective squared and linear variables, the relationship between yields and our profitability indicators for village banks is not significantly different from zero. Though again, because the coefficients for the village bank interactions are insignificant, we also cannot reject the hypothesis that the yield relationships are equal to those for individual-based lenders.

For group lenders, the coefficients for yield and yield squared are also the opposite sign of those for individual-based lenders, but they are significant and much

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pointing out that strong correlations between linear and quadratic terms of the same series can spuriously generate the kinds of patterns here. While we acknowledge the point, the base regressions in Table 7 do not contain the quadratic term, so we feel confident that the positive linear relation between portfolio yield and financial performance is not spurious. We include specifications with the quadratic yield term as a simple test of whether the linear relation becomes less steep as interest rates climb. And again, there are strong theoretical reasons to expect that this might be the case.

larger in magnitude. When the respective coefficients are summed, the yield coefficients are negative and significant, while the coefficients for yield squared are positive and significant. The result is the u-shaped curve in Fig. 2, which gives the relationship between yields and financial self-sufficiency for the median group lending institution. For portfolio yields under 40% per annum, which characterizes the majority of solidarity group lenders in our sample, the relationship is negative. Had we not imposed the non-linearity by including a separate squared yield term for group lenders, the simple linear relation between financial self-sufficiency and yield would have been negative.

Overall, the results in Table 8 suggest that individual-based lenders that charge higher interest rates are more profitable than others, but only up to a point. For most solidarity group lenders, an opposite pattern holds. The results for individual-based lenders are consistent with agency problems or demand forces that reduce scale at high interest rates, but, while the specifications control for costs and geographic variables, we note that the result could also be driven by omitted customer characteristics or reverse causation. Reducing interest rates (and thus lowering profits) might be especially likely when the institution is driven by social objectives or if it seeks to maximize profits but faces potential competition. With the existing data, the competing explanations cannot be distinguished.

Portfolio at risk

We push further to ask whether higher interest rates are also associated with rising loan delinquency. Throughout most of our sample range, loan delinquency is more common for individual-based lenders that charge higher yields (as predicted by theory).

Direct insight into agency problems comes from analyzing determinants of loan delinquencies and their relation to interest rates. We start with a specification that does not control for average loan size, and find a statistically significant inverted-U shaped pattern for individual-based lenders (Table 9, column 1). The specification replaces the dependent variables in the Table 8 regressions with the share of the portfolio that is at risk, defined as the share of loans that are delinquent for at least thirty days. Summing the respective squared and linear yield variables, there is no significant relationship between yields and portfolio risk for group lenders or village banks. Table 9, column 2 shows that including average loan size reduces the yield coefficients such that they lose significance, but the quadratic pattern remains similar.

When we plot the relation between yields and portfolio at risk for individual-based lenders from column 1 (see Fig. 3), there is a positive relation up to real yields of about 45%. Beyond that point, however, the share of loans at risk is declining in portfolio yield, and 7 to 9 individual-based lenders have yields that high. Reconciliation with the earlier results (showing a downturn in profitability only when real yields surpass about 60%) comes from taking demand also into account. From Table 2 we know that the portfolio yield variable is significantly negatively correlated with size of an institution (i.e., total assets) and the ratio of loans to assets, so there is a negative association between charging higher interest rates and having a large customer base. By the same token, there is also a significant negative correlation between real portfolio yields and average loan size (relative to GNP per capita), which indicates that lenders charging high interest rates tend to make small loans, another possible reason for seeing the downward

pressure on profitability at very high fees. Note, though, that the benchmark regressions show no general association of average loan sizes and financial sustainability.

Reducing costs

For individual-based lenders (and village banks), the base results indicated that financial performance was positively linked to labour costs, but negatively linked to capital costs. We speculated that this could be a cost-effective strategy if the resources were used to identify creditworthy borrowers, who would then be given relatively large loans. To test that proposition, Table 10 offers regressions that relate the total cost per dollar lent to the microbank's average loan size.[11] We also include the square of average loan size to capture potential non-linearities. The question is the degree to which expanding loan sizes improves profitability by lowering average costs.

We find that larger loans are associated with lower average costs—but only up to a point. The loan size coefficient is negative and significant in both OLS and robust regressions, while loan size squared is positive and significant. The two coefficients imply a U-shaped relationship between costs per dollar lent and average loan size for individual-based lenders that reaches its minimum for loans two to three times per capita GNP (Fig. 4). Note also that only a handful of individual-based lenders exceed the minimum.

Similar findings hold for group lenders, although they appear to be less able to exploit scale economies. For solidarity group lenders, coefficients for the loan size

[11] We exclude from the regressions institutions with operating costs less than 5% (one observation) or greater than 150% (two observations) of total loans, as these seemed implausible. Two of those observations were already not part of our sample in the base profitability models due to missing data for some variables.

variables are significant and of the same sign as those for individual-based lenders, which also implies a U-shaped relationship between costs per dollar lent and loan size. However, the magnitudes of those coefficients imply a minimum slightly above the level of GDP per capita. Based on the respective minima for the two groups, individual-based lenders seem better able to exploit these scale economies.

The patterns for village banks are not robust to the estimation technique. Results for village banks are, in general, estimated with less precision than those for the other types of lenders. In the OLS regressions in Table 10, the loan size variables tend to share the same signs as those for individual-based lenders, but are insignificant. In the robust regressions in columns 3 and 4, the loan size coefficients are significant, large in magnitude, and of the opposite sign of those for individual-based lenders. Future work with a larger data set may lead to more robust estimates for village banks, but the present data do not provide a reliable guide to patterns. We therefore do not present a figure for those banks.

Mission Drift

Mission drift is a concern for socially-driven microbanks. As clients mature and develop their businesses they should be able to increase loan sizes and their incomes should rise. A successful microbank will thus find that, over time, their clients receive larger loans and will be less poor. The bank's mission and practices may well need to shift with these changes, but the result is not "mission drift" as the term is generally understood.

Mission drift, instead, is a shift in the composition of new clients, or a re-orientation from poorer to wealthier clients among existing clients. The evidence above shows that the concern can not be brushed away easily. In particular, tensions between outreach and sustainability emerged when results were disaggregated by lending type. Results from the section above suggest that individual-based lenders (and to a lesser extent group lenders) find it cost-effective to increase their average loan size. In pursuing profit, microbanks would then naturally ask whether it can make sense to shift focus to wealthier borrowers who can absorb larger loans, even at the sacrifice of outreach to the poorest segments in a community.

