Scope Economies of Lending and Collecting Deposits in Microfinance Institutions

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Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China, August 16-22, 2009

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Abstract:

While economies of scope of lending and mobilizing deposits in banking are justified theoretically (Diamond, 1984) and found empirically (see Saunders, 1999), in microfinance, the existence and the magnitudes of scope economies has not been investigated. We use a semi parametric smooth coefficient model to estimate these economies using the largest publicly available dataset of over 2,800 annual observations from MFIs across the world. We accommodate the outreach objective of Microfinance Institutions (MFIs) by measuring outputs as the number of clients (borrowers and savers) rather than the traditional volume of loans and deposits and compare the results from the two cost functions.

We find substantial scope economies of 47 percent on average. The results also indicate that these economies are entirely due to shared fixed costs since MFIs could not profitably use information they collect from savers to improve their lending products and vice versa. In fact, we find large negative variable cost complementarities. Overall scope economies are the largest in rural banks and coops, while lowest in banks. We further find that, while very few of MFIs in Eastern Europe and Central Asia offer savings, the potential scope economies that they can realize are by far the largest. Finally we compare the two methods and find that while on the average the traditional cost function approach would underestimate scope economies, it would overestimate them for MFIs in Africa and all parts of Asia, as well as for NGOs and non-bank financial institutions.

Keywords: Scope Economies, Microfinance Institutions, Rural Banks

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Introduction

Microfinance emerged as an innovation in lending to the rural poor in Asia, where previous interventions in rural financial markets (directed and subsidized production credit usually disbursed by agricultural development banks) often failed. While it started as "a collection of banking practices built around providing small loans (typically without collateral) and accepting tiny savings deposits" (Armendariz and Morduch, 2005, p.1), today many microfinance institutions (MFIs) expand their services and strive to offer payment and savings facilities, insurance, housing, and longer-term loans. Moreover, MFIs today serve marginalized clientele in rural and urban settings. The goals of microfinance are to reduce poverty by promoting self-employment and entrepreneurship as well as by alleviating liquidity constraints and contributing to consumption and income smoothing.

Estimates show that there are at least 10,000 microfinance programs worldwide, with the majority still relying on traditional multilateral and bi-lateral donors for funds and most continue to focus on lending. However, two related and important trends are now emerging. The first is toward commercialization which essentially is transforming the NGO-MFIs into regulated intermediaries with the intent to lower costs by accessing deposits as well as strengthen the organizations by privatizing it so that it is better monitored by the new owners and the regulator. The second trend is a renewed interest in experimentation to mobilize savings especially rural savings. These developments should be based on observed economies of scope of extending

loans and mobilizing savings but there are no studies that estimate the magnitude and sign of such economies. We present the first evidence using a large sample of MFIs.

Understanding if the current trends of attention to savings are justified is important because funding by "traditional" donors remains a non-trivial quantity. It is estimated that annual spending on microfinance is between US$ 800 million and 1.5 billion (Hartarska and Holtmann, 2006). Bi- and multilateral agencies account for the bulk of quasi-commercial investment in microfinance organizations through equity, guarantees, and quasi-commercial debt (CGAP, 2005b). These donors are becoming more coordinated in their funding and offer less funds for individual MFI experimentation with various financial products. Most recent examples of coordination of donor action plans under CGAP are significant changes to the funding practices of the United Nations Development Programme and the credit lines of the World Bank (CGAP 2006).

In addition, private foundations such as the Bill and Melinda Gates Foundation and the Dell Foundation play an increasingly active role as both donors and investors. Large private banks such as CITIBANK and HSBC have also entered what used to be a niche market (WSJ May 15, 2006) with over 2 billion euros committed according to industry's own estimates. These (quasi-) commercial investors may fund large international microfinance networks (e.g. ACCION International, FINCA, Opportunity International), individual MFIs, or may adopt a "greenfielding" approach and create new micro and small enterprise banks (Schmidt and Zeitinger). Thus, analysis of the possible efficiency gains or losses of intermediation as well under what circumstances they are realized is timely and important.

