Too Many Cooks Spoil the Broth: The Conflicting Impacts of Subsidies and Deposits on the Cost-Efficiency of Microfinance Institutions

Anastasia Cozarenco*
Montpellier Business School, Montpellier Research in Management, and Centre for European Research in Microfinance (CERMi), France

Valentina Hartarska
Auburn University, USA

Ariane Szafarz
Université Libre de Bruxelles (ULB), SBS-EM, Centre Emile Bernheim, and CERMi, Belgium

This version: December 2018

Keywords: Microfinance, cost efficiency, scale economies, subsidies, deposit accounts

JEL Codes: O14, D24, G21, O16, F35

Acknowledgements: The authors thank Emir Malikov for helpful comments.

*Corresponding author. Address: Montpellier Business School, 2300, avenue des Moulins, 34185, Montpellier cedex 4; France. Email: a.cozarenco@montpellier-bs.com, Phone: +33.4.67.10.26.35.

Too Many Cooks Spoil the Broth:
The Conflicting Impacts of Subsidies and Deposits on the Cost-Efficiency of Microfinance Institutions

Abstract

The costs and benefits of subsidized microfinance are still a controversial topic. We evaluate how subsidies affect the cost-efficiency of microfinance institutions (MFIs). At the same time, we account for endogenous self-selection into the business models of credit-only versus credit-plus-deposit MFIs. Our findings draw a contrasting picture. First, they suggest that unsubsidized credit-plus-deposit MFIs have achieved optimal capacity and therefore constitute the most cost-efficient group of institutions in our sample. Second, the unsubsidized credit-only MFIs are the farthest away from their minimum cost. Between the two polar cases, there are subsidized institutions, among which the credit-only ones are closer to optimal capacity. Our results reveal the redundancy between subsidization and deposit-taking in microfinance. In conclusion, combining funds from donors and depositors tends to harm cost-efficiency.

1. Introduction

Microfinance institutions (MFIs) are double-bottom-line organizations providing financial services to the poor and the unbanked (Armendariz and Morduch, 2010; Battilana and Dorado, 2010). They benefit from subsidies in various forms, such as in-kind grants and soft loans (Hudon et al., 2018). Yet, subsidies entail the possibility of perverse effects, such as a soft budget constraint (Kornai, 1986), dependence on donors' money, and low cost-efficiency[1] (Caudill et al., 2009 and 2012). The costs and benefits of subsidized microfinance are still a controversial topic (Khachatryan and Hartarska, 2017; Cull et al., 2018). This paper contributes to the literature by focusing on how subsidies impact on the cost-efficiency of MFIs. In line with Malikov and Hartarska (2018), we estimate cost functions with an econometric design that acknowledges the endogenous self-selection into the business models of credit-only versus credit-plus-deposit MFIs.

Existing evidence on the role of subsidies in microfinance is mixed. On the one hand, subsidies are vital for MFIs' operations, not only during the start-up phase (Morduch, 1999; Hudon and Traça, 2011) but also for mature institutions (Cull et al., 2018). On the other hand, the failure of state-funded microfinance programs—such as in India in the 1970s—raises doubts about the cost-efficiency of subsidized microfinance (Binswanger and Khandker, 1995). Arguably, a closer look at the factors linking subsidization and the other sources of MFIs' funds might provide clues about how subsidies affect cost-efficiency. In turn, these sources of funding depend on the type of financial products that institutions supply.

MFIs worldwide address their social mission with various business strategies, depending inter alia on their stakeholders' vision and on local legal constraints (Hartarska and Nadolnyak, 2007). While some MFIs stick to the traditional model of credit-only services, many others

[1] For surveys of the literature on the efficiency of financial institutions see Berger and Mester (2003), Berger and Humphrey (1997) and Berger et al., (1993). For a recent meta-analysis on the efficiency of MFIs see Fall et al., (2018).

have jumped on the deposit-taking bandwagon (Cull et al., 2016; Labie et al., 2017). Microfinance has become a heterogeneous sector where microcredit-only providers co-exist with MFIs that also take deposits. For the latter institutions, subsidies and deposits may act as substitutes rather than sources of complementary funding (Cozarenco et al., 2016). This paper explores how the subsidy/deposit duality can help understand the contrasted findings on cost-efficiency in microfinance.

Product diversity makes it harder to estimate the efficiency of MFIs. Previous studies circumvented the problem by assuming that all MFIs have the same underlining technology, with credit-only MFIs simply producing zero savings (Hermes et al., 2011; Hartarska et al., 2013b). This assumption was needed to adapt the classical banking-efficiency approach (Berger and Humphrey, 1991).[2] Grouping heterogenous MFIs also enabled scholars to use small datasets to estimate scope and scale economies for the whole industry, a convenient way of linking inefficiencies to governance mechanisms (Hartarska et al., 2014; Delgado et al., 2015).[3] The two main takeaways from this stream of articles are that, unlike banks, MFIs have scope economies from savings and loans, and that savings function as an output (Delgado et al., 2015; Hartarska et al., 2011).

Recent work has shown, however, that credit-only and credit-plus-deposit MFIs use different production processes (Malikov and Hartarska, 2018). Institutions collecting savings offer an additional financial service, likely associated with a specific production technology, to keep costs at minimum. Therefore, empirical work has to account for self-selection of MFIs into either business model (credit-only or credit-plus-deposit). Failure to account for this differentiation runs the risk of overestimating economies of scope and scale. This paper takes

[2] The social orientation of MFIs implies that the measurement of inputs and outputs departs from standard banking models. Hartarska et al. (2010) argue that the number of active borrowers and savers are relevant output variables that reflect MFIs' mission to serve many poor clients.

[3] In this type of framework, product diversification is addressed with dummy variables and adjustments in the functional form to account for zero outputs (no savings) via a semiparametric smooth coefficient model (Hartarska et al., 2011; Delgado et al., 2015), or adaptation of the translog (Caudill et al., 2009; Hartarska et al., 2011). Both methods can handle, albeit imperfectly, zero outputs for credit-only MFIs.

this message seriously. It evaluates the cost-efficiency of subsidization in credit-only and credit-plus-deposit MFIs by estimating a multivariate cost function that acknowledges MFI self-selection into a business model.

Another novel feature of our approach concerns how we specify the output variables to capture the social mission of outreach maximization. This social orientation of MFIs implies that the measurement of inputs and outputs departs from those in standard banking models. In line with Hartarska et al., (2010), we consider that the number of active borrowers and savers is a relevant output variable that reflects the MFI mission of serving many poor clients. However, we refine the methodology by distinguishing between true savings, which are the voluntary, and the mandatory savings that substitute for collateralization in microfinance lending technology. In our model, only voluntary savings correspond to an output that meets clients' needs.

We use high-quality data covering 765 MFIs active in 91 countries between 2004 and 2013. The dataset contains detailed information on subsidies and voluntary savings. Our main empirical result shows that the group of unsubsidized credit-plus-deposit MFIs is the only one to operate at minimum costs and so achieve constant returns to scale. The results suggest that deposit collection helps MFIs free themselves from subsidy dependence. This argument rationalizes the findings of Cozarenco et al. (2016) that MFIs collecting savings receive fewer subsidies than their credit-only counterparts. In addition to its well-known effect of increasing social impact (Karlan et al., 2014), deposit-taking is apparently beneficial for cost minimization.

Our results also indicate that subsidized credit-only MFIs have lower costs than their unsubsidized counterparts, suggesting that subsidies and deposits act as substitutes rather than complements. These findings suggest that subsidies have a positive, and less distortionary, role when supporting traditional credit-only MFIs. Importantly, the effects we find reflect the fact that business models might be endogenous. In the short run, savings collection can be restricted by contextual reasons, such as characteristics of the pool of borrowers or the legal system in which MFIs operate. Yet, these reasons typically hold in the short run only. In the longer run, deposit-taking may provide an opportunity for a wide variety of MFIs to reach financial self-sustainability.

The rest of the paper is structured as follows. The next two sections present methods and data, successively. Our regression results are featured in Section 4, while Section 5 checks the robustness of our findings using an alternative estimation approach. Section 6 concludes.

2. Methods

Following the literature, we use a model based on a cost function rather than a production function (Malikov and Hartarska, 2018). From a methodological perspective, the cost function is more appropriate when firms have monopoly power in the output market but are price-takers in the input markets (Varian, 1984). MFIs have market power in the output market because they cater to poor clients who are not served by banks. At the same time, MFIs are price-takers in the input markets. They pay competitive salaries for relatively skilled labor, and attract funding (equity, loans and donations) from both local and international financial markets. MFIs also pay competitive prices for the physical assets they purchase on local markets. In sum, the input prices are exogenous and the market for outputs is monopolistic. In terms of data requirements, the data needed for the cost function – output quantities, input prices and costs – are collected systematically by the industry. The alternative data needed to estimate a production function include the price of outputs, but MFIs do not collect helpful data on the interest they charge on their loans. In line with the microfinance literature, we use a translog cost function (Caudill et al., 2009; Hartarska et al., 2013a; Hartarska and Mersland, 2012). This section presents and justifies our methodological choices, including the definitions of the variables used in the estimation, while the next section describes our dataset.

