An Investigation of Economies of Scale in Microfinance Institutions

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I. Introduction

The business of microfinance strikes a delicate balance between the profit-seeking enterprise of credit loans and the social effort to improve the living conditions of the rural and urban poor. Envisioned by Muhammad Yunus in Bangladesh in 1976, microfinance was initially an attempt to design "a credit delivery system to provide banking services targeted at the rural poor," one predicated on "removing the need for collateral and [creating] a banking system based on mutual trust, accountability, participation and creativity."[1] Microfinance took root with the work of Yunus, who won the 2006 Nobel Peace Prize, and has continued with the worldwide creation and expansion of microfinance institutes (MFIs). Since Yunus established the Grameen Bank in 1983, microfinance has grown from a simple "credit delivery system" into a vast network of institutions, with diverse locations, structures and even diverse mission statements.

With this rapid growth and diversity has emerged a philosophical dilemma. Where once the foundation of microfinance fell clearly on the social side as a tool to combat poverty through the empowerment of impoverished entrepreneurs, there is now a significant number of people viewing the practice as a self-sustaining, commercial enterprise. This is best exemplified by Compartamos in Mexico which has built a $400 million loan portfolio, makes $80 million in profits and went public in 2007. This latter decision has been questioned by Yunus who believes Compartamos' decision will lead to the abandonment of microfinance's social mission.[2]

Furthermore, microfinance has significant attraction to the for-profit world, albeit an attraction rife with paradox. For one, despite the removal of collateral and credit history as a loan prerequisite, MFIs have been shown to have an extremely small loan default rate,

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[1] Grameen Bank online, http://www.grameen-info.org/bank/
[2] Malkin (2008)

comparable to or even lower than their commercial counterparts.[3] Second, despite most

traditional support coming from non-governmental organizations and socially-oriented

investors[4], Krauss and Walter (2006) show that MFIs generally show very low exposure to

market movements, making them a potentially intriguing risk-reducing portfolio diversification

option for investors.

Amidst this discussion, a key issue has only begun to be examined and thus far has been

left largely unresolved, namely the scalability of the microfinance process. At the base of any

commercialization effort is the implicit idea that an MFI could grow to disperse enough small

loans that it could make up for a loan-size disadvantage with sheer quantity and high repayment

rates. This would allow the MFI to eventually reach self-sufficiency and sustainability as profit-

making ventures while continuing to satisfy their socially-oriented mission.

This paper seeks to address two questions within this area: first, what cost efficiencies are

evident in microfinance with regard to firm size when comparing like firms? And second, what

observable patterns are seen when viewing individual firm growth longitudinally, and do these

patterns suggest the existence of economies of scale? We begin with a discussion of the small

but growing body of work in the area of microfinance efficiency, as we seek to understand the

most appropriate measures of efficiency in this unique area of banking. We will then examine a

broad sample of MFIs using an analysis of covariance regression model with proxies for various

firm attributes. This will allow us to understand the impact of size across similar firms. In order

to understand scale efficiencies in firms as MFIs grow, we also devise a multivariate approach to

consider matched pairs of portfolio growth and operational cost growth for a broad sample of

MFIs. In both analyses, we find strong evidence of scale efficiencies across firms and we break

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[3] Various research papers report a repayment rate over 95% for many MFIs, including Morduch (2000).
[4] Morduch (2000) reports that experts believe only 1% of all NGO-sponsored MFIs are self-sufficient and predict
that no more than 5% would ever be.

this efficiency into various dimensions including firm region, firm type and firm self-sufficiency. We finish with a discussion of the findings as well as identifying other areas for future investigation.
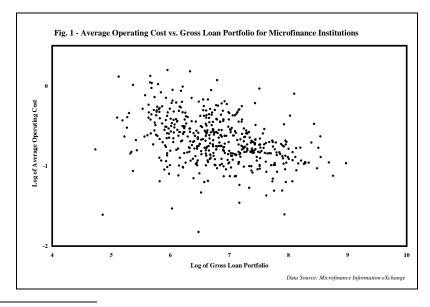
II. Scale Efficiency in Financial Institutions

Investigation into efficiency in commercial financial institutions has a rich background, including a robust subcategory of papers specifically addressing scale efficiencies. Beginning as early as the 1960s, including a study of economies of scale in branch banking by Benston (1965) and continuing with a broad range of international data sets today, these studies have yielded both important specific findings as well as varied general approaches to understanding the relationship between inputs and outputs of financial firms. However, with a multitude of methodologies, several questions emerge with regard to microfinance: what are the challenges to identifying inefficiency versus noise? Moreover, even after identifying inefficiency, how can one best sort out the source? And of course, what is the best approach to overcome these issues?