The cross-sectional data here are not ideal for addressing mission drift since the issues inherently involve adaptation over time. We focus instead on the relationship between outreach and profitability, using a variety of outreach measures as dependent variables. Table 11 gives results on the relationship between profitability and three common measures of outreach: average loan size/GDP per capita, average loan size/GDP per capita of the poorest 20% of the population, and the share of loans extended to women. Smaller average loan size is taken as an indication of better outreach to the poor. Deflating by GDP per capita both normalizes the loan size variable so that it is no longer in terms of local currency and provides an adjustment for the overall wealth of a country. In high-inequality countries, GDP per capita is a poor reflection of typical resources for households, so normalizing instead by the income accruing to the bottom 20% should be a better denominator. It turns out, though, that the results are comparable across measures.

While the simple correlations show that financial self-sufficiency is not significantly linked to any of the outreach measures, the relationship between financial self-sufficiency and outreach becomes apparent when we disaggregate by lending type. In column 1 of Table 11, the coefficient for financial self-sufficiency (corresponding to individual-based lenders) is negative and significant for the average loan size variable. That coefficient is also positive and significant in column 3, where the percentage of women borrowers is the dependent variable. This suggests that individual-based lenders that are financially self-sustainable tend to be more focused on the poor and women. In column 1, the interaction between FSS and lending type is positive and significant for both village banks and group lenders. This does not necessarily indicate that village banks and group lenders with relatively high profitability lend less to the poor. When we sum the coefficients for the FSS variable and the respective interaction terms, we find that FSS is not significantly linked to the average loan size indicator for either type of lender (i.e., there is no evidence of mission drift). The significant coefficients on the interaction terms do however indicate that the relationship is different than that for individual-based lenders.

Countervailing trends emerge, though, when we push further by investigating the role of institutions' age and size. The significant positive coefficient for institution size in the average loan size specification and the significant negative coefficient in the specification on gender indicate that larger individual-based lenders do relatively poorly in terms of outreach. For village banks, the interaction with size produces coefficients of the opposite sign of those for the simple size variable. Because the magnitudes of the two

sets of coefficients are similar, size is not significantly associated with outreach for village banks.

For group lenders, the coefficient on institution size in the average loan size specification takes the same sign as that for village banks, but the magnitude is substantially smaller. The net effect of summing the coefficients for the size variable and the group lending*size interaction term is significantly greater than zero, indicating that large group lenders have larger average loan sizes. Similarly, when those coefficients are summed in the "women borrowers" specification, the total effect is significantly less than zero, indicating that large group lenders lend less to women.

Controlling for financial self-sufficiency, age, and size by type of lending, village banks and group lenders have much smaller average loan sizes and extend a higher share of their loans to women (based on the coefficients for the simple dummy variables for those two groups). However, the interactions between lending type and age, size, and financial self-sufficiency reveal more complicated relationships than those dummy variables would suggest. The significant positive coefficient for age in the specification for average loan size divided by the GNP per capita of the poorest 20% provides some evidence of mission drift over time for individual-based lenders. For village banks and group lenders, age appears to have less association with outreach. For example, in the women borrower specification, neither the age variable nor the village bank*age interaction term is significant. In the loan size specifications, the age coefficient is positive (and significant in column 2), while the interaction terms are negative and significant. The net effect of the two coefficients is never significantly different from zero for either group lenders or village banks.

In sum, outreach appears to be driven by two countervailing influences for individual-based lenders (Table 12). Size (and to a lesser extent age) is associated with less outreach, while profitability is associated with more. On balance, the evidence is consistent with the hypothesis that, as they grow larger, individual-based lenders are more susceptible to mission drift than village banks. Outreach indicators for village banks and group lenders tend not to be significantly negatively associated with age, size, or financial self-sufficiency. For them, mission drift would appear to be a less severe concern, although large group lenders do have worse outreach than smaller ones.

5. Conclusion

At the outset of this paper, we sought to address three questions. Does raising interest rates exacerbate agency problems as detected by lower repayment rates and less profitability? Is there evidence of a trade-off between the depth of outreach to the poor and the pursuit of profitability? Has "mission drift" occurred—i.e., have microbanks moved away from serving their poorer clients in pursuit of commercial viability?

Based on a high-quality survey of 124 microfinance institutions, we find that the answers to our questions depend on an institution's lending method. For example, we find that individual-based lenders that charge higher interest rates are more profitable than others, but only up to a point. Beyond threshold interest rates, profitability tends to be lower. The patterns are consistent with greater loan delinquency (following predictions from agency theory) and, at the highest rates, to falling demand for credit. In contrast, for solidarity group lenders, financial performance tends not to improve (or even

worsens in models with quadratic terms) as yields increase throughout most of our sample range.

We acknowledge the possibility of alternative interpretations. For example, the social objectives of some MFIs might compel them to charge lower interest rates and thus earn lower profits. Those institutions might require substantial subsidies to operate, consistent with the negative correlations between subsidies and profitability in Table 6. However, this would not explain the trade-offs we find for MFIs charging relatively high yields.

Consistent with the economics of information, we also find that individual-based lenders with higher labour costs (as a fraction of total assets) are in fact more profitable. As loan sizes grow, we hypothesize that these lenders need to be especially careful about selecting and monitoring customers, requiring higher labour inputs. For solidarity group lenders, who harness local information to select and monitor customers, we find no significant relationship between labour costs and profitability.

On our second question, regarding trade-offs between outreach to the poor and profitability, the simple relationship between profitability and average loan size is insignificant in our base regressions. Controlling for other relevant factors, institutions that make smaller loans are not necessarily less profitable. But we do find that larger loan sizes are associated with lower average costs for both individual-based lenders and solidarity group lenders. Since larger loan size is often taken to imply less outreach to the poor, the result could have negative implications. For individual-based lenders, the pattern of results are consistent with disincentives for depth of outreach—i.e., the personnel expenses devoted to identifying borrowers worthy of larger loans could deter

institutions from serving the poorest segments of society. At the same time, we note that it is not just the poorest that demand and can take advantage of better access to finance.

We also find some positive results for individual-based lenders regarding mission drift, the third issue we sought to address. Financially self-sustaining individual-based lenders tend to have smaller average loan size and lend more to women, suggesting that pursuit of profit and outreach to the poor can go hand in hand. There are however countervailing influences: larger individual-based and group-based lenders tend to extend larger loans and lend less frequently to women. Older individual-based lenders also do worse on outreach measures than younger ones. While this is not evidence of mission drift in the strict sense (i.e., that pursuit of improved financial performance reduces focus on the poor), the results for larger and older microbanks are consistent with the idea that as institutions mature and grow, they focus increasingly on clients that can absorb larger loans.