We prefer joint modelling rather than the piling-up of univariate equations, for at least three reasons. First, the selection equation allows us to account for non-random selection of business models (credit-only vs. credit-plus-deposit). This selection is unlikely to be exogenous, and it can depend on unobservable factors (Malikov and Hartarska, 2018). We therefore consider explicitly the possibility of endogenous choice between credit-only and credit-plus-deposit MFIs. Second, we estimate separate cost functions for each business model. The alternative view that the production technology is the same for all MFIs is restrictive. Various factors affect MFIs' decision to take deposits. Those that transition from credit-only to credit-plus-deposit adapt their technology to produce two types of output at lower cost. Rather than postulating that credit-only and credit-plus-deposit MFIs have the same cost function, we bring the issue to the data and test the hypothesis of equal cost structure across business models. Last, estimating simultaneously the cost functions with the full sample is statistically more efficient than running univariate estimations on sample subsets.

In a nutshell, our empirical design is the following: We group the MFIs in our sample by business model (credit-only vs. credit-plus-deposit) and by subsidization status (subsidized vs. non-subsidized). This double segmentation leaves us with four categories of institutions, for which cost-efficiency will be first examined separately, and then compared. In the first step, we will jointly estimate the selection equation, the cost function and the cost shares (i.e. the shares of each input in total cost) by using the conditional mixed process (CMP). CMP operates like the usual seemingly unrelated regressions (SUR) used in multivariate model estimation, but it is more general, and therefore preferable in our context (Roodman, 2011). Moreover, the Heckman (1979) selection equation fits well with the SUR-CMP framework. We will estimate a set of similar equations for each of the four MFI categories. Each set includes four components: one selection equation, one cost equation, and two cost-share equations—one by input (labor and financial capital).

For expositional clarity, we omit the index for MFI category and write the estimated model as:

$$D = \mathbb{1}[\lambda_0 + \lambda' x + u > 0] \quad (1)$$

$$\ln C = \alpha_0 + \sum \alpha_j \ln q_j + \sum \beta_k \ln p_k + \frac{1}{2} \sum \alpha_{ij} \ln q_i \ln q_j + \frac{1}{2} \sum \beta_{lk} \ln p_l \ln p_k + \sum \delta_{jk} \ln q_j \ln p_k + \gamma' z + \ln v \quad (2)$$

$$s_k = \beta_k + \sum \beta_{lk} \ln p_l + \sum \delta_{jk} \ln q_j + \ln v_k, \quad k \in \{L, K\} \quad (3)$$

where L stands for labor and K for financial capital,[4] and the error terms are correlated gaussian variables (Roodman, 2011). Equation (1) is a probit selection equation, where D stands for selection into a business model; function $\mathbb{1}[\cdot]$ is the indicator, vector x includes the independent variables, λ is the vector of coefficients, and u is the error term. The rest of the system contains the standard translog cost function and cost shares equations that are well-known in the productivity literature. Specifically, Equation (2) is the outcome equation, where C is the total cost including labor, financial and physical capital expenses with corresponding input prices in p and outputs in q. For each MFI category, the parameters to be estimated are α, β, δ, and γ, while $\ln v$ is the error term. Equation (3) uses the cost shares to make the estimation of the cost function more efficient (León-Ledesma et al., 2010; Hartarska et al., 2013b). The dependent variables are the labor cost share, s_L (personnel expenses divided by total cost), and the financial cost share, s_K (financial expenses divided by total cost), derived from Shepherd's lemma, where:

[4] We impose homogeneity in input prices by normalizing the prices of labor and financial capital, and the total cost, by the price of physical capital.

$$s_k = \frac{\partial \ln C}{\partial \ln p_k}, \qquad k \in \{L, K\}$$

Let us now introduce the explanatory variables included in each equation. In equation (1), the independent variables in vector x include the age of the MFI, its legal status (dummy for an NGO) as well as the following country-specific variables: GDP per capita, share of rural population, financial depth, number of bank branches per 100,000 adults, ratio of remittances to GDP, number of internet subscribers per 100 adults, savings interest rate.[5] The share of rural population can impact the MFI's decision to supply deposit accounts, since both distance and lack of infrastructure can significantly increase the costs of serving the rural poor (Guérin et al., 2013). The financial depth, i.e. the ratio of the money aggregate, including currency and deposits (M2), to GDP, proxies the size of the financial sector (Beck et al., 2000 and 2007). The number of bank branches per 100,000 adults measures access to banking institutions (Honohan, 2008). The ratio of remittances to GDP is considered because remittances require savings accounts (Giuliano and Ruiz-Arranz, 2009; Aggarwal et al., 2011), and so increase demand for deposit services. Likewise, including the number of internet subscribers per 100,000 adults acknowledges that deposit services in remote areas rely on wireless technology, such as phone banking (Duncombe and Boateng, 2009). Last, the (gross) savings interest rate controls for MFIs' cost of capital.

In Equation (2), the expenses are measured by the average annual salary per staff member (personnel expenses in USD divided by average staff size), the cost of financial capital (financial expenses in USD divided by average borrowings plus average deposits), and the cost of fixed capital (administrative expenses over average net fixed assets). The output variables are determined according to the raison d'être of microfinance.

[5] For country-specific variables, we use the World Development Indicators database released by the World Bank.

In our model, credit-only MFIs have two outputs represented by the q variables: the number of borrowers, and the gross loan portfolio. For credit-plus-deposit MFIs, the list of outputs also includes the number of depositors, and the total volume of deposits. This specification of output variables is in line with the microfinance tradition (Hartarska et al., 2013b; Delgado et al., 2015; Malikov and Hartarska, 2018), but it departs from the usual banking approach where outputs are measured with dollar volumes only and deposits are considered as an input. The rationale for this difference is that, compared with banks, MFIs supply deposit products not so much to raise funds but to fulfill the social mission of addressing their clients' needs. In microfinance, reaching as many borrowers and savers as possible is at least as important as collecting large volumes of savings and extending larger amounts of loans (Armendariz and Szafarz, 2011; Hermes et al., 2011). The output measures we use combine dollar volumes and numbers of clients (borrowers or savers). These two-dimensional measures are consistent with the modified production approach (Berger and Mester, 1997) advocated by Hartarska et al. (2010) and Caudill et al. (2012) to represent the specific goals of MFIs. In addition, Malikov and Hartarska (2018) confirm empirically the relevance of treating deposits as an output.

However, we depart from previous microfinance studies on cost-efficiency by considering deposit accounts that receive voluntary savings only. Hence, we exclude from output the collection of compulsory savings, which MFIs impose on their borrowers. Compulsory savings are often characterized as the "hidden collateral" of microfinance loans (Armendariz, 2011). Voluntary savings, by contrast, drive demand for specific deposit products, which are valuable to poor people (Collins et al., 2009). Until recently, the lack of data made it impossible to disentangle the two types of savings, so that previous work used compulsory and voluntary savings indistinctly, even though the two types of savings serve different purposes and only the collection of voluntary savings is part of the social mission of microfinance. This study overcomes the data limitation by using a richer database. We argue that clearly delineating the deposits aligned with credit-plus-deposit MFIs' social mission reinforces the internal consistency of cost-efficiency assessment in microfinance. This delineation is one of the methodological contributions of our paper.

Still in Equation (2), the additional controls in vector z include an MFI's age as a proxy for possible cost reduction over time, a dummy variable for compulsory deposits, and the 30-day portfolio at risk, which is the common risk measure. Controlling for risk is essential when modeling the cost structure of financial institutions because MFIs exposed to higher risk levels and lower loan quality face higher costs (Hughes and Mester, 2013). Mill's ratio controls for potential selection biases.[6]

To make it easier to compute and interpret scale economies, we impose homogeneity in input prices by normalizing both the prices themselves and the total cost by the price of physical capital, and so introduce the following constraints in the estimation of the full model:

$\Sigma\beta_k = 1$, $\Sigma\beta_{lk} = \Sigma\beta_{kl} = 0$ over l and k and $\Sigma\delta_{jk} = 0$ $\forall$ q_j

We also demean the variables by dividing them by their respective means before normalization. With this approach, Equation (3) reduces to two share equations: one for the labor share, s_L,and the other for the financial capital share, s_K.

Once the coefficients of the whole system made of Equations (1) to (3) are estimated, the next step consists in computing the returns to scale associated with the four groups of MFIs. This phase of the analysis is key because the returns to scale will help us establish the impact of subsidies on cost-efficiency for each business model. The returns to scale are obtained by taking the derivatives of $\ln C$ with respect to outputs (Caudill et al., 2009). After demeaning input prices, the return to scale is the sum $\sum_{j=1}^{n} \alpha_j$, where *n*, the number of outputs, is equal to

[6] In the cost equation (2) and the cost-share equations (3), the standard errors of the coefficients are adjusted for selection bias, like in the standard Heckman (1979) model.

two for credit-only MFIs and to four for credit-plus-deposit MFIs. Having economies of scale—or increasing returns to scale—means that an increase in output results in a less-than-proportional change in total cost, holding all input prices constant. We test for economies of scale in each MFI category by performing Wald tests for the null that $\sum_{j=1}^{n} \alpha_j$ is equal one. The interpretation of the results is the following: If $\sum_{j=1}^{n} \alpha_j < 1$, there are economies of scale, meaning that the MFIs in the corresponding category can make costs savings by increasing their size. By contrast, if $\sum_{j=1}^{n} \alpha_j > 1$, there are diseconomies of scale, and downsizing is a cost-reducing strategy. If $\sum_{j=1}^{n} \alpha_j = 1$, constant returns to scale indicate that the MFIs have the optimal size in terms of cost minimization.