For the last quarter century, Allen N. Berger and David B. Humphrey have played a particularly large role in this field, having outlined the idea of X-inefficiency in the early 1990s as well as making significant methodological advances in numerous other papers. In fact, their research has in many ways mirrored the field at large, as studies initially emphasized scale and scope efficiencies and more recently shifted to distinguishing X-inefficiency from the other two forms. Fittingly, the two paired up to conduct a broad survey, Berger and Humphrey (1997), where they parse out different measurement methodologies that have been used in frontier analysis, including both parametric and non-parametric approaches. Along with Berger and Mester (1997), the authors conclude that the assumptions and measurement techniques can make

a difference in the conclusions of the source of inefficiency; however, "the choice made concerning measurement technique, functional form, and other variables usually make very little difference in terms of either industry average or the rankings of individual firms."[5]

That said, Humphrey (1987) and Yuengert (1993) present related approaches that have particular appeal to the task of investigating sources of inefficiency in microfinance as an industry. In both papers, the author shows that the sample of financial institutions can be divided into quartiles by asset size to reveal not only an impact on the average cost of operations as size changes but also on the magnitude of the variation of the costs. Though Humphrey used this primarily to illuminate the differences between similar-sized firms, Yuengert goes on to compare different approaches, specifically a Weighted Least Squares (WLS) approach and a Thick Frontier Analysis (TFA), and ultimately devises a method of measurement that allows the variance of the distributions themselves to vary with firm size.

This has immediate suggestions for an approach to MFIs, because our group of MFIs has a similar general distribution to both of the aforementioned samples. In short, a quick look at Figure 1 confirms that the average cost dispersion varies fairly significantly by firm size:

Fig. 1 - Average Operating Cost vs. Gross Loan Portfolio for Microfinance Institutions

Data Source: Microfinance Information eXchange

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[5] Berger and Mester (1997), p. 42

Before conducting any in-depth analysis, we can perhaps already observe a general downward trend to the data suggesting the presence of scale efficiencies. However, the more striking pattern is the difference in variation, with the cluster of points on the low end of the size spectrum ranging much wider than the cluster on the high end. Thus our distribution is remarkably similar to the life insurance companies examined by Yuengert (1993) and the banks looked at by Humphrey (1987), and a version of their approach seems appropriate. We will take up this discussion later on as we walk through the methodology of this study.

III. Related Studies on Microfinance Institutions

Relative to other financial institutions, the microfinance industry and MFIs offer a much younger body of research, but with a recent explosion of studies and journal articles in the area. For an excellent summary of the earlier portion of this work, including a broad categorization of different avenues of study in microfinance, see Brau and Woller (2004).

Perhaps owing to the infancy of microfinance and thus the relative absence of reliable data, there is a clear bias in prior studies toward the economic theory and social implications. Morduch (2000) and Morduch (1999a) do an outstanding job presenting – and in some cases discrediting – some of the traditional propositions of microfinance. In particular, Morduch (2000) focuses on the delicate balance between efficiency and depth of outreach on one side and sustainability on the other, showing how the perceived "win-win" microfinance ideal rests on shaky presumptions. However, Murduch's argument is mostly a semantic one, based more on general consensus and overall economic theory than on supporting data and research. The reason for this is simple: few studies existed on microfinance operations and efficiency.

A number of researchers have leapt into that void since the publication of Morduch's paper, with an effort to understand efficiencies and operational trends of microfinance firms, including Gutierrez-Nieto, et al. (2007), Cull, et al. (2007), and Nghiem (2003) among others. Reviewing the recent literature, three approaches seem to have emerged in parallel. The first and probably most prolific is the case-based, anecdotal study. This has been and continues in some arena to be the preferred approach to microfinance analysis. Much within this body of work was surveyed by Brau and Woller (2004), and the problem with this approach remains the same: it is very difficult to extend to larger populations and thus merely serves to further the various policy and economic arguments surrounding the field.