Previous studies that explore the productivity and efficiency of organizations providing microfinance are predominantly case studies describing the experience and performance of a

single MFI or a group of MFIs operating in one country or in similar markets (for example Hernandez-Trillo, Pagan, and Paxton, 2005). While it is useful to conduct case studies to gain insight into particular situations, it is also important to look at many institutions to make broad comparisons across the MFI population.

We are the first to estimate scope economies in microfinance. We also evaluate their magnitude by organizational type and across geographic regions. We use the largest publicly available database with over 2700 annual observations from over 880 MFIs from 93 countries. The apply a novel semi parametric smooth coefficient model and account for the outreach mission of the MFIs by measuring outputs in the cost function by the number of active borrowers and savers and then compare the results with results from a typical banking scope economies cost function where outputs are measured by the dollar volume of loans and savings (see Caudill, Gropper, and Hartarska, 2008). Results indicate substantial scope economies in microfinance which are unequally distributed across MFI types and geographic regions.

Methods

Overall scope economies are defined as the percentage of cost savings from producing all outputs jointly as opposed to producing each output separately (see Pulley and Humphrey, 1993):

$$\text{SCOPE} = \frac{C(q_1,0;\bar{r}) + C(0,q_2;\bar{r}) - C(q_1,q_2;\bar{r})}{C(q_1,q_2;\bar{r})} \quad (1)$$

where q_j (j = 1, 2) refers to the j^{th} input, $\bar{r}$ is a vector of input prices, and C(.) is the cost function. The cost function deemed appropriate for estimating economies of scope by Baumol et al. 1982 is

$$C(q; r) = F(q) * G(r) \quad (2)$$

where $F(q)$ is a quadratic form in outputs while $G(r)$ is a linearly homogeneous function of input

prices. The empirical model suggested by Pulley and Braunstein (1992) is

(3) $C(q; \ln r) = F(q; \ln r) * \exp\{G(\ln r)g\} + u$

where $F(q; \ln r)$ is quadratic in outputs, while both q and $\ln r$ appear in $F(.)$ as there is no explicit reason for imposing separability between input prices and outputs.

Since theory does not offer advice on how to correctly model costs, nor provides functional forms for either *F(.)* or *G(.),* we advocate a Semiparametric Smooth Coefficient Model (SPSCM) to reduce parametric specification bias on cost estimation. Thus, we leave the input price function unspecified while employing a quadratic for output. Thus, we estimate

(4) $$y_i = \alpha(z_i) + \beta(z_i)x_i + \varepsilon_i$$

where y_i=C, x_i= [1, q_i' $q\,q_i'$ $q\ln r_i$]′, z_i =lnr_i . We do not have to introduce quadratic and interaction terms in z_i since the unknown smooth coefficient will select the appropriate higher order/interaction terms. Another way to think of this model is that for a given level of z_i, we have a linear in parameters model, with the slopes possibly differing over different levels of z_i. Since z_i and x_i can contain the same variables, this model is more general than that in (3). We use a local linear least squares (LLLS) procedure to estimate the equation. It is described in details in Asaftei G., C. Parmeter, and Y. Yuan, (2008).

Data:

The data were collected from MIXMARKET on November 1st 2008, and at that time the database consisted of over 1,300 MFIs. Most MFIs had data for several years with the maximum of eight years. After dropping all observations that do not have data for the calculation of the cost function, the final data included 882 MFIs with on average about 3 years of data or 2,712 total annual observations in the case of output measured with number of clients, and 2,829 annual

observations in the case of outputs measured as volume of loans. These observations represent 93 countries. The minimum annual observation per MFI per country is one (Central African Republic) and the maximum is 180 (Peru). The data are for the 1998-2006 period.

