On the Efficiency Effects of Subsidies in Microfinance: An Empirical Inquiry

Marek Hudon
SBS-EM (ULB) & CERMi

Daniel Traca
Universidade Nova de Lisboa

Contact Person:

Marek Hudon

21, av. Roosevelt

1050 Bruxelles – Belgium

Tel: +32 2 650 42 47

E-mail: mhudon@ulb.ac.be

ABSTRACT

Using an original database of rating agencies, this paper gives empirical evidence on the impact of subsidy intensity on the efficiency of Microfinance Institutions (MFIs). We find that subsidies have had a positive impact on efficiency, in the sense that MFIs that received subsidies are more efficient than those that do not. However, we find also that subsidization beyond a certain threshold renders the marginal effect on efficiency negative. In our sample, 26% of MFIs receive levels of subsidization higher than that threshold, which implies that a marginal cut on subsidy intensity would increase their efficiency.

JEL G30, G32, J23

Keywords: Microfinance, subsidies, efficiency, productivity

Aknowledgements: We thank Beatriz Armendariz, Jonathan Morduch, Marc Labie, Ariane Szafarz and participants at the Groningen Conference for their comments. We are also grateful to the two anonymous referees for their suggestions. We thank the National Bank of Belgium for financial support.

1 Introduction

Over the last twenty years, the Microfinance sector has attracted a remarkable US$ 1b. per year, in subsidies from private and public donors (CGAP, 2005). Yet, despite the notoriety of some success stories, less than 5 per cent of MFIs are operationally sustainable, while the remaining 95% still require subsidies to cover their costs and finance their loans (UNCDF, 2005). Moreover, dozens of institutions that claim to make profits still rely on subsidies in order to cover their seemingly high transaction costs (Armendariz and Morduch, 2005).

Such extensive subsidization has created a debate on the implications for the efficiency of MFIs. This paper addresses this question from an empirical standpoint. It delivers evidence on the impact of subsidies on the efficiency of Microfinance Institutions (MFIs), based on data collected by two microfinance ratings agencies. Our work is particularly relevant for donors and policy makers, for it provides some guidelines on how far subsidies can take the microfinance industry to develop and achieve improved levels of efficiency.

The effect of subsidies on efficiency is a topic of intense debate in academic and policy circles. Many authors are concerned that excessive subsidization will inhibit the promise of sustainability in the provision of financial services to the poor.[1] The main concerns are that subsidies undercut both scale and efficiency within the MFI, and distort the market by favouring more inefficient institutions. On the other hand, Armendariz and Morduch (2005) have stressed the efficiency-enhancing role of "smart subsidies" that allow MFIs to build their infrastructure and develop the know-how.[2] In an effort to integrate both views, Lapenu (2000) questioned the level of subsidization of microfinance institutions that should be accepted, stressing the

empirical nature of the problem. Surprisingly, evidence on the impact of subsidies on the performance of MFIs is scarce, with the exceptions of Cull et al. (2006) and Hudon (2006).

Using a cross-section regression, we estimate the efficiency-tax as a function of subsidy intensity. The efficiency-tax measures the proportional decline in the efficiency of an MFI with a given level of subsidy intensity, relative to the benchmark of no subsidies. The efficiency tax can be positive or negative depending on whether subsidization reduces or enhances cost-effectiveness. The data we use includes information on "donated equity" which covers equity received through cash donations from sources that do not receive stock and that carries no restrictions (CGAP, 2003). We take this as a measure of historical subsidies received by each institution, and compute subsidy intensity as the ratio of "donated" to total equity.

To address potential nonlinearities, we estimate a quadratic specification of the efficiency tax. This implies that the marginal efficiency-tax (i.e. the proportional decline in efficiency due to a marginal rise in subsidy intensity) depends on the level of subsidy intensity. Based on the notion of "smart subsidies", which suggests that the efficiency-enhancing effects decline as the level of subsidization increases, our working hypothesis is that the marginal efficiency tax is increasing.

Our results show that, for virtually the entire sample, the efficiency tax is negative is the sense that MFIs that receive subsidies are more efficient than those that do not. Moreover, they confirm that the marginal efficiency tax is increasing, and the efficiency tax a non-linear function of subsidy intensity. In particular, the efficiency tax is negative and decreasing for lower levels of subsidy intensity, but becomes increasing beyond a critical value, and could potentially turn positive. In our estimates, only one MFI has a positive efficiency tax. However, a quarter of them

have a level of subsidy intensity where the marginal efficiency tax is increasing. Note that, although these MFIs have a level of efficiency that is higher than those that obtain no subsidies, a marginal decline in their level of subsidization would enhance their efficiency.

In sum, our findings show that, in general, MFIs that received subsidies have seen productivity rise, although, in many cases, the level of subsidization has been excessive, at the margin. We interpret these results as a suggestion that small ("smart") subsidies allow MFIs to increase the productivity of their staff, but beyond a certain threshold, they lower productivity, at the margin, in line with the moral hazard arguments raised in the literature.

An important concern is the well-known endogeneity of the MFI's subsidy intensity. In particular, an MFI with higher unit costs and weaker sustainability may attract higher subsidies from its donors, who are eager to see the MFI survive. Under this hypothesis, the OLS estimate of the efficiency tax is biased upward. Unfortunately, we were unable to find proper instruments to correct this bias, given the limited data available in the ratings reports. However, it should be noted that, given the expected direction of the endogeneity bias, our key result that subsidies enhance efficiency, at least for small levels of subsidization, should not be qualitatively challenged by a correction for endogeneity.