The last step of the empirical analysis introduces an additional methodological novelty in the cost-efficiency literature by using comparisons based on counterfactual cost functions. Specifically, we draw comparisons between unsubsidized and subsidized MFIs using the same model by deriving direct and counterfactual cost predictions. Since there are two cost equations per business model, we have two ways of identifying the effect of subsidies on cost efficiency. First, we can compare the estimated cost of a subsidized MFI with its counterfactual cost obtained from the cost equation estimated from unsubsidized MFIs. Symmetrically, we can compute the estimated cost of an unsubsidized MFI and contrast it with its counterfactual cost as subsidized. Thus, for each business model we use four cost prediction models: two for real costs, and two for counterfactual costs. In this way we will be able to assess, for each business model, the cost-efficiency gains and losses associated with removing and adding subsidies. These figures will in turn make it possible to compare the differential cost efficiency of subsidies for credit-only or credit-plus-deposit MFIs. The final objective is to check where subsidies are more efficient, and so gauge not only the distortions but also the potential merits associated with subsidizing credit-only and credit-plus-deposit MFIs separately while accounting for the endogenous self-selection into these two business models.

3. Data and Summary Statistics

Our data for the 2004-2013 period come from the Microfinance Information Exchange (MIX), a non-profit organization that facilitates access to reliable data in the microfinance sector. The sample consists of 1,805 MFI-year observation points concerning 765 MFIs from 91 countries.[7] The data are self-reported by the contributing MFIs, which serve a large proportion of the worldwide client base (Cull et al., 2009). Our data differ from those used in previous MFI efficiency studies in that they contain detailed information on subsidization and also differentiate between voluntary and compulsory deposits.

We use a conservative definition in which an MFI is subsidized if reports a positive total for donated equity in its balance sheet. Subsidies can be monetary or in-kind. Monetary subsidies are pure or conditional grants, and soft loans, i.e. preferential debt issued at below-market conditions. In-kind donations include labor, buildings, and equipment. Since total donated equity is a stock variable, unsubsidized MFIs have automatically zero accumulated donated equity, i.e. they never received donations. This approach allows us to exploit balance-sheet data, which contain donations accumulated since inception. Donated equity in the balance sheet is commonly used to assess subsidies flowing to MFIs (Hudon and Traça, 2011). For example, Cull et al. (2009) compute subsidy per borrower by dividing the donated equity by total funding. Likewise, Bogan (2012) determines the subsidization ratio as donated equity over total assets. An alternative definition of subsidies stems from the donations reported in the income statement (D'Espallier et al., 2017). We have opted for the more conservative approach in order to make our empirical results more robust.

An additional strength of the MIX dataset stems from the various adjustments that allow us to compare subsidized and unsubsidized MFIs in countries with different accounting standards. These adjustments are key to our purpose of comparing cost efficiency across

[7] We have excluded the 193 MFIs that changed their subsidization status during the observation period.

heterogeneous groups of firms. First, equity and fixed assets are adjusted for inflation. Second, the MIX determines the costs that subsidized MFIs would face if they were unsubsidized. The cost of funds is adjusted for loans at below-market concessional interest rates. The cost reduction is computed with respect to the prevailing market rates and added to the actual financial expenses reported in the profit and loss statements. The MIX also corrects the operating expenses by adding the estimated value of any in-kind donation received by the MFI. The final input prices of subsidized MFIs are the market prices that these institutions would have faced if there were no subsidy at all. Altogether, the adjustments make input prices comparable across MFIs, be they subsidized or not.

Table 1 presents a cross-tabulation by MFIs' business model and subsidization status. A substantial share of the institutions (493 MFI-year observations representing 27% of the full sample) take deposits, but these MFIs are unevenly spread across the subsidized and unsubsidized categories. Among the 1,209 observations of subsidized MFIs, 1,003 (83%) are credit-only, while the 596 observations of unsubsidized MFIs include 309 (52%) credit-only institutions. Unsubsidized MFIs represent one third of the full sample.

Table 2 shows summary statistics for the full sample, the credit-only MFIs, and the credit-plus-deposit MFIs, respectively. In each case, we run t-tests for the difference in means between unsubsidized and subsidized institutions. In the full sample, the unsubsidized MFIs incur total costs that are more than twice as large as those of their subsidized counterparts. The data confirm that unsubsidized MFIs face a significantly higher price of labor, defined as the personnel expenses in USD divided by staff size, and a higher price of fixed capital. Possibly, unsubsidized institutions operate in richer, more urban areas, and therefore pay higher wages. In addition, their typically for-profit status makes them less likely to attract voluntary staff. On the output side, the number of voluntary savers is much higher among subsidy-free institutions, a finding consistent with the evidence that subsidization is more prevalent in the set of credit-only MFIs. Unsubsidized lenders are less likely to require compulsory savings and have larger loan portfolio, suggesting that they supply larger loans. On average, the clients of unsubsidized institutions are less poor than those of subsidized institutions. This result supports the central social role of subsidies as a tool to help MFIs reach the poorest borrowers (Morduch, 1999). The loan portfolio and the total assets of subsidized MFIs are about half the size of those observed for unsubsidized institutions. Thus, the data suggest that unsubsidized MFIs are larger than subsidized MFIs. Another insightful variable is age, considered as a proxy for experience. The full-sample statistics in Table 2 reveal that, on average, the unsubsidized MFIs are older than their subsidized counterparts, but the gap—although statistically significant—is only six months.

Specific features of credit-only and credit-plus deposit MFIs deserve special attention. In contrast to full-sample findings, we observe that unsubsidized credit-only MFIs are at least three years younger than their subsidized counterparts. The figures are consistent with the findings of Cull et al. (2018) according to which the subsidies of credit-only MFIs tend to persist over time, so that older institutions can accumulate larger amounts and thus increase their chances of financial sustainability. If so, credit-only MFIs would find it harder to survive without subsidies. Among credit-plus-deposit MFIs, the relationship is reversed, and unsubsidized institutions appear to be one year older than their subsidized counterparts. The contrasting age-subsidization links across business models is a first, yet preliminary, piece of evidence suggesting subsidies and deposits can act as substitutes.

For credit-only MFIs, the gap in input prices associated with the presence of subsidies is greater than in the full sample. The price of financial capital is significantly higher in unsubsidized MFIs than in subsidized ones. This suggests that, given the nature of the subsidization adjustment described above, the aim of subsidies is to lower the cost of financial capital. No such difference is found for credit-plus-deposit MFIs. In the full sample and in the credit-only sub-sample, the risk levels seem unrelated to subsidization. By contrast, the figures reveal a significant (at the 10% level) and counter-intuitive difference in risk levels, suggesting that subsidy-free institutions serve riskier borrowers. Presumably, deposit-taking unsubsidized MFIs are more likely to operate in mature markets where competition is tougher, and delinquency is more frequent (D'Espallier et al., 2015). This explanation is consistent with Table 2 showing that unsubsidized credit-plus-deposit MFIs serve more savers than their subsidized counterparts, while there is no significant difference in the number of borrowers. These facts corroborate previous findings suggesting that subsidies might crowd out voluntary savings (Cozarenco et al., 2016).

4. Estimating the Cost Functions

We estimate the cost functions following the empirical design described in Section 2. While the full model includes Equations (1) to (3), only the results from Equation (2) are needed for discussing cost efficiency. Therefore, the estimation results obtained for the selection equation (Equation (1)) and the share equations (Equation (3)) are provided in the Appendix. The loadings have the expected signs, and the figures suggest that self-selection is significant. This section organizes the discussion about cost efficiency into three steps: Subsection 4.1 presents the results for credit-only MFIs, and subsection 4.2 deals with the credit-plus-deposit MFIs. Even though the results discussed in the two subsections are presented in separate tables (Tables 3 and 4) for readability, in both cases we use the same multivariate specification and run the estimation with the full sample. By contrast, the numbers of uncensored observations in Tables 3 and 4 correspond to credit-only and credit-plus-deposit MFIs, respectively. Last, subsection 4.3 computes and compares the cost-efficiencies of the two business models with and without subsidies.

4.1 The Costs of Credit-Only MFIs

The results reported in Table 3 account for endogenous self-selection into the credit-only business model. The two outputs are loans in number and in volume. The left-hand, resp. right-hand, side of the table gives the results for the unsubsidized, resp. subsidized, institutions. The adjusted R-squared (0.94 and 0.95, resp.) show that the translog model fit is excellent. The significant coefficients have signs and magnitudes consistent with previous microfinance efficiency studies (Hartarska et al., 2013b; Caudill et al., 2009).