The second approach is through straightforward financial ratio comparisons. Employed by Baumann (2004) as well as by *The Microbanking Bulletin*[6], this benchmarking places a firm or a sample of firms in relation to a population – such as South Africa relative to the world in the case of Baumann's study. The main advantage of this technique is its ease and quickness. With simple grouping and averaging, a firm or groups of firms can broadly evaluate its own performance and perhaps establish relativistic performance goals. However, often the benchmarking is too simplistic and falls well short of informing policy or identifying the true magnitude and source of efficiencies and inefficiencies.

Recently, there have been several sophisticated extensions to this approach – namely the integration of regression techniques as well as preliminary frontier analysis. Traditionally, a lack of reliable data has hampered efforts to get meaningful regression results in the microfinance field, but the Microfinance Information eXchange (MIX) has closed this gap significantly, making financial metrics readily accessible across a broad scope of microfinance firms. Cull, et

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[6] *The Microbanking Bulletin* is a biannual publication put out by the Microfinance Information eXchange (MIX). In each issue, it publishes "MIX Benchmarks" which allows individual firms to quickly place its performance in a number of categories in the broader context of its peer group.

al. (2007) appears to be the first in-depth study to use this data set, and the authors do an outstanding job answering three dimensions of questions, including the impact of interest rate level on MFI performance, the presence of "mission drift" away from the social effort and toward financial viability, and finally the trade-off between depth of outreach and the pursuit of profitability.

The final approach to MFI analysis is a mirror of much current financial institution analysis: a frontier approach primarily through DEA. This appears to have gained significant traction among researchers focusing their effort on categorizing firms in a sample in terms of specific operational characteristics and each firm's relative efficiency in those areas. Of course, the benefit of this approach as outlined by Berger and Humphrey (1997) is that it establishes far more robust benchmarks to identify "best practice" firms, mainly by understanding the relationships between a set of inputs and outputs. In particular, Gutierrez-Nieto, et al. (2007) used DEA to rank the relative efficiencies of a sample of Latin American MFIs in several different dimensions, and then continue on to use Principal Component Analysis (PCA) to understand the sources of variance in the global set. The result is four "principal components of efficiency": an overall assessment of efficiency based on the DEA model, NGO status, efficiency approach based on loan officers or operational costs, and gross loan portfolio. The authors also make some broad hypotheses about the impact of country and NGO status on several measures of efficiency. The drawback to any PCA analysis is that while the authors can make strong conjecture about the "meaning" of the components, the practical application of these vague.

Overall, after years of lagging far behind the study of commercial financial institutions, there is a rapidly growing body of literature investigating microfinance efficiencies on which to build. Specifically, two studies – Cull, et al. (2007) and Gutierrez-Nieto, et al. (2007) – offer

both comparison points as well as methodological forerunners of this paper. In particular, this paper will conduct a similar regression analysis to Cull, et al. (2007); however we will make three major additions: first, we will aim to refine the regression analysis to focus more on the operational metrics of MFIs (as opposed to the financial focus in Cull), specifically the relationship between operational cost and size. Second, we will adopt a slightly different model, using a general linear analysis of covariance (ANCOVA) model with weighted least squares to account for the differences in the variance of MFIs within different asset classes (as seen in Figure 1 earlier). And finally, we will look at the data set over time, using paired sets of operational cost and portfolio size growth measurements to understand patterns as MFIs grow. The next section will discuss this choice of methodology at greater length.

IV. Methodology

This study uses two different measurement techniques on the same core set of data. For the first portion of our study, we use an analysis of covariance (ANCOVA) general linear model with weighted least squares across a wide sample of MFIs. This will allow us to include vital categorical predictors as well as firm attributes measured on a continuous scale. While Yuengert (1993) proposes to use a more complicated regression methodology with two error variables – one to control for X-inefficiency and one for noise – the results from Berger and Humphrey (1997) seem to bear out that for an industry overview the difference is minimal. And while frontier analysis has been used by numerous financial institutional studies and several microfinance studies, as stated before, these approaches seem more appropriate in attempts to benchmark "best practice firms" through the identification of X-inefficiencies (such as DEA

analysis). However, by not including a noise variable, they seem to reduce the value of an industry overview.