On the whole, our results suggest that institutional design and orientation matters importantly in considering trade-offs in microfinance. The trade-offs can be stark: village banks, which focus on the poorest borrowers, face the highest average costs and the highest subsidy levels. By the same token, individual-based lenders earn the highest average profits, but do least well on indicators of outreach to the very poor. At the same time, we find examples of institutions that have managed to achieve profitability together with notable outreach to the poor—achieving the ultimate promise of microfinance. But they are, so far, the exceptions.

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Table 1: Variable Description and Summary Statistics

Variable Name	Definition	Mean	Median	Minimum	Maximum
Financial Self-Sufficiency	Adjusted operating revenue / Adjusted (financial expense + loan loss provision expense + operating expense)	1.035	1.016	0.146	2.183
Operational Self-Sufficiency	Operating revenue / (Financial expense + loan loss provision expense + operating expense)	1.165	1.115	0.157	3.872
Return on Assets adjusted	Adjusted net operating income after taxes / Average total assets	-0.027	0.002	-1.541	0.280
Average Loan Size to GNP per capita		0.676	0.376	0.025	5.831
Age	Age of the MFI in years	9.300	8	2	40
Size of MFI Indicator	Size of the loan portfolio, which is 1 for small, 2 for medium and 3 for large.	2.025	2	1	3
For-Profit Status	For-profit is 1, non-profit is 0.	0.237	0	0	1
Village Bank Lender	The MFI does village bank style lending (as opposed to MFI who do individual lending or solidarity lending).	0.165	0	0	1
Solidarity Lender	The MFI does some solidarity style lending (as opposed to MFI who do only individual lending or do village bank lending.	0.397	0	0	1
Real Gross Portfolio Yield	(Yield on gross portfolio (nominal) - Inflation rate) / (1+ Inflation rate)	0.354	0.305	0.051	1.059
Capital Costs to Assets	(Rent + transportion + depreciation + office + other) / total assets	18.381	0.190	0	816.339
Labor Costs to Assets	Personnel expenses/total assets	18.553	0.225	0	747.121
Loans to Assets	Gross loan portfolio/total assets	0.689	0.726	0.077	0.987
Donations to Loan Portfolio	Donations for financial services/gross loan portfolio	0.122	0.005	0	2.081
Average Loan Size to GNP per capita of the poorest 20%		2.983	1.324	0.108	19.511
Average Loan Size	In US dollars.	715.698	360.500	36.000	5131.231
Women Borrowers	Percentage of borrowers who are women.	0.649	0.615	0.150	1
Eastern Europe and Central Asia		0.169	0	0	1
Africa		0.169	0	0	1
Middle East and North Africa		0.073	0	0	1
South Asia		0.097	0	0	1
East Asia and the Pacific		0.089	0	0	1

Table 2: Correlations

	Financial Self-Suffiency	Operational Self-Suffiency	Return on Assets adjusted	Average Loan Size to GNPPC	Age	Size of MFI	For-Profit Status	Village Bank Lender	Solidarity Lender	Real Gross Portfolio Yield	Capital Costs to Assets	Labor Costs to Assets	Loans to Assets	Donations to Loan Portfolio	ALS to GNPPC of the poorest
Operational	0.8963*	1													
Self-Suffiency	124	124													
Return on Assets	0.7005*	0.5943*	1												
(adjusted)	123	123	123												
ALS to GNPPC	0.0726	0.0828	0.1174	1											
	117	117	117	117											
Age	0.2517*	0.1858*	0.1899*	0.1521	1										
	120	120	119	113	120										
Size	0.3655*	0.2962*	0.3517*	0.3408*	0.2285*	1									
	122	122	121	115	118	122									
For-Profit Status	0.0678	-0.0141	0.0929	0.2073*	-0.0427	0.2664*	1								
	118	118	118	112	114	117	118								
Village Bank	-0.1119	-0.0738	-0.1323	-0.2594*	-0.1568	-0.2744*	-0.2487*	1							
	121	121	120	114	117	120	117	121							
Solidarity Lender	-0.1162	-0.0926	-0.0886	-0.1374	-0.0917	-0.038	0.0575	-0.3608*	1						
	121	121	120	114	117	120	117	121	121						
Portfolio Yield	-0.0543	-0.1484	-0.0383	-0.4004*	-0.2305*	-0.2808*	-0.0458	0.4185*	-0.1129	1					
	122	122	122	116	118	120	117	119	119	122					
Capital Costs to Assets	-0.0975	-0.0659	-0.0411	-0.0731	-0.0411	-0.022	-0.0007	0.0275	0.1502	0.1971*	1				
	124	124	123	117	120	122	118	121	121	122	124				
Labor Costs to Assets	-0.1098	-0.0713	-0.0471	-0.0751	-0.0301	-0.029	0.0125	0.0167	0.1799*	0.1678	0.9753*	1			
	124	124	123	117	120	122	118	121	121	122	124	124			
Loans to Assets	0.2758*	0.1383	0.2648*	0.1701	0.0161	0.3284*	0.0267	-0.2011*	0.1067	-0.2732*	0.0263	0.0061	1		
	124	124	123	117	120	122	118	121	121	122	124	124	124		
Donations to Loans	-0.4768*	-0.4382*	-0.6707*	-0.2052*	-0.2001*	-0.4045*	-0.178	0.2294*	0.1023	0.2304*	0.0021	0.0007	-0.4439*	1	
	124	124	123	117	120	122	118	121	121	122	124	124	124	124	
ALS to GNPPC of the poorest 20%	0.0012	-0.0077	0.0891	0.8653*	0.3922*	0.3098*	0.0768	-0.2508*	-0.2632*	-0.4471*	-0.0781	-0.0814	0.1157	-0.1682	1
	102	102	102	99	98	100	97	99	99	102	102	102	102	102	102
Women Borrowers	-0.1765	-0.2277*	-0.2092*	-0.3567*	-0.1124	-0.3404*	-0.2563*	0.3760*	0.3259*	0.2901*	0.0646	0.0876	-0.0091	0.2873*	-0.3778*
	114	114	114	108	110	112	109	111	111	113	114	114	114	114	94

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc. * indicates significance at the 5 percent level.