Our main interest lies in the coefficients of the output variables in the first two lines of Table 3. These coefficients show that both the number of active borrowers and the dollar volume of loans affect credit-only MFIs' costs, regardless of their subsidization status. The marginal impact of an additional borrower is a 0.23 percent cost increase in a subsidized MFI but only a 0.16 percent cost increase in an unsubsidized one, all else equal. The two groups have the same elasticity of costs (0.71) with respect to loan volume. The figures suggest that, assuming a constant loan portfolio size, unsubsidized MFIs find it less costly than subsidized ones to attract new borrowers. For unsubsidized credit-only MFIs, increasing outreach is therefore less expensive than for their subsidized counterparts.

Additionally, Table 3 shows that there is no difference in the cost functions of MFIs using compulsory deposits and those that do not. This suggests that the true nature of these deposits is simply a feature of the loan contract, which supports our choice of voluntary savings as the output. In line with previous contributions, we find that older MFIs have higher costs (Caudill et al., 2012), and that greater risk increases costs (Hartarska et al., 2013b). But the impact of risk for unsubsidized MFIs is twice that obtained for subsidized ones, suggesting that unsubsidized credit-only MFIs have strong incentives to limit credit defaults due to investors' pressure. Overall, subsidies appear to be beneficial for credit-only MFIs willing to pursue their social mission while controlling costs.

4.2 The Costs of Credit-plus-Deposit MFIs

Table 4 presents the estimation results for the cost function of credit-plus-deposit MFIs. Here, the four outputs are loans and deposits, in numbers and in total volume. Their estimated coefficients are given in the four first lines of Table 4. As expected, the common values of the two adjusted R-squared (0.98) show an excellent statistical fit. The cost of subsidized credit-plus-deposit MFIs is sensitive to the number of depositors, but not to the number of active borrowers. Thus, adding savers to a subsidized credit-plus-deposit MFI increases its costs whereas adding borrowers does not. These results suggest that credit-plus-deposit MFIs find subsidies helpful for developing their lending business but less so for expanding deposit collection. The effect of subsidies on the costs of the lending activity is similar to that obtained for credit-only MFIs. Regardless of deposit collection, subsidies can reduce MFIs' lending-related costs. These results can be related to the evidence that average loan size is donors' preferred indicator of social performance (D'Espallier et al., 2017) and, logically, the criterion most used for assessing how well MFIs fulfill their mission of poverty alleviation (Reichert, 2018; Cull et al., 2007). The findings are also consistent with Tchakoute Tchuigoua (2015) showing that subsidies are correlated with past loans. The link to our results could be that subsidized MFIs allocate their subsidies to their lending activity in priority to please their donors. If so, the impact of subsidies on the cost efficiency of credit-plus-deposit MFIs would be chiefly driven by the incentives created by donors.

Regardless, in unsubsidized credit-plus-deposit MFIs, an additional saver is almost costless whereas handling larger volumes of savings increases costs. T-tests for differences in means between subsidized and unsubsidized credit-plus-deposit MFIs find no significant difference in deposit sizes, but unsubsidized MFIs supply larger loans. This is additional evidence that subsidization is associated with lending to poorer borrowers. In other words, subsidies affect the lending business directly, but not deposit-taking.

The gist of the endogenous self-selection model we estimate is that MFIs are aware of the type of social performance expected by subsidy providers, and they strategically choose the business model that is best-suited to situations, such as market conditions and the regulatory context. If this intuition holds true, then MFIs that have a comparative advantage in taking deposits would give relatively less importance to subsidies and so self-select into the credit-plus-deposit business model. The empirical results in Table A2 (see Appendix) validate the intuition behind our econometric design, since the hypothesis of exogenous business-model selection is rejected by significant Mill's ratios in either cost or share equations. Both the detection of self-selection and the estimation results in Table 4 suggest that the donors' focus on the lending business is partly attributable to MFIs making self-fulfilling expectations about the impact of subsidies on their cost structure. According to this interpretation, credit-plus-deposit MFIs that receive subsidies have a cost structure associated with costlier deposit-taking, presumably because the clientele is harder to serve. This scenario corresponds to circumstances where the cost elasticity of an additional saver is higher for subsidized credit-plus-deposit MFIs, compared with unsubsidized ones, while the cost elasticity of an additional dollar in deposits is lower. To please donors, the MFIs faced with this scenario would adopt a subsidy-friendlier orientation for their production technology and would turn to borrowers, who are less attractive in terms of their capacity to save. Ultimately, this would lead them to offset the additional costs of lending with subsidies.

4.3 Cost-Efficiency of the Two Business Models

The last line of Table 3 reveals that both unsubsidized and subsidized credit-only MFIs are tested with increasing returns to scale, since each sum of the cost elasticities of outputs is significantly smaller than one. Hence, all types of credit-only MFIs can reduce their costs by increasing their size, which means growing. Strategies to reach that goal include mergers and industry-wide consolidations. In any case, additional funding is needed to reach more clients and take advantage of economies of scale. The penultimate line of Table 3 shows, however, that subsidized institutions are closer than unsubsidized ones to constant returns to scale (0.939 > 0.870),[8] suggesting that subsidized credit-only MFIs are thus closer to their cost-minimizing size.

The economies of scale of credit-plus-deposit MFIs are particularly revealing. For the subsidized institutions, summing up the significant coefficients of the four outputs yields a value of 0.907, which is significantly smaller than one and therefore suggests increasing returns to scale. By contrast, the corresponding value for the unsubsidized MFIs is 1.019 and the Wald test does not reject the null that this coefficient equals one. In terms of cost efficiency, the consequences are that unsubsidized credit-plus-deposit MFIs have constant returns to scale, whereas their subsidized counterparts have increasing returns to scale. These results confirm that deposit mobilization makes cost minimization easier. This conclusion is consistent with the summary statistics in Table 2 showing that a majority of credit-plus-deposit MFIs are unsubsidized, while only one-fourth of the credit-only MFIs are unsubsidized. Most importantly, the findings suggest that subsidies can have a negative externality on the efficiency of credit-plus-deposit MFIs. Comparing cost efficiency across the four groups of institutions shows that only those in the group made up of unsubsidized credit-plus-deposit MFIs have achieved their cost-minimizing size. The other three groups have increasing returns to scale, but the group including subsidized credit-only MFIs is the closest to optimal size.

The final step of our investigation compares the predictions produced from our estimated cost functions for each group of MFIs to their counterfactuals, obtained by building predictions from the cost functions of the opposite subsidization status. The idea is to simulate the cost efficiency of an unsubsidized MFI under the hypothetical scenario that it is subsidized, and

[8] A robustness check in Section 5 shows that this difference is statistically significant.

similarly for the reverse. Table 5 shows the counterfactual costs of subsidized and unsubsidized MFIs for each business model.

The counterfactual cost[9] of a subsidized institution with business model X is the cost estimated for its hypothetical unsubsidized counterpart. This cost is thus computed by plugging in all the characteristics of the subsidized MFI of interest into the cost function obtained for the unsubsidized institutions with business model X. Likewise, we derive the counterfactual costs of unsubsidized institutions. Table 5 compares average estimated costs to the corresponding average counterfactual costs. By doing so, we compare the production technologies underpinning subsidized and unsubsidized MFIs sharing the same business model. This allows us to assess the cost-efficiency of any category of MFIs with respect to the hypothetical group of MFIs having the exact same characteristics except for the subsidization status.

For subsidized credit-only MFIs, the average normalized cost is equal to -1.18, and its counterfactual average of -1.15. [10] Under the hypothetical scenario that all the subsidized credit-only MFIs were unsubsidized but otherwise identical, their average cost would be higher by 0.03. The p-value of the t-test for equal means is 7%, suggesting that the difference is statistically moderately significant. For unsubsidized credit-only MFIs, the average predicted, and counterfactual costs are -1.19 and -1.09 respectively. The difference is significant at the 1% level. The two tests are consistent with the hypothesis that, all else equal, credit-only MFIs reach higher cost efficiency in the presence of subsidies. In addition, the comparison between the economic values of the two cost gaps reveals an asymmetric pattern: Providing subsidies to unsubsidized credit-only MFIs reduces costs by more than they would increase if their subsidized counterparts are deprived of their subsidies.

[9] More precisely, we compute counterfactual logs of demeaned total cost normalized by the price of physical capital.

[10] These figures correspond to USD 2.20 million and USD 2.26 million, respectively.

When it comes to credit-plus-deposit MFIs, subsidized institutions have an average estimated cost of -0.52 and an average counterfactual of -0.77. Thus, if subsidized credit-plus-deposit MFIs were unsubsidized, their average cost would be 0.25 lower. A zero p-value shows the high statistical significance of this difference. Similarly, for unsubsidized credit-plus-deposit MFIs, the predicted costs of -0.02 increase to 0.20 when counterfactual. The impressive 0.22 difference is both statistically and economically significant, confirming that credit-plus-deposit MFIs are more cost-efficient when unsubsidized.

Overall, the CMP joint estimation of the selection equation, the cost functions, and the cost shares associated with a counterfactual analysis, shows that the most cost-efficient MFIs belong to one of two groups: subsidized credit-only and unsubsidized credit-plus-deposit institutions. The results suggesting that combining funds from donors and from depositors is associated with lower cost-efficiency are consistent with previous evidence by Cozarenco et al. (2016) showing that subsidization and deposit-taking MFIs are a bad fit. One possible interpretation is that subsidies and deposit-taking act as substitutes rather than complements. Importantly though, our results also underline that subsidies have a key role in supporting the traditional credit-only MFIs. The next section assesses the robustness of our results by introducing an alternative specification of the estimated model.