Although these are self-reported data, most MFIs that disclosed the detailed data necessary for the calculation of a cost function were rated with at least three stars (78 %) which indicated that they have at least two years of financial statements and outreach data (as these were necessary to calculate the price of capital and labour) or four stars with audited financial statements (33 percent). Adjustments usually considered important in microfinance are irrelevant here because for efficiency purposes it is important to use the "subsidized" or actual prices that managers faced (45 percent). All values are in US dollars and are calculated by Mixmarket.

Since the data does contain direct values of input prices, available ratios were used to calculate the value of *cost of capital* and *salary* which captures not only the cost of labor but also of fixed assets. *Total costs (TC)* is the sum of financial and operating expense. *Salary* is the ratio of operating expanse divided by the number of employees, cost of capital *ccost* is defined as the financial expense to liability, so it incorporates the cost of both loans and deposits measured as the actual price paid by the MFI. These ratios are not directly available but were found by the following calculations (in foot note):

Summary statistics of the variables used in the scope estimation are in Table 1. The average MFI has about $19.5 mln in gross loan portfolio (current US dollars), with a range from from slightly more than $1,200 to 3 billion. The volume of savings (when offered) ranges from about 100 to 5 billion. The average number of borrowers is 58,000 but the rage is huge from 9 to over 6 million borrowers and up to 32 million savers. The average ratio of operating expense per staff member (*salary*) is $12,518 and ranges from two to $106,000 (see Table 1 for more details).

Table 1. Summary statistics of variables used to estimate scope economies.

Variable	Obs	Mean	Std. Dev.	Min	Max
y1nab	2,829	58,074	351,827	9	6,287,000
y2nas	2,699	117,175	1,589,573	0	32,300,000
y1glp	2,829	19,400,000	114,000,000	1,252	3,040,000,000
y2save	2,829	15,500,000	178,000,000	0	4,870,000,000
Tc	2,829	5,041,728	35,700,000	24	835,000,000
Ccost	2,829	0.11	0.19	0.00	2.72
Salary	2,829	12,518.62	10,171.23	1.78	106,562.20

Results

The estimation results are presented in Table 2. We find that the average scope economies in microfinance institutions are substantial. When we measure outputs by an MFI as the number of clients (borrowers and savers) the average scope economies are 47 percent, indicating that lending and collecting savings instead of just lending saves cost by 47 percent on average. If we measure outputs of the MFI by the volume of savings and loans distributed, we find that the scope economies are slightly less at 43 percent but statistically significant nevertheless. These results suggest that the traditional method of specifying a cost function would underestimate the benefits of offering both loans and savings.

Most of the benefits from scope economies are due to shared fixed assets as the results in Table 2 further suggest. We find that fixed costs complementarities are about 90 percent and larger when output is measured with by number of clients, while cost complementarities are negative though large. These results suggest that MFI do not learn from their savers/borrowers information that can be profitably used to construct a better lending/savings product. The benefits from providing both savings and loans are entirely due to shared fixed costs in term of

branch infrastructure, IT, and know how. These results have implications for the policies that donors and governments would pursue in terms of choosing the most effective subsidies.