Table 3: MFI Lending Style by Region

	Individual	Solidarity	Village Bank	Total
East Asia and Pacific	7	4	0	11
Eastern Europe and Central Asia	8	11	2	21
Latin America	32	10	8	50
Middle East and North Africa	3	3	3	9
South Asia	1	9	2	12
Sub-Saharan Africa	5	11	5	21
Total	56	48	20	124

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 4: Summary Statistics by Lending Type

	Individual Lenders		Solidarity Lenders		Village Bank Lenders	
	Mean	Stndrd. Dev.	Mean	Stndrd. Dev.	Mean	Stndrd. Dev.
Financial Self-Suffiency	1.11	0.29	0.98	0.32	0.95	0.47
Operational Self-Suffiency	1.23	0.28	1.12	0.35	1.09	0.75
Return on Assets adjusted	0.01	0.08	-0.05	0.24	-0.08	0.22
Average Loan Size to GNP per capita	1.01	1.10	0.54	0.52	0.20	0.17
Age	11.12	8.67	8.60	5.85	6.95	3.71
Size of MFI Indicator	2.23	0.67	2.00	0.72	1.60	0.60
For-Profit Status	0.29	0.46	0.26	0.44	0.00	0.00
Real Gross Portfolio Yield	0.31	0.16	0.33	0.14	0.54	0.31
Capital Costs to Assets	2.43	8.62	34.64	126.94	24.07	72.03
Labor Costs to Assets	1.34	4.07	37.13	123.29	22.04	58.09
Loans to Assets	0.70	0.17	0.71	0.20	0.60	0.17
Donations to Loan Portfolio	0.02	0.06	0.17	0.43	0.30	0.47
Average Loan Size to GNP per capita of the poorest 20%	4.80	4.92	1.63	1.97	0.63	0.39
Average Loan Size (USD)	1220.23	1184.51	430.98	499.56	148.69	126.61
Women Borrowers	0.46	0.16	0.75	0.24	0.88	0.21

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 5: Subsidized Share of Funding

	Mean	Standard deviation
Sample average	21.4%	29.3%
By Lending Type		
Individual-Based (n=56)	11.0	17.9
Solidarity Group (n=48)	27.7	37.3
Village Banks (n=20)	35.5	23.6
By Profit Status		
For-profit (n=28)	6.6	14.9
Not-for-profit (n=90)	26.2	31.6

Notes: Subsidized Share of Funding is equal to (subsidized costs of funds adjustment+ in-kind subsidy adjustment + donated equity)/(total liabilities+ total equity). "Profit status" refers to the institution's official designation and is independent of actual profitability.
Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 6: Correlations of Subsidized Share of Funding

	Correlations with: Capital costs/ Assets	Labour Costs/ Assets	Port-folio at Risk
Sample average	.10	.13	-.08
By lending type:			
Individual-based	.14	.12	-.21
Solidarity Group	.25*	.08	-.02
Village Bank	-.01	.13	.03

Notes: Subsidized Share of Funding is equal to (subsidized costs of funds adjustment+ in-kind subsidy adjustment + donated equity)/(total liabilities+ total equity). FSS is financial self-sufficiency, OSS is operational self-sufficiency, and portfolio at risk is the share of loans delinquent at least thirty days. There is no variation in profit status for village banks, and thus no correlation can be calculated for that variable and our subsidy measures for that group.
Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 7: Profitability Regressions

	Financial Self-Sufficiency	Operational Self-Sufficiency	Return on Assets
	(1)	(2)	(3)
Real Yield	0.735	0.663	0.319
	[3.63]***	[2.81]***	[2.93]***
Real Yield (Village bank)	-0.867	-1.428	-0.29
	[1.59]	[1.52]	[2.05]**
Real Yield (Solidarity)	-0.236	-0.558	-0.218
	[0.41]	[0.89]	[0.81]
Capital Costs to Assets	-0.018	-0.013	-0.006
	[7.03]***	[6.20]***	[3.16]***
Capital Costs to Assets (Village bank)	-0.057	-0.091	-0.030
	[1.99]**	[1.77]*	[1.67]*
Capital Costs to Assets (solidarity)	0.022	0.015	0.009
	[6.05]***	[3.85]***	[3.44]***
Labour Costs to Assets	0.037	0.038	0.007
	[6.71]***	[5.21]***	[1.81]*
Labour Costs to Assets (Village bank)	0.006	0.022	0.015
	[0.34]	[0.74]	[1.28]
Labour Costs to Assets (Solidarity)	-0.04	-0.039	-0.009
	[6.68]***	[4.87]***	[2.56]**
Village bank	0.407	0.758	0.105
	[1.08]	[1.15]	[1.35]
Solidarity	-0.041	0.050	-0.002
	[0.21]	[0.24]	[0.02]
Size Indicator	0.190	0.23	0.059
	[3.73]***	[3.23]***	[2.64]***
Log of age	0.142	0.138	0.091
	[2.79]***	[2.00]**	[1.70]*
Average Loan Size to GNP per capita	-0.009	-0.008	0.008
	[0.29]	[0.19]	[0.62]
Loans to assets ratio	0.421	0.081	0.223
	[2.29]**	[0.25]	[2.48]**
For-profit dummy	-0.082	-0.178	0.007
	[0.96]	[1.83]*	[0.19]
Eastern Europe and Central Asia	0.193	0.384	0.136
	[1.89]*	[2.65]***	[1.39]
Sub-Saharan Africa	0.119	0.191	0.042
	[1.15]	[1.53]	[0.48]
Middle East and N. Africa	0.104	0.08	0.126
	[1.03]	[0.54]	[1.49]
South Asia	0.327	0.481	0.118
	[2.25]**	[2.04]**	[1.30]
East Asia	-0.028	0.031	0.0005
	[0.43]	[0.41]	[0.01]
Constant	-0.195	0.074	-0.616
	[1.24]	[0.38]	[2.73]***
Observations	104	104	104
R-squared	0.51	0.42	0.36

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 8: Profitability regressions – allowing nonlinear effects of interest rates

	Financial Self-Sufficiency	Operational Self-Sufficiency	Return on assets
	(1)	(2)	(3)
Real Yield	1.845	1.905	0.620
	[2.31]***	[1.89]*	[1.77]*
Real Yield squared	-1.314	-1.530	-0.299
	[1.66]	[1.48]	[0.96]
Real Yield (Village bank)	-1.431	-3.214	-0.379
	[0.72]	[0.93]	[0.58]
Real Yield (Village bank) squared	1.116	2.573	0.258
	[0.64]	[0.88]	[0.42]
Real Yield (Solidarity)	-5.207	-5.566	-3.002
	[2.98]***	[2.61]**	[2.10]**
Real Yield (Solidarity) squared	6.563	6.606	3.597
	[3.27]***	[2.76]***	[2.17]**
Capital Costs to Assets	-0.002	-0.001	-0.001
	[0.51]	[0.40]	[0.35]
Labour Costs to Assets	0.001	0.001	0.001
	[0.27]	[0.38]	[0.46]
Village bank	0.304	0.750	0.040
	[0.57]	[0.79]	[0.28]
Solidarity	0.790	0.882	0.483
	[2.23]**	[2.07]**	[2.15]**
Size Indicator	0.180	0.210	0.056
	[3.46]***	[2.93]***	[2.41]**
Log of age	0.191	0.194	0.114
	[3.27]***	[2.28]**	[1.83]*
Average Loan Size to GNP per capita	0.008	0.011	0.013
	[0.22]	[0.22]	[0.89]
Loans to assets ratio	0.390	0.016	0.207
	[1.68]*	[0.04]	[2.17]**
For-profit dummy	-0.054	-0.130	-0.001
	[0.63]	[1.30]	[0.04]
Eastern Europe and Central Asia	0.122	0.329	0.095
	[1.12]	[2.30]**	[1.10]
Sub-Saharan Africa	0.097	0.128	0.020
	[0.87]	[0.97]	[0.26]
Middle East and N. Africa	0.177	0.172	0.164
	[2.11]**	[1.47]	[1.77]*
South Asia	0.283	0.401	0.097
	[1.84]*	[1.72]*	[0.97]
East Asia	-0.065	-0.029	0.003
	[0.96]	[0.36]	[0.05]
Constant	-0.459	-0.166	-0.714
	[1.97]*	[0.63]	[2.72]***
Observations	104	104	104
R-squared	0.43	0.33	0.33