5 An Alternative Model Specification

To assess whether the differences across groups uncovered in the previous section are statistically significant, we re-estimate the CMP model but account for subsidies by way of interactions between a subsidization dummy variable and the other explanatory variables. The new specification includes two cost functions (instead of four), corresponding to credit-only and credit-plus-deposit MFIs, while sticking to the key feature of endogenous selection into a business model. While this specification permits sensitivity analyses across groups, it is less reliable for computing scale economies. The new cost equation is:

$$\ln C = \alpha_0 + \sum \alpha_j \ln q_j + \sum \beta_k \ln p_k + \frac{1}{2}\sum \alpha_{ij} \ln q_i \ln q_j + \frac{1}{2}\sum \beta_{lk} \ln p_l \ln p_k + \sum \delta_{jk} \ln q_j \ln p_k + \gamma' z + \sum \theta_j subsidized * \ln q_j + \sum \mu_k\, subsidized * \ln p_k + \frac{1}{2}\sum \theta_{ij} subsidized * \ln q_i \ln q_j + \frac{1}{2}\sum \mu_{lk}\, subsidized * \ln p_l \ln p_k + \sum \eta_{jk}\, subsidized * \ln q_j \ln p_k + \omega' subsidized * z + \ln v \quad (2')$$

The econometric design is the previous one, except for the interactions terms that deal with both subsidized and unsubsidized MFIs sharing the same business model. In addition to acting as a robustness check, estimating this model will help us further scrutinize the impact of subsidies on the cost functions of each business model.

Regarding credit-only MFIs, the results on the left side of Table 6 reveal that the cost of subsidized MFIs depends more heavily on the numbers of active borrowers than is the case for unsubsidized institutions. This result corroborates the findings suggesting that subsidized credit-only institutions are closer than unsubsidized ones to constant returns to scale.

The figures on the right side of Table 6 are consistent with credit-plus-deposit MFIs extracting little benefit from being subsidized. Indeed, the estimated cost function seems to be barely affected by the interactions between subsidization and the output variables stemming from the lending activity. Yet, the cost of subsidized credit-plus-deposit MFIs increases with the number of voluntary depositors, suggesting that subsidization harms the expansion of deposit collection.

Estimating the alternative specification of the cost function in Equation (2') is insightful because it eases coefficient comparisons across the equations estimated separately in the previous section. In addition, using another model specification is a way to assess the robustness of the results derived from the original specification in Equation (2). In this regard, the results in Table 6 corroborate successfully the previous findings that subsidies to credit-only MFIs are more beneficial than those to allocated to credit-plus-deposit institutions. The potential reasons are twofold. First, among subsidized MFIs, the credit-only institutions are closer to constant returns to scale. Second, subsidies seem to counteract on the credit-plus-deposit MFIs' ability—or willingness—to reach more voluntary depositors.

6 Discussion and Conclusions

This paper contributes to the ongoing conversation on the impact of subsidies on cost efficiency in microfinance. Microfinance emerged as a development concept whereby MFIs would be set up with the explicit objective to offer financial services to poor clients excluded from formal financial institutions. Expectations that MFIs would eventually meet their social objectives while covering costs remain only partially fulfilled as part of the industry continues to rely on subsidies. Moreover, it became apparent in the past decades that the poor need more than just loans (Collins et al., 2009) and that many MFIs transformed into credit-plus-deposits institutions, thereby changing their product mix. Yet, a large proportion of MFIs continue to supply credit only. Meanwhile, many MFIs, be they credit-only or credit-plus-deposits, still rely on subsidies. The main takeaway of this paper is that the impact of subsidies on an MFI's cost depends crucially on the business model that it adopts: Subsidies are undeniably cost-efficient for credit-only MFIs but less so for their credit-plus-deposits counterparts. In fact, subsidies fit poorly with the deposit-taking activity, probably because they act as substitutes for deposits.

Previous work in the field of microfinance acknowledged both the need for and the social benefits from subsidies, but it questions the efficiency of subsidized MFIs (Cull & Morduch, 2018). Bos and Millone (2015) show that MFIs seeking to pursue a double bottom line, which means targeting the poor while covering costs, are relatively inefficient. Yet, subsidies flow typically to non-profit institutions, and a lack of them has socially harmful consequences (D'Espallier et al., 2013; Khachatryan and Hartarska, 2017). In sum, the subsidy/efficiency trade-off is still poorly understood. Strikingly, the differential cost-efficiency of subsidized and unsubsidized MFIs has remained unexplored. The ambition of this paper has been to fill the gap and to scrutinize how key production characteristics, such as the product mix, affect the subsidy/efficiency trade-off. We study how subsidies are related to efficiency and scale in MFIs, explicitly accounting for the differences in production processes in credit-only and credit-plus-deposit MFIs.

From the methodological standpoint, the production analysis means taking into consideration the social context that makes the outputs of MFIs depart from those of banks. Our approach accounts for the dual mission of MFIs—outreach and sustainability—by considering the cost minimization process as well as accounting for both the number of clients and (by including the volume of loans implicitly) their poverty level. Our data are taken from the MIX market dataset and cover the period 2004-2013. Unlike most studies, we adjust the data for various types of subsidies and separate voluntary savings from mandatory savings. In this respect, we innovate by developing an estimation framework which acknowledges that collecting voluntary savings is a socially desirable mission for MFIs. Further, the potential endogeneity of the MFI business model is a key feature that complicates the empirical analysis. We address this problem by referring to the recent contribution of Malikov and Hartaska (2018). We also use counterfactual analysis to deepen the comparison of cost functions in unsubsidized and subsidized institutions.

Our approach offers policy-makers and stakeholders a nuanced perspective on the benefits and costs of using subsidies in credit-only and credit-plus-deposit MFIs, based on the potential for cost savings from scale economies. Overall, our results indicate that subsidization involves tradeoffs, especially for credit-plus-deposit MFIs. We find that within this group, unsubsidized MFIs achieve cost-minimizing size while those with subsidies do not. This suggests that subsidization may prevent these MFIs from achieving constant returns to scale or minimizing the cost of producing deposits and loans. In credit-only MFIs, subsidies can help the institutions to reach their target clientele without unduly impacting on economies of scale. In this group, we find increasing returns to scale, irrespective of whether subsidies are used, although subsidized credit-only MFIs are significantly closer to constant returns to scale.

These results should be interpreted with caution for several reasons. First, inferring differences from counterfactual scenarios carries the risk of relying on situations that do not exist in real life due to circumstances unrelated to our research question. Second, in our framework, subsidized MFIs have non-zero donated equity in their balance sheet. The donated equity is a stock and corresponds to the donations accumulated since inception. Hence, the group of subsidized MFIs includes institutions that might not have received subsidies during the study period but are categorized as subsidized because of donations they have received in the past. Moreover, MFIs that are categorized as unsubsidized might receive unreported financial support such as preferential debt, volunteer work, and so on. Third, even though the MIX Market adjusts the prices for concessional borrowing rates, in-kind adjustments, national inflation, measurement errors remain an issue.

Emerging microfinance productivity research has admittedly focused on evaluating various aspects of MFIs’ efficiency, such as how to translate the production process into the proper functional form and estimate scope and scale economies, as well as how to link those economies to internal and external MFI governance mechanisms. Even so, the role of subsidies remains underexplored. Our results show that subsidization may have an adverse influence on credit-plus-deposit institutions seeking to reach to optimal capacity. Arguably, this effect can to some extent be attributed to donors who measure social performance with rough indicators, such as average loan size, which focus exclusively on lending activity. This intuition is corroborated by the observation that, in both business models, the provision of subsidies has no negative impact on the supply of loans, in comparison with deposits. According to our interpretation, the empirical findings would capture a potentially perverse incentive scheme that pushes subsidy-seeking MFIs to concentrate on producing loans rather than collecting deposits. This explanation should however be mitigated by the fact that some MFIs, such as NGOs, face institutional constraints that prevent them from launching a deposit-taking activity.

Finally, our results also call for caution when promoting subsidies with the argument that an increase in size would help any MFI to achieve optimal scale and reach its target clientele. A more appropriate recommendation might stem from emphasizing the feasible transition paths that can take an MFI from subsidized credit-only to unsubsidized credit-plus-deposit status. Further work is needed to assess the practicalities of this general suggestion. Yet our results provide a first and promising analysis showing that unsubsidized credit-plus-deposit MFIs develop a cost-efficient production technology that meets the financial needs of the poor. In that sense, this paper advocates for a new generation of “smart subsidies”, a term coined by Jonathan Morduch (2006).

References

Aggarwal, R., Demirgüç-Kunt, A., and Martinez Peria, M.S.M. (2011). Do remittances promote financial development? *Journal of Development Economics*, 96(2), 255-264.

Armendariz, B. (2011). Women and microsavings. In: Armendariz, B., Labie, M. (Eds.), *The Handbook of Microfinance*. London-Singapore: World Scientific Publishing, pp. 503–515.