The structure of the paper is as follows. In the following section, we present the dataset obtained from the microfinance rating agencies, focusing on the measure of subsidy intensity. Next, we discuss the theoretical linkages between subsidy intensity and the efficiency of MFIs. Sections 4 and 5 present the econometric specification and results, and Section 6 concludes.

2 The Microfinance Ratings Data

Our data was obtained from the financial statements gathered by two leading microfinance rating agencies: PlaNet Rating and Microfinanza. The ratings were produced between 2002 and 2005, and provide balance-sheet and income statement information for 100 institutions, including data on subsidies obtained historically. For most MFIs, the dataset includes observations for three different years. The rating reports include the balance-sheet and income statement data, in addition to the number of borrowers and staff and indicators of operational and financial sustainability. Due to the variety of subsidies and the problems of transparency of many MFIs, it is difficult to obtain data on the amount of subsidies. The financial statements included in the ratings are one of the most trustworthy solutions, since they have all been audited during the rating process (contrary to voluntary databases, such as the Mix Market).

The MFIs in our sample include some of the largest and better managed around the world. Given the well-established concentration of microfinance clients in the largest institutions (Honohan, 2004), our sample is quite representative of the universe of microfinance activity.[3] In particular, our sample is comparable to the largest database in microfinance, with more than 700 MFIs, included in the 15th MicroBanking Bulletin [MBB] (MicroBanking Bulletin, 2007): the average Operational Sustainability in our database is 118%, compared to 115% for the MBB; the average number of borrowers is 14,081 compared to 10,102 for the MBB; the average nominal yield of 32.6% and 30.2% in the MBB; and, finally, the average staff productivity is 121 borrowers per staff and 112 in the MBB.

The difficulties to obtain reliable data on subsidies have been a key obstacle to studying

the link between subsidies and performance. Subsidies may be direct through cash or donations, indirect with in-kind asset or training facilities or through soft loans when the interest rate obtained through the market would be much higher. Other forms of subsidies are tax holidays, loan guarantees, soft equity or public goods that the MFI might otherwise not provide such as data collection or impact surveys (Armendariz and Morduch, 2005). These adjustments can make a big difference. For instance, Morduch (1999b) calculated that the sum of the direct and indirect subsidies to the Grameen between 1985 and 1996 reached $144 million while the Grameen reported $ 1.5million.

The rating reports make an impressive effort of capturing the subsidies obtained from each of the MFI, for a rather long period of time. The balance-sheet includes an entry for "donated equity", which includes equity received through cash donations from sources that do not receive stock. It represents accumulated donations that carry no restrictions (CGAP, 2003). On the other hand, all donations for operating and non-operating expenses are included in retained earnings, net of the operational deficit of the MFI, and thus are not included in "donated equity". In this sense, "donated equity" underestimates the magnitude of subsidies received by the institutions.

We obtain the subsidy intensity of each MFI, as the ratio of "donated equity" by total equity. For each MFI, we then average over the three years for which we have data. Out of the 100 MFI's in the sample, 16 have zero donated equity, i.e. are subsidy free. The mean subsidy intensity is 0.73 and the median is 0.65.

3 Subsidy Intensity and the Efficiency of MFIs

In this section, we discuss the literature and derive testable propositions for the empirical effect of subsidies on the efficiency of MFIs. Donors have supported most microfinance programs since the emergence of the sector during the 70s. Their common goal is to encourage the development of a more inclusive financial sector. From this perspective, subsidies would be helpful to meet the social bottom line of microfinance or reach very remote populations that are not likely to be served without external support, particularly during start up.

In reality, even if microfinance has constantly argued to be a new, self-sustained development policy, one must recognize that very few MFIs have reached independence from donors' funds. The norm remains subsidization, leading Morduch (1999a) to argue that much of the success of microfinance has been dependent on the role of continuing subsidies. The trade-off between financial performance and outreach in the main argument of MFIs looking for subsidies beyond the start-up phase (Diop et al., 2007).

Recently, the role of public donors has been challenged by the emergence of new actors. First, interested by the prosperous financial results of some leading MFIs and by the positive image surrounding the sector, some socially-oriented or commercial investors are willing to develop microfinance portfolios and finance major institutions. Public subsidies should complement what these actors are not likely to finance, rather than compete with them. Second, private donors, including charitable foundations, such as the Gates and Omidyar Foundations, have decided to commit a large part of their funding to microfinance. While they are increasingly related to the traditional public donors, they appear to attach fewer conditions

to their subsidies (Diop et al., 2007).

In terms of the impact evaluation by donors, the focus has been on financial or social performance. However, a more robust and reliable criterion than financial performance is efficiency (Balkenhol, 2007). Improving efficiency could help enlarge market penetration and improve profitability, and/or facilitate the social mission, when MFIs pass on the cost savings into lower interest rates (Brand, 2000). Although it is commonly argued that over-reliance on and poor design of subsidies limit scale and undermine incentives to build strong institutions (Morduch, 2005), very little is known empirically on the efficiency effects of subsidies.