All models estimated via OLS, with White's Heteroskedasticity consistent standard errors.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 9: Portfolio at Risk Regressions

	Portfolio at Risk	
	(1)	(2)
Real Yield	0.220	0.164
	[1.89]*	[0.97]
Real Yield squared	-0.271	-0.219
	[2.18]**	[1.34]
Real Yield (Villagebank)	-0.077	-0.016
	[0.39]	[0.07]
Real Yield (Villagebank) squared	0.108	0.052
	[0.53]	[0.23]
Real Yield (Solidarity)	-0.399	-0.363
	[1.87]*	[1.55]
Real Yield (Solidarity) squared	0.363	0.335
	[1.52]	[1.33]
Capital Costs to Assets	0.00001	0.00002
	[0.06]	[0.06]
Labour Costs to Assets	0.00001	0.00001
	[0.03]	[0.04]
Village bank	0.010	-0.001
	[0.30]	[0.03]
Solidarity	0.090	0.084
	[2.16]**	[1.70]*
Size Indicator	-0.015	-0.016
	[1.62]	[1.63]
Log of age	0.016	0.018
	[1.70]*	[1.74]*
Average Loan Size to GNP per capita		-0.0001
		[0.02]
Loans to assets ratio	-0.070	-0.070
	[2.07]**	[2.02]**
For-profit dummy	0.011	0.013
	[1.06]	[1.06]
Eastern Europe and Central Asia	-0.010	-0.011
	[0.73]	[0.79]
Sub-Saharan Africa	-0.015	-0.016
	[0.91]	[0.91]
Middle East and N. Africa	-0.003	-0.002
	[0.18]	[0.11]
South Asia	-0.029	-0.030
	[2.11]**	[2.05]**
East Asia	-0.012	-0.012
	[0.57]	[0.54]
Constant	0.050	0.058
	[1.42]	[1.38]
Observations	107	101
R-squared	0.23	0.24

All models estimated via OLS, with White's Heteroskedasticity consistent standard errors.

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 10: Cost/ Loan Size Trade-offs

	White's Standard Errors		Robust Regressions	
	-1	-2	-1	-2
Loan Size Indicator	-0.223	-0.218	-0.219	-0.205
	[3.49]***	[3.41]***	[2.45]**	[2.60]**
Loan Size Indicator squared	0.054	0.052	0.052	0.049
	[3.26]**	[2.87]**	[2.09]**	[2.22]**
Loan Size*Village bank	-0.238	-0.369	4.823	4.792
	[0.19]	[0.37]	[3.09]***	[3.43]***
Loan Size squared*Village bank	0.072	0.608	-11.832	-11.516
	[0.05]	[0.52]	[3.23]***	[3.49]***
Loan Size*Solidarity	-0.736	-0.507	-0.573	-0.461
	[3.31]***	[2.83]***	[3.10]***	[2.80]***
Loan Size squared*Solidarity	0.337	0.225	0.253	0.201
	[3.35]***	[2.79]***	[2.73]***	[2.44]**
Village bank dummy	0.186	0.094	-0.171	-0.211
	[1.10]	[0.68]	[1.19]	[1.66]*
Solidarity dummy	0.228	0.141	0.189	0.156
	[2.24]**	[1.84]*	[2.41]**	[2.23]**
Size indicator	-0.127	-0.052	-0.087	-0.062
	[3.47]***	[2.01]**	[3.22]***	[2.50]**
Age	-0.011	-0.011	-0.010	-0.009
	[3.04]***	[3.74]***	[3.14]***	[3.23]***
Donations over Loan Portfolio		0.507		0.408
		[5.99]***		[7.90]***
E. Eur. and Ctrl Asia	0.021	-0.051	-0.007	-0.041
	[0.23]	[0.76]	[0.12]	[0.79]
Sub. Africa	0.139	0.101	0.146	0.126
	[1.64]	[1.49]	[2.71]***	[2.62]***
Middle East and N. Africa	-0.142	-0.212	-0.187	-0.189
	[1.25]	[2.71]***	[2.92]***	[3.33]***
South Asia	-0.166	-0.186	-0.178	-0.169
	[1.41]	[2.57]**	[2.78]***	[3.01]***
East Asia	0.035	0.040	0.046	0.058
	[0.45]	[0.73]	[0.68]	[0.97]
Constant	0.786	0.627	0.672	0.590
	[7.85]***	[7.05]***	[8.44]***	[8.19]***
Observations	106	106	105	105
R-squared	0.52	0.73	0.66	0.81

Robust t-statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 11: Mission Drift