The second portion of the study looks at MFI growth over time. The sample is a subsection of the firms above, namely the ones that have multiple years of operational and financial data. The goal is to look at each firm's growth on a one-year and five-year basis, while regressing normalized operational cost growth on one side against normalized gross loan portfolio growth on the other. In mathematical terms (where g = growth, OC = Operating Costs and GLP = Gross Loan Portfolio):

$$g_i^{OC} = \beta_0 + \beta_1 * (g_i^{GLP}) + \varepsilon_i$$

The results of this regression give us a sense of the relationship between cost growth and size growth, which is then broken down further by different dimensions. Specifically, if a firm sees no economies of scale, we expected the regression coefficient, β_1, to be equal to 1. That is, a one unit increase in Gross Loan Portfolio growth correlates to a one unit change in Operational Cost growth. Anything significantly different from one informs us about scale efficiency: for $\beta_1 < 1$, a one unit change in size correlates to a smaller change in costs which is the essence of economies of scale. Again, we normalize the growth data thus eliminating the complications of negative growth in either operating costs or gross loan portfolio.

Another appealing factor in this approach is that we implicitly control for many of the internal and external operational factors since we are basically comparing a firm to itself over time, thus much irregular variation can be attributed to noise and will be captured by our error term, ε. Granted, there may be some systematic bias, but we attempt to account for this by looking at the growth relationship across different slices (most notably by age, region and type of firm), effectively controlling growth for various firm factors. Overall, we then relate the results

from the ANCOVA regression with what we see by looking at scale efficiencies in a different dimension (i.e. time) in order to further understand the major factors that play into efficiencies.

V. Data Source

All data for microfinance institutions was drawn from the 2006 financial data contained in the Microfinance Information eXchange (MIX), a "global information exchange for the microfinance industry [that] strives to facilitate exchange and investments flows, promote transparency and improve reporting standards in the microfinance industry."[7] A few words on the database: as of the writing of this paper, MIX makes basic financial reports available for 1,158 MFIs from around the world, with 625 of these receiving a rating of four or five diamonds indicating that they have a minimum of two consecutive years of audited financial statements. This study only used this smaller group of 625 MFIs for issues of data completeness and reliability (i.e. for firms with a 3-diamond rating or lower, there were many key elements missing from their operational data thus making regression analysis impossible).

For the longitudinal study, this data set was refined even further to include only firms with a 5-diamond rating. Again, the rationale is simple: we needed firms with multiple years of financials and only 5-diamond firms qualified beyond two years. This left the study with a set of 248 firms to examine on a one-year growth basis, though only 100 of these have complete five-year operational cost growth available.

Like Cull, et al. (2007), this study is only possible due to the excellent work that MIX has done distilling financial statements from many MFIs into a core set of data markers. That said, there are several bias factors that must be mentioned: first, there is obvious selection bias in our sample as only those firms that choose to report to MIX are used. Furthermore, in selecting the

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[7] Microfinance Information eXchange at http://www.mixmarket.org/

firms that have the best relationship with MIX – essentially the 4- and 5-diamond firms – we may be further biasing our results toward the healthier MFIs. In particular, we might also expect some survivorship bias since firms that have since been removed from the higher diamond rating status, or removed from the database overall, will not be included in this study. However, these sources of bias are more easily addressed than the traditional issue with microfinance studies: a lack of robust data to begin with. Thus we do our best to account for the implications of bias in our discussion of the results.

VI. Variable Selection

For the most part, the Methodology section addresses how the longitudinal study was conducted. However, a few words must be said about the selection of variables in the ANOVA model. The first issue was to select proxies for operational efficiency. One particular measure emerged as the best: Average Operating Cost (which equals operating expenses divided by gross loan portfolio). Average Operating Cost has been used successfully in prior studies of financial institutions – for examples, see Yuengert (1993) and Gutierrez-Nieto, et al. (2007) – and are available in our data set. Furthermore, Average Operating Cost will have to be converted to a logged scale, as the distribution is clearly logarithmic (see Appendix 1 for histogram).