The theoretical arguments raised in the literature on the efficiency effects of subsidies go in both directions. On the efficiency taxing effects of subsidies, the literature advances two lines of argument. First, there are the effects of soft-budget constraints, where donor-financed bailouts of poorly preforming MFIs reduce the incentives for cost-cutting (Dewatripont and Maskin, 1995; Kornai et al., 2003). The need to ensure the public-good effects associated with the commitment to fight poverty in a given region create the conditions for the time-inconsistency of donors attempts to discipline MFIs. Morduch (2000) argues that maintaining `hard' budget constraints and clear performance criteria are key to push managers to cope with failures and improve efficiency, even in nonprofit programs.

Second, there is the traditional moral hazard argument, related to the information problems of donors. Concretely, managers and workers of MFIs take advantage of the high cost of monitoring by donors to shirk, gather perks or extract wage-rents. The monitoring problems that are the backbone of these theories are clearly pervasive in the sector. Donors are often geographically far away from the MFI's operations, and lack the information or the knowledge

about the inner workings of the sector. Moreover, the lack of reliable information, the inadequate bookkeeping, and insufficient disclosure of the sector makes it difficult to monitor the use of donated funds or measure their effectiveness. For example, in 2004, after a peer-review headed by CGAP and DFID, the European Commission chose to stop funding most credit lines to MFIs, due to the lack of internal expertise and the poor management of its schemes (Domes, 2005). According to Bhutt and Tang (2001), subsidies to microfinance NGOs end up funding inefficient and lax management practices resulting in limited outreach and high loan default. They argue that, in addition to wasting resources, this hinders the incentives for MFIs to become independent from donors.

On the other hand, there are several reasons to expect that subsidies may contribute to increase the efficiency of MFIs. In particular, subsidies allow institutions the breathing space to invest in the development of its infrastructure and human resources to increase efficiency and quality of service in the long-run. Such relaxation of the liquidity constraint is particularly important in a sector with limited access to banks and capital markets, due to tradition, ownership structures and mission statements[4]. Along these lines, Armendariz and Morduch (2005) argue for targeting subsidies in financing start-up expenses and institutional capacity building.[5] Morduch (2007) suggests that financing of costs occurred when the institution expands in new areas or when it starts almost from scratch might be appropriate. Overall, the notion of "smart" subsidies seems to make the case for a limited level of subsidization, suggesting that the efficiency-enhancing effects of subsidies are likely to peter out, when the levels of subsidy intensity go beyond a certain threshold. Balkenhol (2007) argues that the extent of disincentives depends on the intensity, entry point, dosage, timing and phasing-out.[6]

4 Econometric framework

4.1 Specification

The main costs of the loan granting activity of MFIs include the financial costs of accessing loanable funds, the fixed costs of supporting the MFI and the administrative costs of maintaining a relationship with borrowers for the provision of loans.[7] Given the loan methodologies in microfinance, the relationship with borrowers, including the gathering of information, the monitoring of borrowers or the collection of late payments, is the main component of the cost structure, occupying the bulk of the staff time and cost. In theory, this cost should depend on the actual number of borrowers, the numbers of loans provided to each, and the value of each loan. However, experience from microfinance organizations suggests that once a relationship with a client is established, the marginal costs of providing additional or larger loans amount only to the financial cost of the funds lent, while the marginal administrative cost is small. Hence, we use an index of staff productivity defined in terms of the number of borrowers - borrowers per staff - to capture the efficiency of an MFI.[8]

We assume that productivity, denoted by A_i, is a random variable determined by:

$$\ln A_i = \beta_0 + \beta_1 s_i + \beta_2 s_i^2 + \beta_z \ln z_i^y + \beta_y \ln y_i^* + \beta_g g_i + \beta_d d + \varepsilon_i \qquad (1)$$

where s is the subsidy intensity, $z_i^y \equiv z/\tilde{y}$ is the average loan size (z) (scaled) by the GDP per

capita ($\tilde{y}$), g is the size of the MFI, $\tilde{y}_i^*$ is the GDP per capita, PPP in 2000 international dollars, d is a set of dummy variables controlling for the region and governance model (for-profit, non-profit and cooperative).

4.2 The efficiency tax

The term: $-(\beta_1 s_i + \beta_2 s_i^2)$ is the efficiency tax from subsidies, which is the main focus of our analysis. Following Balkenhol (2007), we assume that the extent of disincentives from subsidies depends on their intensity. Note that, given the logarithmic specification for the dependent variable, the efficiency tax measures approximately the proportional increase or decrease in productivity, relative to the benchmark of no subsidies. The efficiency reducing effects of subsidies due to moral hazard or soft-budget constraints raise the efficiency tax. On the other hand, the efficiency enhancing effect of "smart subsidies" lowers the efficiency tax. Ultimately, the subsidy tax captures the net effect of these two forces, and, therefore, can be positive or negative.

We also compute the marginal efficiency tax: $-(\beta_1 + 2\beta_2 s_i)$, capturing the impact of a marginal increase in subsidy intensity on the efficiency tax. Our working hypothesis is that the marginal efficiency tax is increasing in s (i.e. $\beta_2 < 0$). It draws on two compounding arguments. First, the notion of "smart subsidies" suggests that the efficiency-enhancing effects of subsidies peter out when the levels of subsidy intensity become exaggerated. Second, moral hazard and soft-budget constraint effects are likely to worsen at a high subsidization rate.