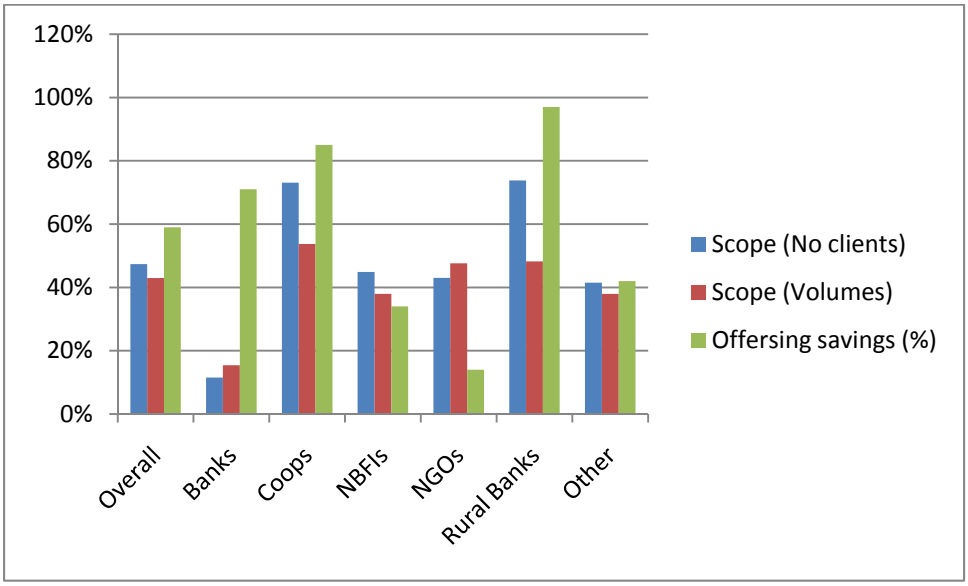
Table 2. Summary statistics of scope economies, differences by method used, and the sub elements fixed cost complementarities, and cost complementarities

	Scope (Clients)	Scope (Volume)	Difference	Fixed Compl. (Clients)	Fixed Compl. (Volumes)	Cost compl (Clients)	Cost Comple (Volumes)
Average	0.47	0.43	-0.04	0.97	0.86	-0.49	-0.43
St dev	(0.87)	(0.30)	(0.81)	(1.75)	(0.59)	(0.92)	(0.30)
Min	-11.85	-0.67	-28	-26.14	-0.38	-29.48	-1.70
Max	29.42	1.70	12	58.91	3.40	18.10	0.65
OB	2,712	2,829	2,699	2,712	2,829	2,712	2,829

Another interesting result is that we find week evidence of scope diseconomies with only 2.1 percent of the cases in in the number of clienst outputs version and only 0.9 percent with the volume of outputs version of the costs function. Thus, the effort to induce MFIs to offer more deposits is justified.

To further study these issues we explore what types of MFI could realize biggest benefits from simultaneously offering loans and collecting deposits. Figure 1 compares the variable cost economies by MFI types and juxtaposes these to the percentage of MFI in that type that in fact collect deposits. MFIs are classified as Banks, Cooperatives, Non-bank financial institutions, non-governmental (non-profits), Rural Banks and others. Results show that banks have the smallest scope economies. Rural banks and coops, on the other hand, realize the biggest scope economies and almost all collect voluntary savings. It is also interesting that rural banks and coops realize the biggest scope economies in terms of reaching many clients as the breakdown of the scope economies from the cost function with outputs measured by number of clients.

Figure 1. Overall scope economies and savings services offered by MFI organizational types.