The second decision was to establish specific categories and/or proxy variables to include in the regression in order to account for the vast differences in MFIs. In other words, what control dimensions are needed in order to distill the relationship between cost and size? MIX offers a number of indicators; the goal was to find proxies for four core areas: size, profitability, region and type. This was based on preliminary tests for significance as well as the PCA

analysis in Gutierrez-Nieto, et al. (2007) which found that size, type, and approach/mission were the key dimensions of their DEA analysis. Thus the selected indicators are as follows:

Size: To understand the relationship between the efficiency and scale of MFIs, this is obviously the most important category. There are two dimensions that we include: Gross Loan Portfolio, and Average Loan Size. In the context of MFIs, the latter proxy is particularly interesting as loan size can be a very good indicator of the mission of various firms (with the assumption that smaller loans often indicate a dedication to the original goal of microfinance, namely targeting the very poor). Furthermore, the measure addresses the intuition that the number of borrowers and the overall gross loan portfolio are key drivers of operational costs. Thus taken together, we understand the two dimensions in which a microfinance firm might see economies of scale. Both variables follow logarithmic distributions and are therefore logged throughout this study.

Profitability: As with size, two proxies are used to account for variance in MFI profitability: Operational Self-Sufficiency (equal to Revenues/Expenses) and Return on Assets (ROA). This will control for firms of different profit classes. In the commercial banking world, this would mean "financial health;" in the microfinance world, profitability may not always be the goal of the institution – particularly when one considers non-profits or NGOs – so we will talk in terms of mission as well as health.

Region: This is a proxy for the different global operational locations. The markers in the data are taken from MIX with the following six regions: "Latin America & The Caribbean," "Africa," "Middle East & North Africa," "Eastern Europe & Central Asia," "South Asia," and "East Asia & The Pacific."

Type: This is a proxy accounting for different types of microfinance institutions. Again, the markers are drawn from MIX with the following six categories of firms: "Non-Government Organization (NGO)," "Non-Bank Financial Institution (NBFI)," "Bank," "Rural Bank," "Cooperative/Credit Union (Coop)," and "Other."

Several other indicators were also tested for significance: "Age of Firm," "Number of Staff Members," and "% of Women Borrowers," all of which proved to have inconclusive results in the ANCOVA model and thus were dropped from the discussion of results. Of these, only Age will be re-introduced in the longitudinal portion of the study, as it shows some significance with regard to the cost-size growth relationship.

VII. Results: Analysis of Covariance

In this section, we will discuss the results of the ANCOVA model.[8] As we said above in the Methodology section, the overall approach is similar to that undertaken by Cull, et al. (2007), with a focus on the operational costs as opposed to the many financial metrics. The results of the ANCOVA model are outlined in Table 1 below.

Right away, we can observe that MFIs in this sample see scale efficiencies. This can be interpreted in several ways. With regard to overall firm size – or Log GLP in the regression – it appears that each percent of growth in Gross Loan Portfolio is correlated with a 0.0626 percent reduction in Average Costs. In other words, bigger firms are associated with smaller average costs and therefore better efficiency, the very definition of economies of scale. This result can be extended even more strongly to Average Loan Size, which also has an inverse relationship with Average Costs but of a magnitude nearly three times Gross Loan Portfolio.

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[8] Descriptive statistics for all variables can be found in Appendices 2 and 3.

Table 1:
Regression of Operational Efficiency vs. Firm Attributes

	Log Average Costs
Size	
Log Gross Loan Portfolio ($)	-0.0626*
Log Average Loan Size ($)	-0.1838*
Profitability	
Operational Self-Sufficiency (%)	-0.3773*
Return on Assets (%)	0.9460*
Region	
Africa	0.1027*
East Asia & Pacific	0.0645**
Eastern Europe & Central Asia	0.0441**
Latin America & Caribbean	0.0687*
Middle East & North Africa	0.0053
South Asia	-0.2847*
Type	
Bank	0.1184*
Rural Bank	-0.0208*
Coop/Credit Union	-0.1631
Non-Bank Finanacial Institution	0.0103
Non-Government Organization	0.0091
Other	0.0461*
Constant	0.6128*
R^2	0.5877

Data Source: 2006 MFI data from Microfinance Information eXchange

* Significant at a .001 level. ** Significant at .1 level

Figures represent an ANCOVA general linear model. All variables under "Type" and "Region" are categorical predictors. "Profitability" and "Size" are continuous predictors with unit of measurement noted.