	Average Loan Size over GNP per capita	Avg. Loan Size over GNP p.c. poorest 20%	Percentage Women Borrowers
	(1)	(2)	(3)
Financial Self-Sufficiency	-1.618	-6.457	0.27
	[2.44]**	[1.17]	[2.13]**
Village bank	-0.917	-3.953	0.623
	[1.72]*	[1.36]	[3.67]***
Solidarity	-1.143	-5.096	0.458
	[1.96]*	[1.73]*	[2.63]**
Self-Sufficiency*Village bank	1.876	7.331	-0.355
	[2.68]***	[1.29]	[2.08]**
Self-Sufficiency*Solidarity	1.586	5.985	-0.033
	[2.26]**	[1.04]	[0.19]
Age	0.043	0.245	-0.001
	[1.50]	[2.05]**	[0.59]
Age*Village bank	-0.075	-0.365	-0.026
	[1.98]*	[2.34]**	[1.44]
Age*Solidarity	-0.064	-0.284	0.007
	[2.09]**	[2.17]**	[1.55]
Size Indicator	0.624	2.155	-0.113
	[1.72]*	[1.30]	[2.31]**
Size*Village bank	-0.556	-1.949	0.176
	[1.60]	[1.13]	[1.74]*
Size*Solidarity	-0.203	-0.523	-0.102
	[0.57]	[0.30]	[1.48]
Eastern Europe and Central Asia	0.3	-0.141	-0.096
	[1.26]	[0.12]	[1.58]
Sub-Saharan Africa	0.418	0.161	-0.05
	[2.13]**	[0.17]	[0.85]
Middle East and N. Africa	-0.189	-2.155	-0.033
	[1.00]	[2.34]**	[0.50]
South Asia	0.49	0.117	0.027
	[0.93]	[0.09]	[0.30]
East Asia	-0.066	-1.915	0.075
	[0.34]	[1.94]*	[1.07]
Constant	0.832	4.534	0.447
	[1.58]	[1.55]	[3.65]***
Observations	108	94	105
R-squared	0.35	0.45	0.6

All models estimated via OLS, with White's Heteroskedasticity consistent standard errors.

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

Table 12: Summary of Mission Drift Results

	Association with Size of Loans (significance)	Association with Proportion of Loans to Women (significance)
Individual-Based Lenders		
Increases in:		
Age of firm	Larger (5%)	No significant relation
Size of firm	Larger (10%)	Lower (5%)
Financial Self-Sufficiency	Smaller (5%)	Higher (5%)
Solidarity Group Lenders		
Increases in:		
Age of firm	No significant relation	No significant relation
Size of firm	Larger (1%)	Lower (1%)
Financial Self-Sufficiency	No significant relation	Higher (5%)
Village Banks		
Increases in:		
Age of firm	No significant relation	No significant relation
Size of firm	No significant relation	No significant relation
Financial Self-Sufficiency	No significant relation	No significant relation

Notes: Significance levels in brackets. A significant result for loan size implies that the coefficient was significant in either model 1 of Table 11 (with dependent variable average loan size over GNP per capita) or model 2 (with dependent variable average loan size over the GNP per capita of the poorest 20% of the population), or both.

Appendix A. Financial Statement Adjustments and their Effects

Adjustment	Effect on Financial Statements	Type of Institution Most Affected by Adjustment
Inflation Adjustment of Equity (minus Net Fixed Assets)	Increases financial expense accounts on income statement, to some degree offset by inflation income account for revaluation of fixed assets. Generates a reserve in the balance sheet's equity account, reflecting that portion of the MFI's retained earnings that has been consumed by the effects of inflation. Decreases profitability and "real" retained earnings.	MFIs funded more by equity than by liabilities will be hardest hit, especially in high-inflation countries.
Reclassification of certain long-term liabilities into equity, and subsequent inflation adjustment	Decreases concessionary loan account and increases equity account; increases inflation adjustment on income statement and balance sheet.	NGOs that have long-term low-interest "loans" from international agencies that function more as donations than loans.
Subsidized cost of funds adjustment.	Increases financial expense on income statement to the extent that the MFI's liabilities carry a below-market rate of interest. Decreases net income and increases subsidy adjustment account on balance sheet.	MFIs with heavily subsidized loans (i.e., large lines of credit from governments or international agencies at highly subsidized rates).
Subsidy adjustment: current-year cash donations to cover operating expenses	Reduces operating expense on income statement (if the MFI records donations as operating income). Increases subsidy adjustment account on balance sheet.	NGOs during their start-up phase. The adjustment is relatively less important for mature institutions.
In-kind subsidy adjustment (e.g. donation of goods or services: line staff paid for by technical assistance providers)	Increases operating expense on income statement to the extent that the MFI is receiving subsidized or donated goods or services. Decreases net income, increases subsidy adjustment on balance sheet.	MFIs using goods or services for which they are not paying a market-based cost (i.e., MFIs during their start-up phase).
Loan loss reserve and provision expense adjustment	Usually increases loan loss provision expense on income statement and loan loss reserve on balance sheet.	MFIs that have unrealistic loan loss provisioning policies.
Write-off adjustment	On balance sheet, reduces gross loan portfolio and loan loss reserve by an equal amount, so that neither the net loan portfolio nor the income statement is affected. Improves (lowers) portfolio-at – risk ratio.	MFIs that do not write off non-performing loans aggressively enough.
Reversal of interest income accrued on non-performing loans	Reduces financial income and net profit on the income statement, and equity on the balance sheet.	MFIs that continue accruing income on delinquent loans past the point where collection becomes unlikely, or that fail to reverse previously accrued income on such loans.

Source: *The Microbanking Bulletin, Our Methodology* (www.mixmbb.org/en/company/our_methodology.html)