Armendariz, B. and Morduch, J. (2010). *The Economics of Microfinance*. Cambridge, MA: MIT Press.

Armendariz, B. and Szafarz, A. (2011). On mission drift in microfinance institutions. In Armendariz, B., Labie, M. (Eds.), *The Handbook of Microfinance*, London-Singapore: World Scientific Publishing, pp. 341-366.

Battilana, J. and Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53. 1419-1440.

Beck, T., Demirgüç-Kunt, A., and Levine, R. (2000). A new database on the structure and development of the financial sector. *World Bank Economic Review*, 14(3), 597-605.

Beck, T., Demirgüç-Kunt, A., and Martinez Peria, M.S.M. (2007). Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics*, 85(1), 234-266.

Berger, A.N., and Humphrey, D.B. (1997). Efficiency of financial institutions: International survey and directions for future research. *European Journal of Operational Research*, 98(2), 175-212.

Berger, A.N., and Humphrey, D.B. (1991). The dominance of inefficiencies over scale and product mix economies in banking. *Journal of Monetary Economics*, 28(1), 117–148.

Berger, A.N., Hunter, W.C., and Timme, S.G. (1993). The efficiency of financial institutions: A review and preview of research past, present and future. *Journal of Banking and Finance*, 17(2-3), 221-249.

Berger, A.N., and Mester, L.J. (2003). Explaining the dramatic changes in performance of U.S. banks: Technical change, deregulation, and dynamic changes in competition. *Journal of Financial Intermediation*, 12(1), 57–95.

Berger, A.N., and Mester, L.J. (1997). Inside the black box: What explains differences in the efficiencies of financial institutions. *Journal of Banking and Finance*, 21(7), 895–947.

Binswanger, H.P., and Khandker, S.R. (1995). The impact of formal finance on the rural economy of India. *Journal of Development Studies*, 32(2), 234-262.

Bogan, V. (2012). Capital structure and sustainability: An empirical study of microfinance institutions. *Review of Economics and Statistics*, 94(4), 1045–1058.

Bos, J.W.B., and Millone, M. (2015). Practice what you preach: Microfinance business models and operational efficiency. *World Development*, 70, 28-42.

Collins, D., Morduch, J., Rutherford, S., and Ruthven, O. (2009). *Portfolios of the Poor: How the World's Poor Live on USD 2 a Day*. Princeton University Press.

Cozarenco, A., Hudon, M., and Szafarz, A. (2016). What type of microfinance institutions supply savings products? *Economics Letters*, 140, 57-59.

Caudill, S.B., Gropper, D.M., and Hartarska, V. (2012). Microfinance institution costs: Effects of gender, subsidies and technology. *Journal of Financial Economic Policy*, 4(4), 292-304.

Caudill, S.B., Gropper, D.M., and Hartarska, V. (2009). Which microfinance institutions are becoming more cost-efficient with time? Evidence from a mixture model. *Journal of Money, Credit, and Banking*, 41(4), 651–672.

Cull, R., Demirguc-Kunt, A., and Morduch, J. (2007). Financial performance and outreach: A global analysis of leading microbanks. *Economic Journal*, 117(517), F107–F133.

Cull, R., Demirguc-Kunt, A., and Morduch, J. (2009). Microfinance meets the market. *Journal of Economic Perspectives*, 23(1), 167-192.

Cull, R., Demirguc-Kunt, A., and Morduch, J. (2018). The microfinance business model: Enduring subsidy and modest profit. *World Bank Economic Review*, 32(2), 221–244.

Cull, R., and Morduch, J. (2018). Microfinance and economic development (Chapter 20). In Beck, T. and Levine, R. (Eds.) *Handbook of Finance and Development*, Edward Elgar Publishing, pp. 550–572.

Delgado, M.S., Parmeter, C.F., Hartarska, V., and Mersland, R. (2015). Should all microfinance institutions mobilize microsavings? Evidence from economies of scope. *Empirical Economics*, 48(1), 193–225.

D'Espallier, B., Hudon, M., and Szafarz, A. (2013). Unsubsidized microfinance institutions. *Economics Letters*, 120(2), 174-176.

D'Espallier, B., Hudon, M., and Szafarz, A. (2017). Aid volatility and social performance in microfinance. *Nonprofit and Voluntary Sector Quarterly*, 46(1), 116-140.

D'Espallier, B., Labie, M., and Louis, P. (2015). Microcredit crises and unsustainable growth: A management perspective. In I. Guérin, M. Labie and J.-M. Servet (Eds.), *The Crises of Microcredit*. London: Zed Books, pp. 23-38.

Duncombe, R. and Boateng, R. (2009). Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly*, 30(7), 1237-1258.

Fall, F., Akim, A.M., and Wassongma, H. (2018). DEA and SFA research on the efficiency of microfinance institutions: A meta-analysis. *World Development*, 107, 176-188.

Guérin, I., Morvant-Roux, S., and Villarreal, M. (Eds.). (2013). *Microfinance, Debt and Over-Indebtedness: Juggling with Money*. Routledge, London.

Giuliano, P., and Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144-152.

Hartarska, V., and Nadolnyak, D. (2007). Do regulated microfinance institutions achieve better sustainability and outreach? Cross-country evidence. *Applied Economics*, 39(10), 1207-1222.

Hartarska, V., Nadolnyak, D., and Mersland, R. (2014). Are women better bankers for the poor: Evidence from rural microfinance institutions? *American Journal of Agricultural Economics*, 96(5), 1291-1306.

Hartarska V., Mersland, R., Nadolnyak, D., and Parmeter, C. (2013a). Governance and scope economies in microfinance institutions. *International Journal of Corporate Governance*, 4(1), 74-86.

Hartarska, V., Shen, X., and Mersland, R. (2013b). Scale economies and input price elasticities in microfinance institutions. *Journal of Banking and Finance*, 37(1), 118-131.

Hartarska, V., Parmeter, C., and Nadolnyak, D. (2011). Economies of scope of lending and mobilizing deposits in rural MFI: A semiparametric analysis. *American Journal of Agricultural Economics*, 93(2), 389-398.

Hartarska, V., Parmeter, C., Nadolnyak, D., and Zhu, B. (2010). Economies of scope for microfinance: Differences across output measures. *Pacific Economic Review*, 15(4), 464–481.

Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica*, 47(1), 153-161.

Hermes, N., Lensink, R., and Meesters, A. (2011). Outreach and efficiency of microfinance institutions. *World Development*, 39(6), 938–948.

Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking and Finance*, 32(11), 2493-2500.

Hudon, M., Reichert, P., and Szafarz, A. (2018). Crowding-in without crowding-out: Subsidy design to foster commercialization. Working Paper, CERMi, Université Libre de Bruxelles (ULB).

Hudon, M. and Traça, D. (2011). On the efficiency effects of subsidies in microfinance: An empirical inquiry. *World Development*, 39(6), 966-973.

Hughes, J. P. and Mester, L.J. (2013). Who said large banks don't experience scale economies? Evidence from a risk-return-driven cost function. *Journal of Financial Intermediation*, 22(4), 559–585.

Karlan, D., Ratan, A. L., and Zinman, J. (2014). Savings by and for the poor: A research review and agenda. *Review of Income and Wealth*, 60(1), 36-78.

Khachatryan, K., and Hartarska, V. (2017). Performance and capital structure of microfinance institutions in Eastern Europe and Central Asia. *Eastern European Economics*, 55(5), 395-419.

Kornai, J. (1986). The soft budget constraint. *Kyklos*, 39(1), 3-30.

Labie, M., Laureti, C., and Szafarz, A. (2017). Discipline and flexibility: A behavioural perspective on microfinance product design. *Oxford Development Studies*, 45(3), 321-337.

Laureti, C. (2018). Why do poor people co-hold debt and liquid savings? *Journal of Development Studies*, 54(2), 213-234.

León-Ledesma, M.A., McAdam, P., and Willman, A. (2010). Identifying the elasticity of substitution with biased technical change. *American Economic Review*, 100(4), 1330–1357.

Malikov, E. and Hartarska, V. (2018). Endogenous Scope Economies. *Journal of Banking and Finance*, 93, 162-182.

Mersland, R. and Strøm, R.Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking and Finance*, 33(4), 662-669.

Morduch, J. (1999). The role of subsidies in microfinance: Evidence from the Grameen Bank. *Journal of Development Economics*, 60(1), 229-248.

Morduch, J. (2006). Smart Subsidies, *Journal of Microfinance*, 8 (1), 10-17.

Reichert, P. (2018). A meta-analysis examining the nature of trade-offs in microfinance. *Oxford Development Studies*, 46(3), 430-452.

Roodman, D. (2011). Fitting fully observed recursive mixed-process models with cmp. *Stata Journal*, 11(2), 159-206.

Tchakoute Tchuigoua, H. (2015). Capital structure of microfinance institutions. *Journal of Financial Services Research*, 47(3), 313–334.

Varian, H. (1984). The nonparametric approach to production analysis. *Econometrica*, 52(3), 579–597.