The obvious desire here is to imply causality, namely to state that increasing the size of the firm and the size of the average loan both cause the average costs to go down, thus allowing the firm to recognize the benefits of efficiency. There are several concerns: first, as we discussed in the prior studies section, there is a delicate balance between the loan size and microfinance

efforts to loan to the poor. On the one hand, the goal is to put the money in the hands of people who do not have access to traditional channels of credit, with the underlying theory that these people will repay at the same rates. However, the implication that larger loan size is associated with more efficient firms puts the financial and operational goals of the firm at direct odds with the social motivation of microfinance (basically, this is the "schism" that Morduch discusses at great length). Moreover, this relationship may be circular, as firms that have scaled up might have done so through different channels that are inherently more profitable and by extension more efficient. Thus causality is *possible* with regard to scale efficiency, but certainly not *clear*.

Indeed, our profitability proxies seem to some degree to bear this out. In terms of self-sufficiency, MFIs have a very strong relationship between higher self-sufficiency and better efficiency. Again, the causal relationship could point both directions. Thus taken together with the implication that greater size and greater loan size improve efficiency, we begin to see a problem with the incentives inherent in the industry. To put it bluntly, firms managers striving for profitability and operational efficiency have incentive to make larger loans and become more self-sufficient – and all indications are that this is mainly achievable through lending efforts that extend above the "very poor" that the social effort is geared toward. Return on Assets is bit more confusing until we remember that the relationship is a semi-log. Thus a one percent increase in return on assets leads to a less than .01 percent increase on average costs, a positive relationship but a very small one.

The final dimensions included in the ANCOVA model are Type and Region. These will be discussed at greater length in our longitudinal model, but we see some trends emerging with regard to efficiency. Looking at Region difference, the most striking results are the extremes, Africa on the inefficient end and South Asia on the efficient side. As the focus of this study is on

the existence of scale efficiencies, we will not comment on the explanations for this large spread; suffice it to say that this is a major area for future research.

VIII. Results: Scale Efficiency with Growth

In this section, we outline the results from our longitudinal regression analysis. We will focus on the final two dimensions – Type and Region – as well as how the results relate to the ANCOVA model. Firm Type was further subdivided into "NGO" and all others, as these Non-Government Organizations occupy a unique place in the microfinance industry, driven by social gains but often with an eye toward self-sufficiency and self-sustainability. The intuition from analyzing these firms as a separate entity is also confirmed by the results of Gutierrez-Nieto, et al. (2007) which posits that NGO status is one of the principal components driving efficiency. In short, the NGO stands out as different from the rest and thus is examined separately in Table 2.

Table 2:
Growth Relationship by Firm Type

	NGO	**Non-NGO**	**Overall**
'01-'02	0.769	0.987	0.881
'02-'03	0.727	0.800	0.763
'03-'04	0.775	0.731	0.733
'04-'05	0.844	0.706	0.761
'05-'06	0.800	0.773	0.787
'01-'06	0.664	0.784	0.719

Data Source: Microfinance Information eXchange

'01-'06 data is based on a regression of 5-year CAGR of MFIs.

Data in chart represent β_1 such that: OC Growth = β_0 + β_1 * (GLP Growth) + error

All calculations significant at a .001 level.

As outlined above, the overall regression of 5-year growth of average costs versus the 5-year growth of operational costs shows a gap in efficiency between NGOs and Non-NGOs, with NGOs seemingly *more* efficient as they have scaled by a significant margin.[9] However, this difference has not been uniform over the past five years. Whereas the efficiency growth relationship has grown slightly for NGOs, the Non-NGOs saw a big shift downward after 2002 and otherwise similar or even better returns to scale. Without longer-term data, it is difficult to fully explain this trend; we will discuss this at greater length in our concluding remarks. Overall, though, the story is the same is in our ANCOVA regression: MFIs do see operational efficiencies as they grow larger.

The final part of our study looks at the size-cost growth relationship by Region of operation. Again, Gutierrez-Nieto, et al. (2007) guide our intuition, as their results show "country clusters" in their PCA analysis with regard to the dimensions/components of size and efficiency. In other words, MFIs within the same region in their study appeared to have similar scale efficiencies. As such, we have outlined the observed 5-year growth relationship by region in Table 3 below in an effort to quantify the differences by region.

Table 3:
Growth Relationship by Region

	Africa	Eastern Europe	Latin America	Middle East	South & East Asia	Overall
'01-'06	0.870	0.838	0.857	.451*	0.661*	0.719

Data Source: Microfinance Information eXchange

'01-'06 data is based on a regression of 5-year CAGR of MFIs.