An increasing marginal efficiency-tax implies that, at the margin, the efficiency-

enhancing effects of subsidies are likely to be stronger at lower levels of subsidy intensity, whereas the efficiency-taxing effects are likely to strengthen as the level of subsidization increases. Note that an increasing marginal efficiency tax has two important implications. First, it allows for an optimal, finite level of subsidization, when and if the marginal efficiency is zero. Second, it means that the absolute (and average) efficiency tax is large, and more likely to be positive at higher levels of subsidization.

4.3 Additional controls

Eq. (1) is clearly not exhaustive in outlining the drivers of productivity. Our parsimonious specification is driven by the availability of data and by our main focus on estimating the efficiency-tax from subsidies. Nevertheless, we include a few additional controls, which are important because, due to the potential correlation with the extent of subsidization, their omission would bias the estimates of the efficiency tax.

In particular, we first include a control for size, g, that captures economies of scale, namely due to the higher incentives to adopt labor saving information technologies. Our measure of size is computed using the methodology developed by the MicroBanking Bulletin.[9]

Second, we include a control for benchmark productivity of the labor force. In the absence of staff profiles or worker characteristics, at level of the MFIs, we use GDPpc,PPP ($\tilde{y}_i^*$), implicitly assuming that benchmark productivity in an institution is correlated with average productivity in the country. It is important to include this control, due to potential negative correlation between GDPpc,PPP and the subsidy intensity, to the extent that donors target

countries or regions with lower standards of living and higher poverty rates. If we were to omit this control for GDPpc,PPP, we would introduce a bias in the estimate of the coefficients on subsidies to zero.

Last but not least, and as it is well-established in the microfinance literature (Balkenhol, 2007), the average loan size (z) is an indicator of the poverty incidence of the MFI, since it is associated with the income level of its clients. It reflects the debt absorption capacity of clients and the MFIs poverty focus. The inclusion of a control for z_i^y in (1) captures the notion that MFIs serving borrowers with higher income levels must provide a better quality of service, and thus incur in a higher staff time per borrower, which implies that $\beta_z > 0$. Given the commitment of donors to the social mission of microfinance of providing loans to the poor, the subsidy intensity (s) and the loan size (z^y) is likely to be negatively correlated. For this reason, the omission of $\ln z^y$ in is likely to bias downward the estimate of the efficiency tax.

5 Econometric results

5.1 Data

Our sources include the ratings reports described above, for all data concerning the MFIs, and the World Development Indicators (WDI) for country data on GDPpc, in LCU and PPP. A measure of productivity - borrowers per staff - is provided in the ratings data. Data on loans is obtained from the balance sheets, in local currency, and averaged for the beginning and end of

the year. Then we divide it by the number of borrowers and scale it by GDPpc,LCU, to obtain the loan size per borrower by GDPpc, z_i^y. For all variables, data is averaged across the years in the sample to produce a cross-section dataset.

Out of the 100 institutions, 22 are also active in the savings sector, receiving deposits from their clients. We ignore these MFIs in our regressions, because the data does not allow us to separate the costs of each activity. In so doing, we avoid potential contamination of our results from savings activity. Our results are robust to including these MFIs, although the effect of savings activity on the MFIs administrative costs is unclear.

On the other hand, in our sample, 3 MFIs present very high levels of subsidization. Using the method of Hadi (1992, 1994), we can identify these as outliers with a significance of 0.0001. In addition, 2 MFIs lack data needed to obtain the dependent variables. In our regressions, we eliminate these 27 observations from the sample, leaving a final sample of 73 MFI. Moreover, data on GDPpc,PPP is not available for Serbia and Montenegro in WDI, which leaves only 71 MFIs, when the variable is included in the regressions. Table 1 provides the main descriptive statistics and Table 2 the correlations for the restricted sample.

TABLE 1 HERE + TABLE 2 HERE

5.2 Results

Table 3 presents the OLS regression results for the specification in (1). The R^2 is around 0,1 showing that the model does not capture the full extent of the determinants of productivity. The controls show signs in accordance with our predictions, although most are not statistically

significant.[10] First, an increase in the average loan size reduces productivity, - capturing the notion that the MFIs customers are likely to be among the better off, requesting a higher level of service. Likewise, GDPpc,PPP, a measure of overall country-level productivity, increases the efficiency of MFI staff. Finally, staff productivity is higher in larger MFIs, as they benefit from economies of scale and cost-spreading of IT fixed costs.[11]

TABLE 3 HERE

In terms of the estimates of the efficiency tax, the main results are as follows. The estimated coefficients of the quadratic and linear terms with subsidy intensity are significant in all specifications, provided a control for ln GDPpc is included. While the quadratic term has a consistent negative sign, the coefficient of the linear term is consistently positive. This implies that the marginal efficiency tax is increasing in subsidy intensity, being negative for small levels.

The implications for the efficiency tax can be seen in Fig. 1, which plots the efficiency tax, obtained from the estimates of regression 1, along with the cumulative distribution of subsidy intensity for the 73 MFI's included in the regression. The efficiency tax is negative and decreasing for low levels of subsidy intensity. It reaches a minimum for levels of subsidy intensity around 0,88 (when the marginal tax is zero), and starts increasing after that. The estimated efficiency tax is zero for a subsidy intensity of 1,74. In our sample of 73 MFI, this implies that for virtually the whole sample, MFIs that receive subsidies are more productive than those that do not. However, 26% of the MFIs are in the region where a decline in their level of subsidization would increase their efficiency, at the margin (i.e. the marginal efficiency tax is positive).