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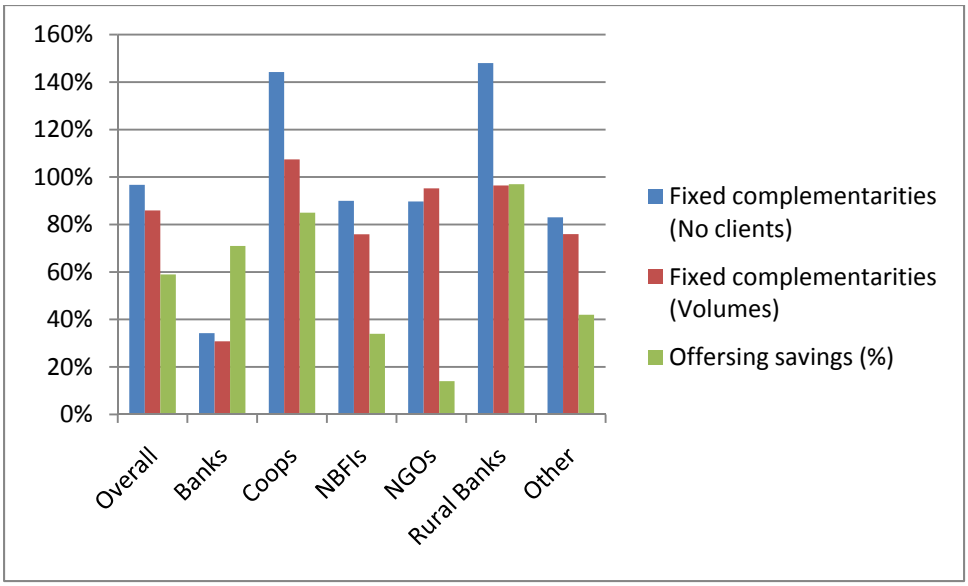
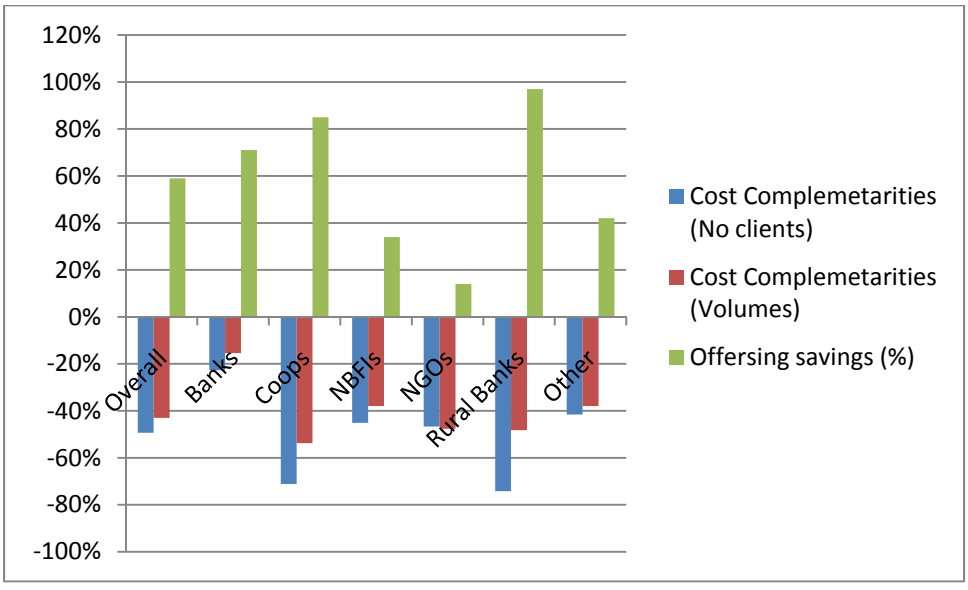
Further, it is clear that large fixed costs complementarities drive these results. As Figure 2 shows, by far the biggest fixed costs complementarities are in coops and rural banks (about 150 percent) and they are significantly higher when estimated from a cost function with number of clients as outputs. It is also clear that these fixed costs complementarities are least used in NGOs and NBFIs who usually do not collect deposits.

Figure 2. Fixed costs complementarities and savings offered by MFI type



The very high fixed costs complementarities are negated by the negative variable costs complementarities which are the biggest (in absolute term) also in coops and rural banks (see Figure 3).

Figure 3. Cost complementarities and savings offered by MFI type



A further breakdown of MFI by geographic regions is also usefully because it shows the trends in MFI worldwide. With a few exceptions, most MFI in the regions collect savings in proportion to the benefits of scope economies (see Figure 4). Eastern Europe and Central Asia is an exception because we estimate the largest scope economies in terms of reaching poor clients there but most of the MFI in this region do not collect savings. Therefore, MFIs in this region can benefit substantially from deposit collection. MFIs in the Middle East and Central Asia do not collect deposits in the standard way but even in this region overall scope economies are substantial.

Figure 4. Scope Economies and actual savings by geographic region.