Data in chart represent β_1 such that: OC Growth = $\beta_0 + \beta_1$ * (GLP Growth) + error

All calculations significant at a .001 level, unless otherwise indicated.

* Significant at a .01 level.

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[9] Recall that in this regression, a value of "1" means that an MFI's costs have grown in step with its overall portfolio. Anything less than one indicates that the costs have grown slower than the portfolio; or in other words, the firm has been able to achieve scale efficiencies as it has grown.

The results show that firms in the Middle East, South Asia and East Asia see much stronger scale efficiencies than their counterparts in the other three regions. This result is consistent with the results from our ANCOVA model summarized in Table 1, namely that Africa sees the fewest scale efficiencies – though still positive – with Latin America and Eastern Europe in the same basic realm and South Asia in particular showing strong economies of scale. These results have significant implications for business models in those areas, namely that the Middle Eastern and Asian MFIs should be as large as possible while MFIs in the other regions should focus on efficiencies in other areas than scale.

It is important to note that sample size may play a role in the results, as Africa, Eastern Europe and Latin America each have a significant number of firms in this sample. This may get back to our original concerns with selection bias, namely that the regions with fewer firms reporting to MIX also have the most successful firms reporting to MIX. Overall, further study of major operational difference in these regions is an important area for future research, as the implications for scale decisions are clear.

IX. Discussion and Conclusion

We have examined economies of scale in microfinance institutions in two dimensions – by comparing similar firms across a broad sample as well as by looking at firms as they grow – and in both cases, we see strong evidence that operational efficiencies and size are positively correlated. In short, a larger MFI appears on average to be a more efficient one. However, converting this result into suggestions for policy is much more complicated.

Consider the results we saw with NGOs versus non-NGOs, namely that NGOs show stronger economies of scale than non-NGOs. The reality is that there may be several possible

underlying themes to this result: first, the difference could be that NGOs are receiving subsidies that do not get filed under operating costs. The role of subsidies in microfinance and specifically the Grameen Bank was discussed at length in Morduch (1999b), while the impact of subsidies in financial institutions was examined in Wolken and Navratil (1980). In short, both argue that subsidies are a vital part of operations across many financial institutions and that if grants were subtracted from profits – or accounted for in operational budgets at the market rate for the subsidy – much of the increased return would disappear. This is not to say that the subsidies are bad, merely that they are going toward the non-monetary "social returns" of poverty alleviation. The trade-off is that the apparent scale efficiency of those firms receiving the subsidies cannot be taken at face value as traditional measures improperly value the firm costs.

Alternatively, as argued in Krauss and Walter (2006), microfinance institutions show some resistance to broader market movements. But this effect may not be uniform across different firm types and thus the market downturn after 2001 may have disrupted the operations of the non-NGOs more than the NGOs. This too would have an impact on scale efficiency and deserves further study in the context of product diversification. In short, we can see that it is hard to simply say that NGOs should implement a growth policy in order to become more efficient.

Converting the results into policy gets even more complicated when considering that efficiency may not be a firm's primary goal. Indeed, efficiency and self-sustainability in microfinance do not imply "success" since societal improvement is often paramount to the venture. In fact, striking this balance between social and financial gains has become the new challenge in the industry, one that has only begun to be evaluated. Jonathan Morduch envisioned many of these issues nearly a decade ago in Morduch (2000) and still his writings resound loudly with current struggles:

"Addressing the schism [between rhetoric and action, and between financially-minded donors and socially-minded programs] may also mitigate the emerging backlash against the microfinance movement. The insistence on the win-win proposition has alienated many potential supporters. Those willing to trade off costs for benefits have become frustrated as microfinance institutions stretch accounting data in order to claim profitability while simultaneously eschewing social evaluations. Perhaps more problematically, those interested in replicating the well-known success stories have only had partial and unreliable evaluations on which to base their plans."[10]

As mentioned earlier in the paper, this debate has recently brimmed over as two of the largest players in the microfinance world – Yunus' Grameen Bank in Bangladesh, and Compartamos in Mexico – have begun openly criticizing each other, as Yunus believes that the pressures of seeking profit will cause Compartamos to abandon its social mission.[11] This debate more than any highlights the importance of better understanding the scale efficiencies in order to inform decision-making for many players, including donors, investors and most importantly the managers of the firm.