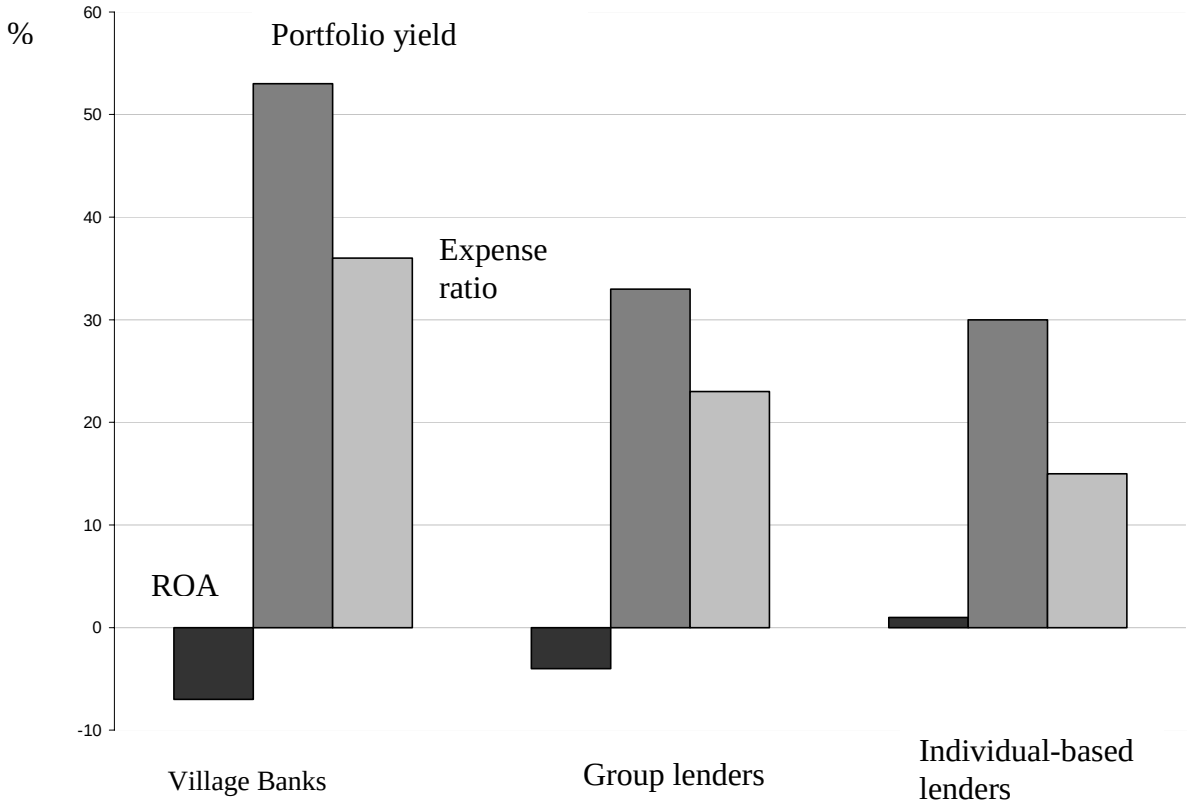

Fig. 1: Profitability, portfolio yield, and expenses by lending type

Source: Calculated from data in *MicroBanking Bulletin*, July 2003 (n=124)