List of Tables

Table 1. Sample Composition

	Credit-only MFIs	Credit-plus-deposit MFIs	Total
Unsubsidized MFIs	309	287	596
Subsidized MFIs	1003	206	1209
Total	**1312**	**493**	**1805**

Table 2. Summary Statistics

Variable	Full sample			Credit-only MFIs			Credit-plus-deposit MFIs		
	Unsub.	**Sub.**	**t-test[a]**	**Unsub.**	**Sub.**	**t-test[a]**	**Unsub.**	**Sub.**	**t-test[a]**
Total cost (USD millions)	7.67	3.48	***	4.26	3.29	**	11.33	4.42	***
	(0.64)	(0.17)		(0.66)	(0.18)		(1.09)	(0.55)	
Number of active borrowers (thousands)	34.74	39.44		32.16	37.73		37.52	47.76	
	(3.12)	(2.4)		(4.77)	(2.4)		(3.95)	(7.89)	
Number of savers (thousands)	32.47	26.49		6.56	13.58	**	58.66	85.82	**
	(3.58)	(2.8)		(1.38)	(1.64)		(6.73)	(13)	
Number of voluntary savers (thousands)	28.8	14.15	***	0	0		55.49	66.89	
	(3.62)	(2.27)					(6.6)	(9.93)	
Loan portfolio (USD millions)	31.43	16.03	***	12.64	14.59		51.67	23.06	***
	(2.74)	(1.01)		(1.77)	(0.98)		(5.1)	(3.51)	
Deposits (USD millions)	17.92	3.83	***	0.39	0.69		36.81	19.12	***
	(1.93)	(0.65)		(0.1)	(0.15)		(3.71)	(3.53)	
Voluntary deposits (USD millions)	15.77	2.44	***	0	0		32.42	14.03	***
	(1.78)	(0.45)					(3.4)	(2.42)	
Price of labor	9356	8074	***	9900	8327	***	8770	6841	***
	(240)	(152)		(343)	(165)		(333)	(377)	
Price of fixed capital	3.27	2.86	**	4.34	3.02	***	2.12	2.08	
	(0.15)	(0.08)		(0.24)	(0.1)		(0.16)	(0.14)	
Price of financial capital	0.18	0.16		0.23	0.17	***	0.12	0.11	
	(0.01)	(0.01)		(0.02)	(0.01)		(0.01)	(0.01)	
Risk (30-day portfolio-at-risk)	0.06	0.06		0.06	0.06		0.07	0.06	*
	(0.00)	(0.00)		(0.01)	(0.00)		(0.01)	(0.01)	
Age (in years)	13.74	13.25	**	10.09	13.13	**	14.20	13.38	**
	(0.45)	(0.23)		(0.42)	(0.24)		(0.32)	(0.19)	
Compulsory deposits (Y/N)	0.17	0.32	***	0.21	0.29	***	0.13	0.45	***
	(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.03)	
Voluntary deposits (Y/N)	0.48	0.17	***	0.00	0.00		1.00	1.00	
	(0.02)	(0.01)							
Total assets (USD millions)	41.93	20.62	***	14.88	18.17		70.99	32.54	***
	(3.7)	(1.28)		(2.08)	(1.15)		(6.95)	(4.96)	
Donated equity (USD millions)	0.00	2.20	***	0.00	2.47	***	0.00	0.87	***
		(0.2)			(0.24)			(0.11)	
Donated equity/Total assets	0.00	0.21	***	0.00	0.24	***	0.00	0.09	***
		(0.01)			(0.01)			(0.01)	

[a]Two-sided t-test for equal means of unsubsidized and subsidized MFIs. Significance: *** p<0.01, ** p<0.05, * p<0.1)

Table 3. Cost Equation: Credit-Only MFIs

	Unsubsidized MFIs		**Subsidized MFIs**	
VARIABLES	Coefficient	Standard error	Coefficient	Standard error
ln(number of active borrowers)	0.160***	(0.048)	0.230***	(0.027)
ln(loans in USD)	0.710***	(0.053)	0.709***	(0.028)
ln(PLabor)	0.417***	(0.014)	0.372***	(0.005)
ln(PFinCapital)	0.310***	(0.018)	0.337***	(0.006)
Ln(number of active borrowers)²	-0.148***	(0.043)	0.138***	(0.018)
ln(loans in USD)²	-0.042	(0.048)	0.186***	(0.020)
ln(loans in USD) * ln(number of active borrowers)	0.109**	(0.043)	-0.138***	(0.015)
ln(PFinCapital)²	0.080***	(0.008)	0.088***	(0.004)
ln(PLabor)²	0.083***	(0.008)	0.078***	(0.004)
ln(PLabor) * ln(PFinCapital)	-0.067***	(0.007)	-0.063***	(0.003)
ln(number of active borrowers) * ln(PLabor)	0.047***	(0.006)	0.056***	(0.004)
ln(loans in USD) * ln(PLabor)	-0.053***	(0.007)	-0.081***	(0.004)
ln(number of active borrowers) * ln(PFinCapital)	-0.032***	(0.007)	-0.046***	(0.004)
ln(loans in USD) * ln(PFinCapital)	0.052***	(0.008)	0.081***	(0.004)
Risk (30-day portfolio-at-risk)	0.131***	(0.017)	0.066***	(0.011)
Age (in years)	0.008**	(0.004)	0.006***	(0.002)
Compulsory deposits (Y/N)	0.030	(0.072)	0.025	(0.039)
Constant	-0.670*	(0.363)	-0.100	(0.085)
Mill's ratio	-0.056		-0.061	
Country dummies	Yes		Yes	
Observations	573		1,173	
Uncensored observations	301		998	
Adjusted R-squared	0.94		0.95	
Economies of scale	0.870		0.939	
P-value Wald test H0: Constant returns to scale	0.000		0.000	

All the variables are demeaned. The prices of labor and financial capital are normalized by the price of physical capital.
Significance: *** p<0.01, ** p<0.05, * p<0.1

Table 4. Cost Equation: Credit-plus-Deposit MFIs

	Unsubsidized MFIs		Subsidized MFIs	
VARIABLES	Coefficient	Standard error	Coefficient	Standard error
ln(number of active borrowers)	0.113***	(0.039)	0.055	(0.049)
ln(loans in USD)	0.727***	(0.045)	0.670***	(0.072)
ln(number of voluntary depositors)	0.007	(0.025)	0.110***	(0.035)
ln(deposits in USD)	0.179***	(0.035)	0.127**	(0.052)
ln(PLabor)	0.300***	(0.010)	0.315***	(0.012)
ln(PFinCapital)	0.379***	(0.012)	0.329***	(0.015)
ln(number of active borrowers)²	0.098***	(0.028)	-0.082	(0.052)
ln(loans in USD)²	0.300***	(0.048)	0.124	(0.088)
ln(number of voluntary depositors)²	0.016	(0.010)	0.042***	(0.016)
ln(deposits in USD)²	0.187***	(0.034)	0.025	(0.031)
ln(number of active borrowers) * ln(number of voluntary depositors)	-0.035***	(0.013)	0.003	(0.023)
ln(loans in USD) * ln(number of active borrowers)	-0.103***	(0.029)	0.053	(0.063)
ln(deposits in USD) * ln(number of active borrowers)	0.048**	(0.022)	-0.026	(0.037)
ln(loans in USD) * ln(number of voluntary depositors)	0.092***	(0.019)	-0.047	(0.031)
ln(deposits in USD) * ln(number of voluntary depositors)	-0.067***	(0.016)	0.017	(0.017)
ln(loans in USD) * ln(deposits in USD)	-0.221***	(0.036)	-0.033	(0.046)
ln(PFinCapital)²	0.178***	(0.009)	0.133***	(0.008)
ln(PLabor)²	0.083***	(0.008)	0.052***	(0.008)
ln(PLabor) * ln(PFinCapital)	-0.091***	(0.007)	-0.046***	(0.006)
ln(number of active borrowers) * ln(PLabor)	0.051***	(0.006)	0.046***	(0.008)
ln(loans in USD) * ln(PLabor)	-0.037***	(0.008)	-0.043***	(0.010)
ln(number of voluntary depositors) * ln(PLabor)	-0.006	(0.004)	0.005	(0.004)
ln(deposits in USD) * ln(PLabor)	-0.023***	(0.006)	-0.018***	(0.006)
ln(number of active borrowers) * ln(PFinCapital)	-0.051***	(0.009)	-0.036***	(0.010)
ln(loans in USD) * ln(PFinCapital)	0.019*	(0.011)	0.058***	(0.012)
ln(number of voluntary depositors) * ln(PFinCapital)	0.009	(0.005)	-0.011**	(0.006)
ln(deposits in USD) * ln(PFinCapital)	0.034***	(0.009)	0.012	(0.008)
Risk (30-day portfolio-at-risk)	0.020*	(0.010)	0.011	(0.017)
Age (in years)	-0.002	(0.002)	0.002	(0.002)
Compulsory deposits (Y/N)	0.087*	(0.051)	0.117**	(0.049)
Constant	-0.701***	(0.226)	-0.113	(0.185)
Mill's ratio	0.116**		-0.033	
Country dummies	Yes		Yes	
Observations	552		1,031	
Uncensored observations	285		205	
Adjusted R-squared	0.98		0.98	
Economies of scale	1.019		0.907	
P-value Wald test H0: Constant returns to scale	0.549		0.047	

All the variables are demeaned. The prices of labor and financial capital are normalized (divided) by the price of physical capital.
Significance: *** p<0.01, ** p<0.05, * p<0.1

Table 5. Predicted and Counterfactual Costs

	Credit-only MFIs		Credit-plus-deposit MFIs	
Cost Prediction:	Unsubsidized	Subsidized	Unsubsidized	Subsidized
Using cost-function for subsidized MFIs	**-1.19**	-1.18	**0.20**	-0.52
Using cost-function for unsubsidized MFIs	-1.09	**-1.15**	-0.02	**-0.77**
P-value of the two-sided t-test for equal means of predicted and counterfactual costs.	0.00	0.07	0.00	0.00

The table gives predicted and counterfactual costs in log, demeaned, and normalized. The counterfactual costs are in bold.