On the one hand, this study offers an answer to this question: yes, there are scale efficiencies. But the areas in which we see them have very important suggestions for the future of the industry. In essence, bigger portfolios and bigger loans are associated with better efficiency; or differently, the firms see economies of scale. That said, Yunus' concern with Compartamos' business model may be well-founded as the act of increasing average loan size may run counter to the social design of microfinance. This leaves managers with a quandary: if organizational leaders are pushing for better efficiency and perhaps even profitability, how can this be balanced with the social mission? This question is even stronger for NGOs which currently see very strong scale economies but have perhaps an even stronger social mission, if only because the receipt of subsidies may be at the root of much of this efficiency and the subsidies are in theory allotted almost exclusively for the social goals of the firm.
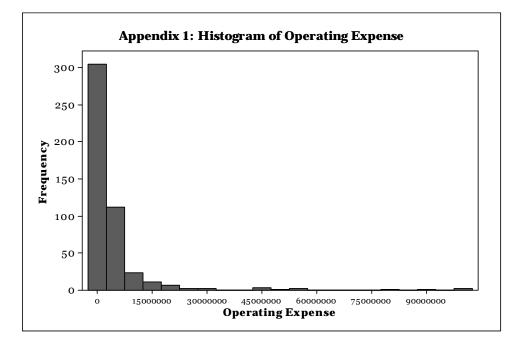
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[10] Morduch (2000), p. 627
[11] Malkin (2008)

Thus the roadmap to exploiting efficiency in microfinance remains unclear. On the positive side, a great deal of research is being conducted to address both "best practice" and industry-wide issues, much of which speaks loudly about how managers can attempt to balance the profit and social aims of the firm. However, the negative side is that many of these studies – Cull, et al. (2007) in particular – show that this balance must stem from an acceptance that there is a trade-off between profit and social mission, and thus the "win-win" proposition of microfinance discussed in Morduch (2000) is a mirage. The results from our study would seem to confirm the latter, with the implication that managers who hope to maximize social gains must be willing to sacrifice profit in order to do so. And conversely, any firm that places profit first will ultimately find itself moving out of the business of microfinance for social gains and into the broader realm of credit loans. In all, while not confirming a "win-win" solution, results such as these should at least allow firms and managers to be more realistic in their operational and strategic prioritization.

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XI. Appendices

Appendix 1: Histogram of Operating Expense

Appendix 2:
Descriptive Stats for Firm Attributes

	Mean	StDev	Min	Median	Max
Efficiency					
Log Average Costs	-0.6691	0.2896	-1.6073	-0.7014	0.1961
Size					
Log Gross Loan Portfolio ($)	6.7824	0.7438	4.7306	6.7540	8.9739
Log Average Loan Size ($)	2.7004	0.5026	1.5441	2.7235	4.4297
Profitability					
Operational Self-Sufficiency (%)	1.1843	0.2795	0.1881	1.1721	2.2702
Return on Assets (%)	0.0583	0.0695	0.0002	0.0419	0.7788

Data Source: Microfinance Information eXchange

Appendix 3:
Descriptive Stats for Average Costs (by Type and Region)

	N	Mean	StDev	Min	Median	Max
Region						
Africa	93	-0.530	0.304	-1.604	-0.520	0.196
East Asia & Pacific	26	-0.421	0.265	-1.014	-0.377	0.180
Eastern Europe & Central Asia	85	-0.761	0.218	-1.607	-0.718	-0.357
Latin America & Caribbean	195	-0.676	0.270	-1.309	-0.722	0.124
Middle East & North Africa	28	-0.691	0.246	-1.369	-0.682	-0.141
South Asia	44	-0.889	0.271	-1.530	-0.881	0.070
Type						
Bank	34	-0.614	0.321	-1.158	-0.692	0.196
Rural Bank	10	-0.850	0.243	-1.152	-0.940	-0.447
Coop/Credit Union	56	-0.862	0.258	-1.607	-0.830	-0.249
Non-Bank Finanacial Institution	160	-0.693	0.270	-1.604	-0.717	0.180
Non-Government Organization	197	-0.593	0.277	-1.272	-0.583	0.124
Other	14	-0.704	0.328	-1.369	-0.682	-0.171
OVERALL	471	-0.669	0.290	-1.607	-0.701	0.196

Data Source: Microfinance Information eXchange