FIGURE 1 HERE

Our interpretation of these results is that they support both strands of the policy debate. On one hand, the role of subsidies in helping MFIs increase their efficiency, by providing the liquidity to improve the human and physical infrastructure, is well borne out in the data. Although our data on subsidies does not allow us to identify empirically the "smart subsidies", our results are in accordance with the principles argued by Armendariz de Aghion and Morduch (2004), that small levels of subsidization are more likely to produce positive effects. On the other hand, the scope for an efficiency-taxing effect, based on notions of moral hazard, is also supported by the data. Such effects seem to be dominant, at the margin at higher levels of subsidy intensity.

Our results also provide a first response to the question raised by Lapenu (2000) and Balkenhol (2007) about the acceptable level of subsidies. If the cost of subsidy is zero and subsidies aim at increasing efficiency, the optimal level of subsidy intensity is the one that equates the marginal efficiency tax to zero, when the efficiency tax is minimal. All subsidization beyond this implies that funds (subsidies) are being used to reduce the efficiency. Of course, it is possible and likely that subsidies are targeting other goals, such as lowering the interest rates. In this case, our results suggest that donors should only worry about the potential adverse incentive effects when the subsidy intensity rises above 0,88.

5.3 Estimation Biases

A fundamental concern is the endogeneity of the MFI's subsidy intensity. The argument is straightforward: if donors have ulterior motivations to support effects of an MFI's work on the

ground they are likely to provide additional subsidies if the productivity of an MFI is low and its sustainability is threatened. This notion implies that the estimates of the efficiency tax we obtained using OLS are biased upwards. From this perspective, the qualitative results of the previous section, which suggest a negative efficiency tax, are not challenged by the endogeneity bias. On the contrary, this bias suggests that the efficiency enhancing effects of subsidies are likely to be stronger than those found in the previous section.

Traditional forms of correcting for the endogeneity bias imply the use of instruments, i.e. MFI- specific variables that are correlated with the Subsidy Intensity, but which are not driven by changes in Productivity. Unfortunately, the ratings data does not provide information that could be used as an instrument.

Another concern is that two of our controls in (1), namely the Loan Size and GDPpc,PPP, are also important determinants of subsidy intensity, since they are a measure of the poverty incidence of the MFIs activities, and thus related to the ability to lobby donors for funds. However, the role of these controls as determinants of the subsidy intensity does not bias our estimates of the efficiency-tax, provided we include them as controls in the regression. Technically, the role of GDPpc,PPP and Loan Size as determinants of subsidy intensity create potential multicollinearity, hence overblown standard errors, and not estimation bias.

5.4 Robustness: Yaron's SDI

The measure of subsidy intensity used above is one of the many used in microfinance. Another measure commonly used is Yaron's subsidy dependence index. The latter is defined as

the ratio of subsidy to revenue from lending, and captures the percentage change in the yield on lending that, all else constant, would allow the MFI to compensate society for the use of public funds, on a yearly basis (Schreiner and Yaron, 1999).

Because our data provides excellent data on the historical stock of subsidies, our most obvious approach was to define subsidy intensity in relation to the stock of equity. In this section, we test the robustness of our results to the use of a subsidy intensity measure that is more closely related to Yaron's. Hence, we define a modified subsidy dependence index (mSDI), which takes the ratio of donated equity, rather than subsidies per year, to revenue from lending.

Table 4 presents the OLS regression results with the mSDI as the subsidy indicator. Like before, the results exhibit low levels of R^2. The estimated coefficient of $mSDI^2$ is negative and that of mSDI is positive, confirming the results of the previous regressions. Nevertheless, the results now exhibit lower levels of significance, where only the coefficient om the quadratic terms is significant in the second and third regressions.

TABLE 4 HERE

6 Concluding Remarks

Delivering credit, savings or insurance through MFIs should reduce transaction costs and informational hurdles and improve the access of the poor to financial services. To this end, donors should aim at building a more inclusive financial sector large without creating aid dependence or weakening incentives to reach sustainability (Hardy et al., 2002, p. 13). Donors'

challenge is thus to design efficient or " smart subsidies" which are not likely to introduce long-term subsidy dependence (UNCDF, 2005).

Our results suggest that subsidies have had a positive impact on efficiency, but over-subsidization of a MFI can be counter-productive. For the vast majority of MFIs in the sample, the subsidies they obtain allow them to have a higher productivity than MFIs that are not subsidized. The marginal effect on efficiency however becomes negative above a threshold, and a quarter of the MFIs in our sample are in this condition. For them, reductions in the levels of subsidization should increase efficiency.

From a policy standpoint, these results support both strands of the policy debate, confirming Balkenhol's (2007) notion that the effect of subsidies depends on their intensity. On one hand, the role of subsidies in helping MFIs increase their efficiency, by providing the liquidity to improve the human and physical infrastructure is well borne in the data. This effect is stronger and dominant at lower levels of subsidy intensity which in turn lends support to the "smart subsidies" idea, that take into account the intensity and magnitude of the subsidies. On the other hand, the scope for an efficiency-taxing effect, based on notions of moral hazard, is also supported by our empirical analysis, and seems to be dominant at the margin and at higher levels of subsidy intensity.