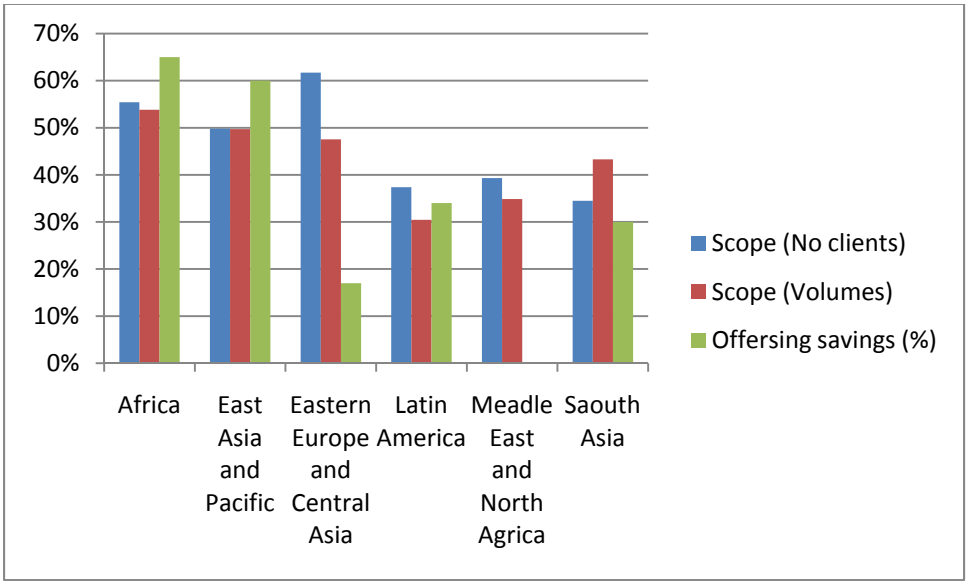


Figure 5. Fixed costs complementarities and actual savings by geographic region.

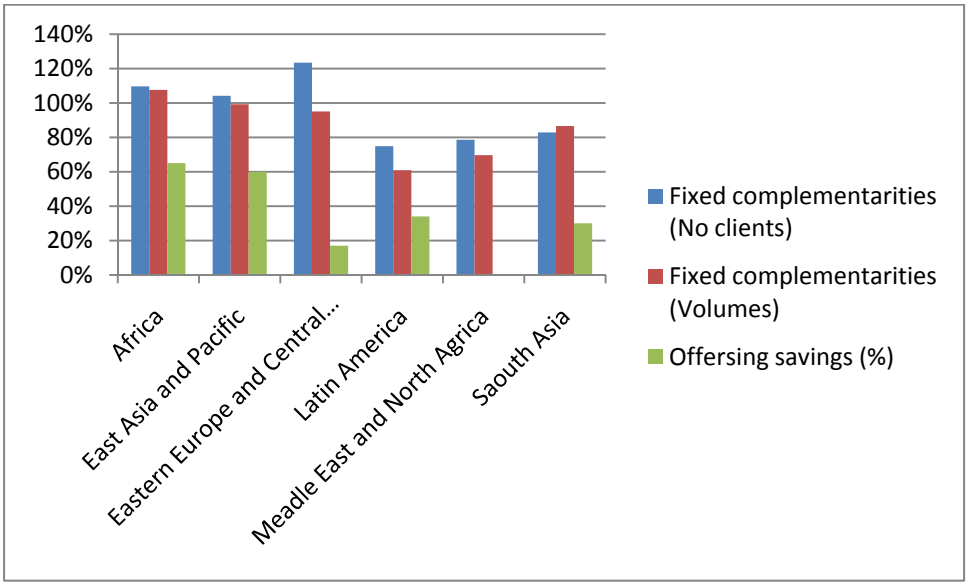
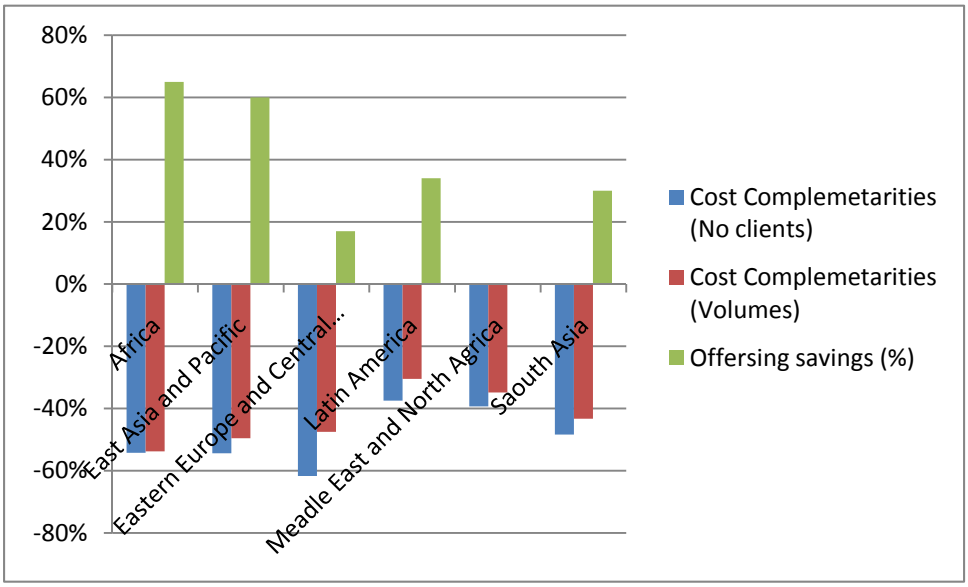