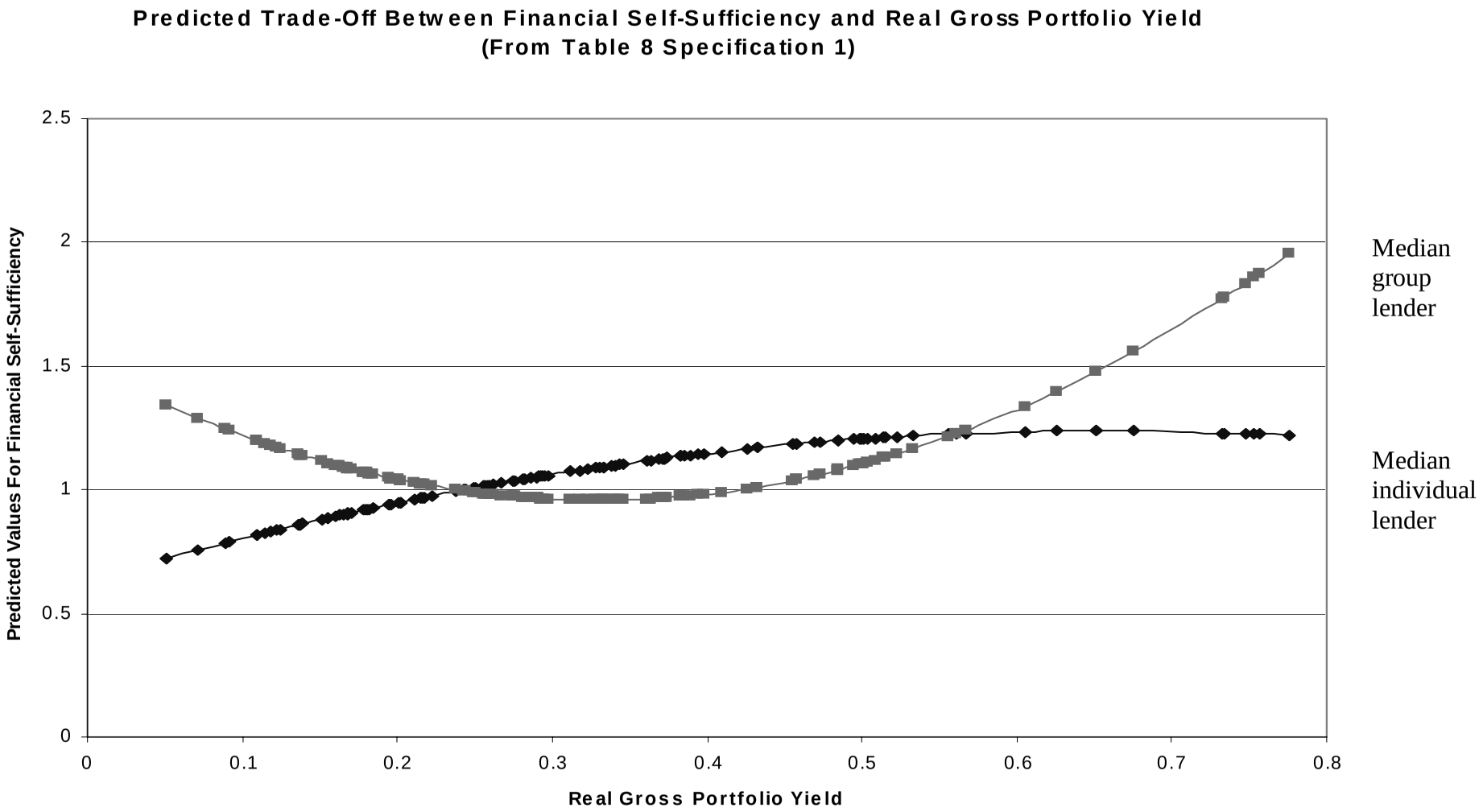

Fig. 2: Financial Self-Sufficiency and Portfolio Yield

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

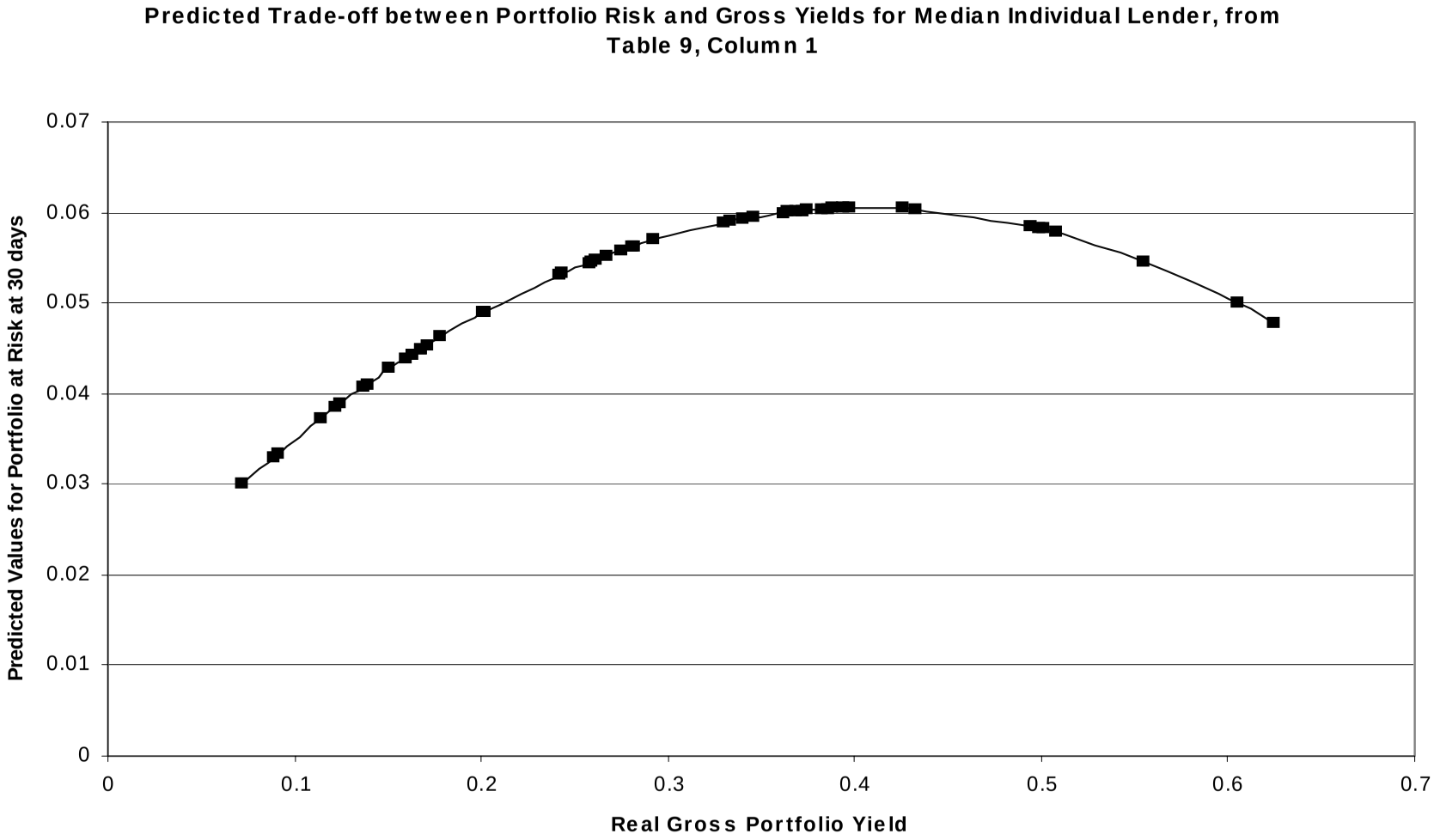

Fig. 3: Portfolio Yield and Portfolio Risk, Individual Lenders
Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.

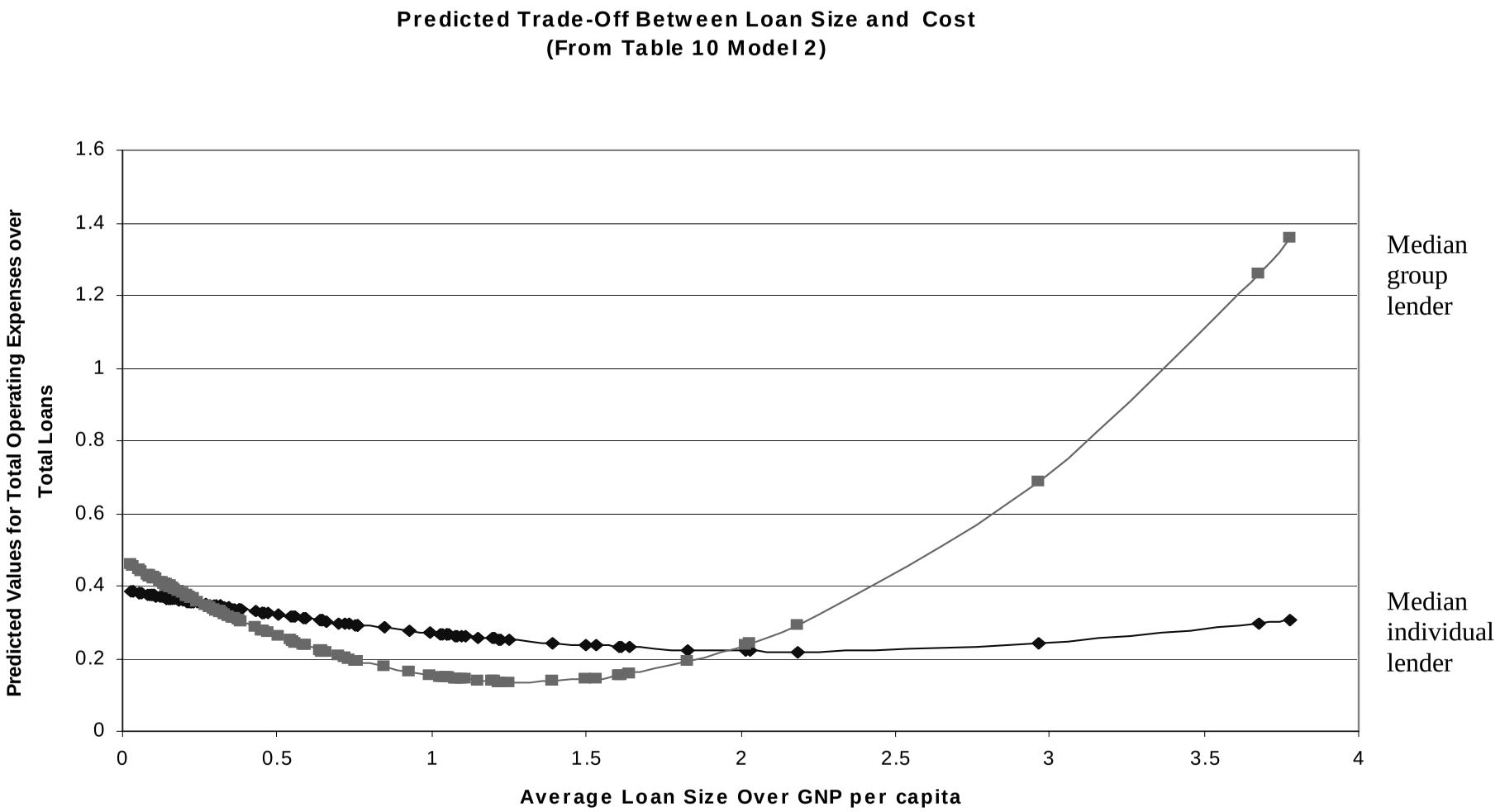

Fig. 4: Loan Size and Costs

Source: Authors' calculations, based on data from the Microfinance Information eXchange, Inc.