One point to note is that our measure of subsidy intensity covers only subsidies in the form of equity due to availability of data. Although we have shown that these subsidies matter, it might be argued that subsidies that cover operational expenses are even more likely to generate an efficiency tax. Lack of data prevents us from addressing this question, which remains a challenge for future work. Likewise, the correction of the endogeneity bias using an

appropriate instrument also remains a challenge.

7 References

Armendariz de Aghion, B. & Gollier, C. (1999). Peer group formation in an adverse selection model. *The Economic Journal*, 110(465), 632 -- 643.

Armendariz de Aghion, B. & Morduch, J. (2004). Microfinance, Where do we stand? In C. Goodhart (Ed.), *Financial development and economic growth: Explaining the links* (pp. 135-148). London: Palgrave.

Armendariz, B. & Morduch, J. (2005). *The economics of microfinance*. Boston: MIT Press.

Balkenhol, B. (2007), *Microfinance and public policy. Outreach, performance and efficiency*, New York: Palgrave Edition.

Besley, T. & Ghatak, M. (2005). Competition and incentives with motivated agents. *American Economic Review*, 95(3), 616--636.

Bhutt, N. & Tang, S.-Y (2001). Delivering microfinance in developing countries: Controversies and policy perspectives. *Policy Studies Journal*, 29(2), 319-333.

Brand, M. (2000). More bang for the buck: Improving efficiency. *MicroBanking Bulletin*, 4, 13 -18.

Christen, R. (2000). Bulletin highlights. *MicroBanking Bulletin*. 4, 41-47.

Consultative Group to Assist the Poor (CGAP) (2003). *Definitions of selected financial terms ratios and adjustments for microfinance*. Washington D.C.: CGAP.

Consultative Group to Assist the Poor (CGAP) (2004). *Building inclusive financial systems:*

Donor guidelines on good practice in microfinance. Washington D.C.: CGAP.

Consultative Group to Assist the Poor (CGAP) (2005). *Mapping of funding flows*, CGAP, Washington D.C.

Cull, R., Demirgüç-Kunt, A. & Morduch, J. (2006). Financial performance and outreach: A global analysis of leading microbanks. *World Bank Policy Research Working Paper*, 3827.

Dewatripont, M & Maskin, E. (1995). Credit and efficiency in centralized and decentralized economies. *Review of Economic Studies*, 62, 4, 541-555.

Diop, A., Hillenkamp I. & Servet, J.-M. (2007). Poverty versus inequality In B. Balkenhol (Ed.), *Microfinance and public policy. Outreach, performance and efficiency (*27-46). New York: Palgrave.

Domes, D. (2005), *The European Commission's approach to microfinance*, European Dialogue Conference -- Luxembourg Round Table on Microfinance, 17 October 2005.

Ghosh, S. & Van Tassel, E. (2007). *Microfinance, subsidies and dynamic incentives*, University of Florida Working Paper.

Guérin, I. (2006). Women and money: Lessons from Senegal. *Development and Change*, 37(3), 549-570.

Hardy, D., Holden, P. & Prokopendo, V. (2002), *Microfinance institutions and public policy*, IMF Working Paper, 02/159.

Hermes, N., Lensink, R. Mehrteab, H. (2005). Peer monitoring, social ties and moral hazard in group lending programs: Evidence from Eritrea, *World Development*, 33(1), 149-169.

Hermes, N. & Lensink, R. (2007). The empirics of microfinance: what do we know? *The Economic Journal* , 117, F1--F10.

Honohan, P. (2004). *Financial sector policy and the poor: Selected findings and issues*. World Bank Working Paper No. 43. Washington, DC: World Bank.

Hudon, M. (2006). *Financial performances, management and ratings of the microfinance institutions: Do subsidies matter?*, Université libre de Bruxelles Working Paper, 15.

Hulme, D. & Mosley, P. (1996). *Finance against poverty*. London: Routledge

Kornai, J., Maskin, E. & Roland, G. (2003), Understanding the soft budget constraint. *Journal of Economic Literature*, XLI, 1095-1136.

Labie, M. (2001), Corporate governance in microfinance organizations: a long and winding road. *Management Decision*, 39(4), 296-301

Lapenu, C. (2000). *The role of the state in promoting microfinance institutions*. Washington D.C.: IFPRI.

Mersland, R. & Ø ystein Strom, R. (2008). Performance and trade-offs in microfinance institutions -- Does ownership matter? *Journal of International Development*, 20, 5, 598-612.

MicroBanking Bulletin (2002). An introduction to the peer groups and tables. *MicroBanking Bulletin*, November 2002.

Morduch, J., (1999a). The microfinance promise. *Journal of Economic Literature*, 37, 1569-1614.

Morduch, J. (1999b), The role of subsidies in microfinance: Evidence from the Grameen Bank. *Journal of Development Economics*, 60, 229--248.

Morduch, J. (2000). The microfinance schism. *World Development*, 28(4), 617-629.

Morduch, J. (2005). Smart subsidy for sustainable microfinance,. *Finance for the Poor*, 6(4), 1-7.

Morduch, J. (2007). Smart subsidies In B. Balkenhol (Ed.), *Microfinance and public policy. Outreach, performance and efficiency (*pp. 72-83). New York: Palgrave.