Figure 6. Costs complementarities and actual savings by geographic region.



A final result that we present is the difference between standard volume approach to MFI outputs and the one that accounts for outreach. We graph that difference as a percentage of outreach based approach. Thus on average a positive value indicates that the standard method

would overestimate the scope economies, while when the value is negative, the traditional specification would underestimate the scope economies.

For the sample as a whole, the traditional approach underestimates the scope economies in reaching many clients. Figure 7 shows that scope economies would be overestimated in Africa and all of Asia with the traditional approach but they would be underestimated for the case of ECA, LA, and MENA regions. Moreover, as figure 8 shows the traditional scope economies approach would overestimate the scope economies achieved by NGOs but significantly underestimates the achievements of rural banks

Figure 7. Overestimation of scope economies when outputs are in monetary values compared to measure in number of clients as a percentage of the latter, by geographic region.

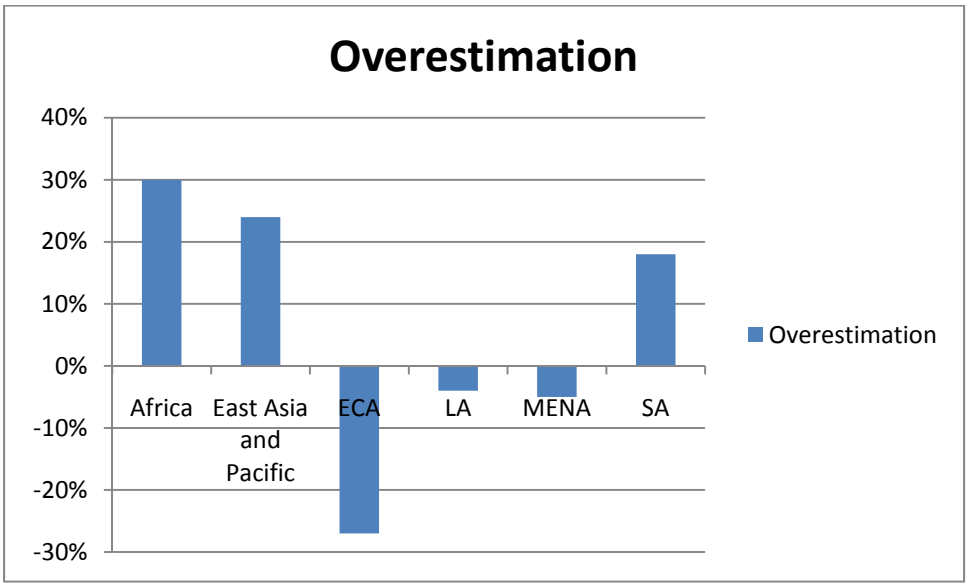
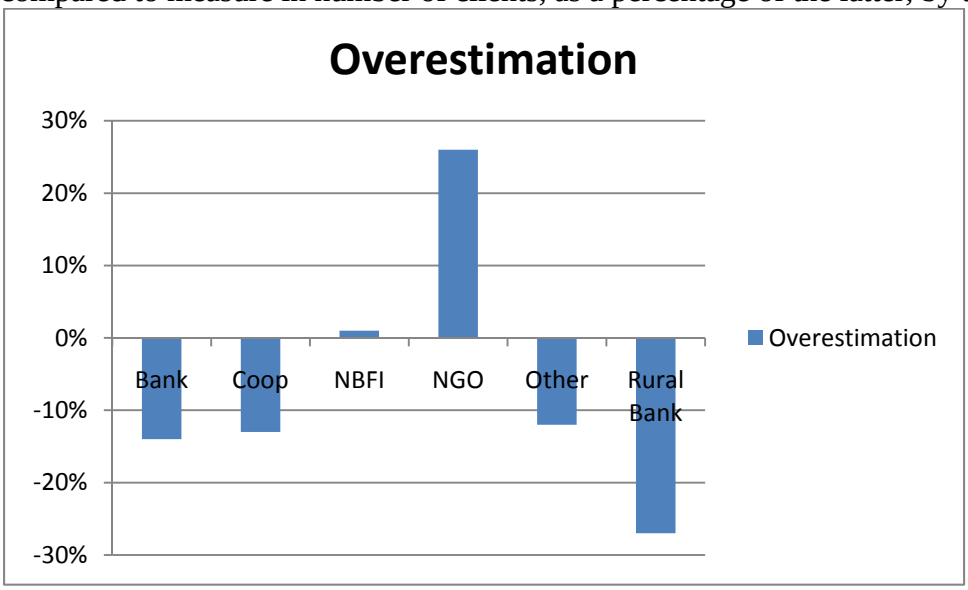


Figure 8. Comparison of scope economies when outputs are measure in monetary values compared to measure in number of clients, as a percentage of the latter, by type of MFI



Conclusions

While economies of scope of lending and mobilizing deposits in banking are justified theoretically (Diamond, 1984) and found empirically (see Saunders, 1999), in microfinance, the existence and the magnitudes of scope economies has not been investigated. We use a semi parametric smooth coefficient model to estimate these economies using the largest publicly available dataset of over 2,800 annual observations from MFIs across the world. We estimate two versions of a cost function: a typical cost function where outputs are measured in volumes of loans and deposits and a modified version to account for the outreach mission of MFIs where outputs are measured by the number of borrowers and savers.

We find that scope economies are substantial for the MFI industry and on average amount to 43 percent according to the traditional cost function results or 47 percent according to the modified cost function results. We also find that overall scope economies are mostly due to shared fixed costs and that MFIs could not profitably use information they collect from savers to

improve their lending products and vice versa. In fact, we find large negative cost complementarities.

A further investigation of the average scope economies by MFI types and geographic region reveals that rural banks and coops have the largest overall economies of scope especially for the case of the modified cost function where outputs are number of clients (borrowers and savers), while banks have the lowest scope economies. We further find that, while very few of MFIs in Eastern Europe and Central Asia offer savings, the potential scope economies that they can realize are by far the largest. Finally we compare the two methods and find that while on the average the traditional cost function approach would underestimate scope economies, it would overestimate them for MFIs in Africa and all parts of Asia, as well as for NGOs and non-bank financial institutions.

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