Rowat, C. & Seabright, P. (2006). Intermediation by aid agencies. *Journal of Development Economics*, 79, 469-491.

Schreiner, M.. & Yaron, J. (1999). The subsidy dependence index and recent attempts to adjust it. *Savings and Development*, 23(4), 375-405.

UNCDF (2005). *Blue Book*. Geneva: UNCF Press.

Valenzuela, L. (1998). *Overview of MFIs fraud*, Cambridge: ACCION.

Zeller, M. & Meyer, R. (2002). *The triangle of microfinance: Financial sustainability, outreach and impact*. Baltimore: Johns Hopkins University Press.

[1]See, for example, CGAP (2004), Morduch (2005) and (UNCDF, 2005)

[2]Other effects of subsidies in the sector are often mentioned. Many commentators stress the role of subsidies in supporting the low interest rates that make loans affordable to the poorer of the poor. For instance, Zeller and Meyer (2002) argue that " reaching large numbers of the poorest may therefore justify the provision of subsidies to MFIs specialized in serving them" . On the other hand, CGAP (2006) argues that excessive subsidisation hurts the sector by creating hurdles for the emergence of private actors (e.g. commercial banks).

[3]Honohan (2004) finds that " the largest 30 microfinance firms account 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)."

[4]On the distinction between " mission-oriented" nonprofit organizations and " profit-oriented" , see Besley and Ghatak (2005), Guérin (2006) or Labie (2001)

[5]Armendariz de Aghion and Morduch (2004) also emphasize the *form* of subsidies, arguing that " smart" subsidies should be transparent, rule-bound and time-limited.

[6]Another interesting argument is raised by Rowat and Seabright (2006). They provide a model where aid agencies pay below market wages, as a commitment device to reassure donors against the misuse of their funds. From this perspective, we might expect that organizations that are more subsidized have to pay lower wages to attract donors funds. In this case, although productivity is not affected the actual staff cost of the MFI with higher subsidy is lower, which implies an increase in the wage-adjusted productivity.

[7]Note that we are ignoring the costs associated with savings activity. In the empirical section, we will eliminate from the sample all MFIs with savings activities.

[8]As argued by Christen (2000), measuring efficiency using resources per borrower has the additional benefit of neutralizing the effect of loan size. The alternative of using the cost per dollar of loan, institutions serving the low-end market are likely to be, on average, more efficient than broad and high-end programs.

[9]The scale is measured by the size of the institution's loan portfolio. The measure of scale is regionalized to reflect differences in income levels across regions (Microbanking Bulletin, 2002). See Appendix 1.

[10]In all cases, controls for the region and governance of the organizations were non-significant, and we omit them from the regressions throughout the paper. These results are in line with Mersland and Strø m (2008).

[11]Regarding some potential heteroskedasticity, the OLS-regression adequacy has been checked using graphical (plot of the residuals versus fitted values) and non-graphical methods (White test). The results comfort us regarding the homogeneity of variance of the residual. Moreover, in the table, we report robust t-statistics, using White's robust covariance estimator to obtain the standard errors (Stata's "robust" extension).

Table 1 : Descriptive Statistics

Name	Min	Mean	Std. Dev.	p25
Ln Productivity (Borrowers per staff)	3,045	4,571	0,612	4,190
Subsidy Intensity 1 (SUB = Donated Equity/ Total Equity)	0,000	0,607	0,474	0,190
Subsidy Intensity 2 (mSDI = Donated Equity/ Revenue from lending)	0,000	1,913	4,046	0,182
Ln Loan Size per Real GDP per capita	-9,783	-2,557	2,848	-4,433
LN Real GDP per capita	6,932	8,384	0,523	8,040

p25, p50 and p75 refer to 25%, 50% (Median) and 75% percentiles

Table 2: Correlation matrix

N = 71	ln Prod.	SUB	ln LOSZ	ln GDPpc	mSDI
ln Prod.	1,0000				
SUB	0,1001	1,0000			
ln LOSZ	-0,1581	-0,0756	1,0000		
ln GDPpc	0,1245	-0,1905	-0,4206	1,0000	
mSDI	-0,0286	0,4104	-0,1663	-0,2311	1,0000

where
Ln Productivity = Ln (Borrowers per staff)
SUB = Donated Equity/ Total Equity
ln LOSZ = LN (Loan Size per Real GDP per capita)
ln GDPpc = LN (Real GDP per capita)
mSDI = Donated Equity/ Revenue from lending

Table 3 - The Efficiency Tax and Subsidy Intensity

	1	2	3	4
SUB^2	-0.408*	-0.433*	-0.478*	-0,26
	[2.13]	[2.44]	[2.58]	[1.44]
SUB	0.717+	0.798*	0.869*	0,395
	[1.73]	[2.11]	[2.24]	[1.05]
ln LOSZ	-0,032		-0,022	-0.050+
	[1.10]		[0.90]	[1.73]
ln GDPpc	0,19	0,261	0,19	
	[1.04]	[1.46]	[1.05]	
Size	0,137	0,092		0,193
	[1.12]	[0.85]		[1.55]
Constant	2,599	2,081	2.678+	4.207**
	[1.63]	[1.31]	[1.69]	[25.26]
Observations	71	71	71	73
R-squared	0,11	0,09	0,09	0,09

Dependent variable is Ln Productivity

SUB is Donated Equity/Total Equity

OLS estimates, with Robust White t statistics in brackets: + 10%; * 5%; ** 1%

Inavailability of data for GDPpc,PPP for Serbia and Montenegro implies that, when lnGDPpc,PPP is included, two observations of MFIs from this country must be removed from the sample.

Additional controls for Governance and Region were included in the regression but were consistently not significant. We omit them for reasons of space.

Table 4 - The efficiency tax with modified SDI (mSDI) as subsidy intensity

	1	2	3	4
mSDI^2	-0,022	-0,024+	-0,026+	-0,019
	[0,015]	[0,015]	[0,015]	[0,014]
mSDI^2	0,129	0,152	0,165	0,092
	[0,121]	[0,113]	[0,116]	[0,109]
ln LOSZ	-0,027		-0,016	-0,037
	[0.030]		[0,027]	[0,029]
ln GDPpc	0,100	0,164	0,11	
	[0,196]	[0,187]	[0,194]	
Size	0,149	0,112		0,187
	[0,128]	[0,116]		[0,123]
Constant	3,482*	3,020+	3,501*	4,316**
	[1,704]	[0,650]	[1.6726]	[0,162]
Observations	72	72	72	74
R-squared	0,0728	0,0616	0.0548	0.0864

Dependent variable is Ln Productivity

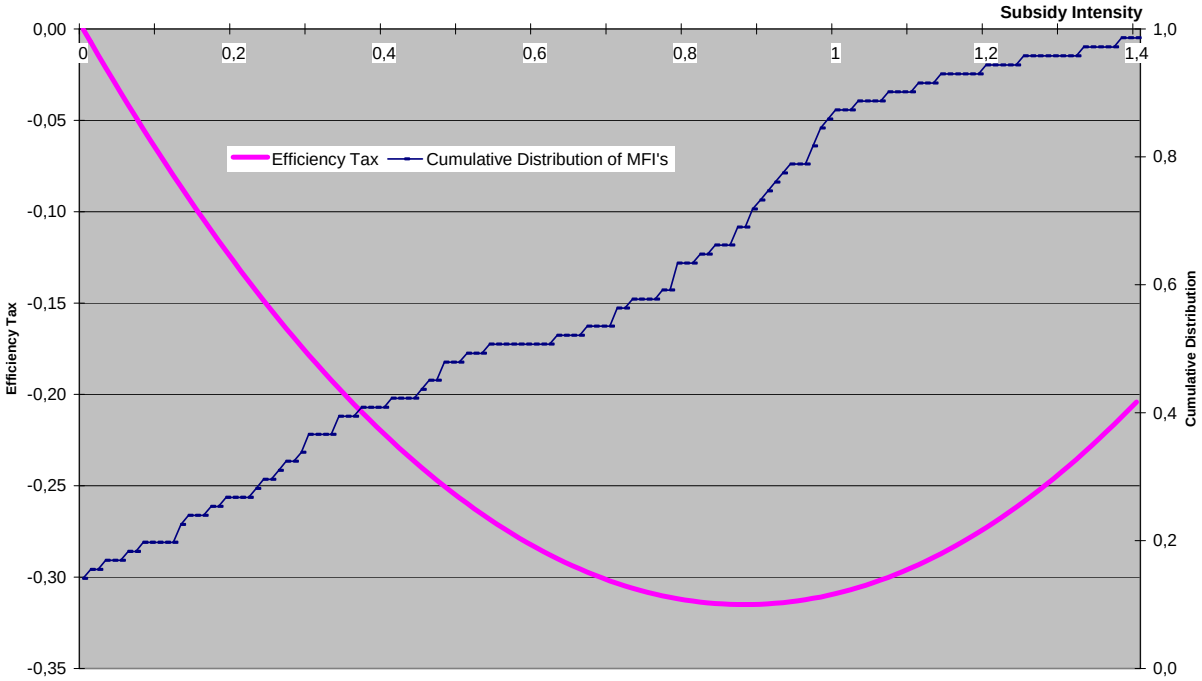
Modified SDI (mSDI) is Donated Equity/Revenue from Lending

OLS estimates, with Robust White t statistics in brackets: + 10%; * 5%; ** 1%

Inavailability of data for GDPpc,PPP for Serbia and Montenegro implies that, when lnGDPpc,PPP is included, two observations of MFIs from this country must be removed from the sample.

Additional controls for Governance and Region were included in the regression but were consistently not significant. We omit them for reasons of space.

Figure 1: Cumulative Distribution of Subsidy Intensity in the Sample and Efficiency Tax



Appendix 1: Size categories; The Microbanking Bulletin Methodology

Region	Scale of Operations[1] Total loan portfolio (US$)
Africa Africa/ MENA[2] Asia (Central)	Large: > 5 million Medium: 800,000 to 5 million Small: < 800,000
Asia (Pacific) Asia (South)	Large: > 8 million Medium: 1 to 8 million Small: < 1 million
Eastern Europe Latin America	Large > 10 million Medium: 1.5 to 10 million Small: < 1.5 million

1 Criteria for classification of scale of operations varies by region. See corresponding group of regions.

2 MENA = Middle East/ North Africa.

Source: http://www.mixmbb.org/en/company/our_methodology.html