Table 6. Cost Equation with Interaction Terms for Subsidization

	(1)		(2)	
	Credit-only MFIs		**Credit-plus-deposit MFIs**	
VARIABLES	Coefficient	Standard error	Coefficient	Standard error
ln(number of active borrowers)	0.144***	(0.047)	0.140***	(0.040)
ln(loans in USD) (loans in USD)	0.718***	(0.051)	0.706***	(0.048)
ln(number of voluntary depositors)			0.011	(0.027)
ln(deposits in USD) (deposits in USD)			0.174***	(0.038)
ln(PLabor)	0.415***	(0.009)	0.295***	(0.009)
ln(PFinCapital)	0.318***	(0.010)	0.382***	(0.011)
ln(number of active borrowers)²	-0.153***	(0.044)	0.108***	(0.031)
ln(loans in USD)²	-0.042	(0.048)	0.268***	(0.053)
ln(number of voluntary depositors)²			0.017	(0.012)
ln(deposits in USD)²			0.169***	(0.037)
ln(number of active borrowers) * ln(number of voluntary depositors)			-0.041***	(0.014)
ln(loans in USD) * ln(number of active borrowers)	0.110**	(0.044)	-0.104***	(0.034)
ln(deposits in USD) * ln(number of active borrowers)			0.041	(0.025)
ln(loans in USD) * ln(number of voluntary depositors)			0.099***	(0.020)
ln(deposits in USD) * ln(number of voluntary depositors)			-0.070***	(0.018)
ln(loans in USD) * ln(DEPOSITS IN USD)			-0.192***	(0.039)
ln(PFinCapital)²	0.082***	(0.008)	0.168***	(0.008)
ln(PLabor)²	0.078***	(0.007)	0.092***	(0.008)
ln(PLabor) * ln(PFinCapital)	-0.065***	(0.006)	-0.090***	(0.007)
ln(number of active borrowers) * ln(PLabor)	0.046***	(0.005)	0.053***	(0.006)
ln(loans in USD) * ln(PLabor)	-0.054***	(0.006)	-0.042***	(0.008)
ln(number of voluntary depositors) * ln(PLabor)			-0.005	(0.004)
ln(deposits in USD) * ln(PLabor)			-0.023***	(0.006)
ln(number of active borrowers) * ln(PFinCapital)	-0.032***	(0.006)	-0.054***	(0.008)
ln(loans in USD) * ln(PFinCapital)	0.054***	(0.007)	0.025**	(0.011)
ln(number of voluntary depositors) * ln(PFinCapital)			0.008	(0.005)
ln(deposits in USD) * ln(PFinCapital)			0.030***	(0.008)
Risk (30-day portfolio-at-risk)	0.131***	(0.017)	0.019*	(0.011)
Age (in years)	0.008**	(0.004)	-0.005***	(0.002)
Compulsory deposits (Y/N)	0.030	(0.073)	0.124**	(0.054)

(Continued on next page)

Table 6 (continued): Cost Equation with Interaction Terms for Subsidization

	(1)		(2)	
	Credit-only MFIs		**Credit-plus-deposit MFIs**	
VARIABLES	Coefficient	Standard error	Coefficient	Standard error
Subsidized*ln(number of active borrowers)	0.097*	(0.054)	-0.066	(0.062)
Subsidized*ln(loans in USD)	-0.019	(0.057)	-0.037	(0.084)
Subsidized*ln(number of voluntary depositors)			0.083*	(0.042)
Subsidized*ln(deposits in USD)			-0.043	(0.061)
Subsidized*ln(PLabor)	-0.038***	(0.009)	0.018	(0.012)
Subsidized*ln(PFinCapital)	0.018*	(0.011)	-0.049***	(0.015)
Subsidized*ln(number of active borrowers)²	0.291***	(0.048)	-0.185***	(0.058)
Subsidized*ln(loans in USD)²	0.224***	(0.052)	-0.111	(0.097)
Subsidized*ln(number of voluntary depositors)²			0.034*	(0.019)
Subsidized*ln(deposits in USD)²			-0.134***	(0.047)
Subsidized*ln(number of active borrowers) * ln(number of voluntary depositors)			0.031	(0.026)
Subsidized*ln(loans in USD) * ln(number of active borrowers)	-0.246***	(0.047)	0.148**	(0.068)
Subsidized*ln(deposits in USD) * ln(number of active borrowers)			-0.051	(0.042)
Subsidized*ln(loans in USD) * ln(number of voluntary depositors)			-0.141***	(0.036)
Subsidized*ln(deposits in USD) * ln(number of voluntary depositors)			0.079***	(0.024)
Subsidized*ln(loans in USD) * ln(deposits in USD)			0.138**	(0.057)
Subsidized*ln(PFinCapital)²	0.006	(0.009)	-0.031***	(0.011)
Subsidized*ln(PLabor)²	0.001	(0.008)	-0.049***	(0.011)
Subsidized*ln(PLabor) * ln(PFinCapital)	0.002	(0.007)	0.045***	(0.009)
Subsidized*ln(number of active borrowers) * ln(PLabor)	0.008	(0.006)	-0.012	(0.010)
Subsidized*ln(loans in USD) * ln(PLabor)	-0.024***	(0.008)	0.005	(0.012)
Subsidized*ln(number of voluntary depositors) * ln(PLabor)			0.010*	(0.006)
Subsidized*ln(deposits in USD) * ln(PLabor)			0.006	(0.008)
Subsidized*ln(number of active borrowers) * ln(PFinCapital)	-0.014**	(0.007)	0.017	(0.013)
Subsidized*ln(loans in USD) * ln(PFinCapital)	0.025***	(0.009)	0.033**	(0.016)
Subsidized*ln(number of voluntary depositors) * ln(PFinCapital)			-0.019**	(0.008)
Subsidized*ln(deposits in USD) * ln(PFinCapital)			-0.019	(0.012)
Subsidized*Risk (30-day portfolio-at-risk)	-0.065***	(0.020)	-0.005	(0.020)
Subsidized*Age (in years)	-0.001	(0.004)	0.009***	(0.003)
Subsidized* Compulsory deposits (Y/N)	-0.007	(0.082)	-0.009	(0.071)
Constant	-0.131	(0.083)	-0.193	(0.174)
Country dummies	Yes		Yes	
Observations	1,746		1,583	
Uncensored observations	1,299		490	

Standard errors in parentheses.

Subsidization status is represented by the dummy variable "Subsidized" that takes value 1 if the MFI is subsidized, and 0 otherwise. All the variables are demeaned (divided by their mean). Prices of labor and financial capital are normalized (divided) by the price of physical capital.

Significance: *** p<0.01, ** p<0.05, * p<0.1

Appendix: The Selection and Share Equations

Table A1. Estimation of Selection Equation (1)

	(1)		(2)		(3)		(4)	
	Credit-only MFIs				**Credit-plus-deposit MFIs**			
	Unsubsidized		**Subsidized**		**Unsubsidized**		**Subsidized**	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Age (in years)	-0.056***	(0.008)	-0.035***	(0.006)	0.055***	(0.008)	0.030***	(0.007)
NGO	1.860***	(0.229)	1.065***	(0.114)	-1.918***	(0.228)	-1.295***	(0.121)
National saving rate	-0.011	(0.010)	-0.013***	(0.005)	0.014	(0.009)	0.019***	(0.006)
Branches per 100,000 adults	-0.017***	(0.005)	-0.008	(0.005)	0.022***	(0.005)	0.005	(0.007)
Internet subscr. per 100 people	0.099***	(0.023)	0.045	(0.029)	-0.089***	(0.024)	-0.043	(0.034)
Financial sector depth	0.006	(0.004)	0.004**	(0.002)	-0.007**	(0.004)	-0.001	(0.002)
National remittance rate	-0.005	(0.010)	0.021**	(0.010)	0.010	(0.010)	-0.031***	(0.011)
Rural population share	0.003	(0.007)	-0.002	(0.005)	-0.006	(0.006)	-0.003	(0.005)
GDP p.c.	0.197	(0.209)	0.634***	(0.129)	-0.342	(0.209)	-0.783***	(0.150)
Constant	-1.531	(1.988)	-4.447***	(1.220)	2.788	(1.987)	5.943***	(1.372)
Observations	573		1,173		552		1,031	

Standard errors in parentheses. Significance: *** p<0.01, ** p<0.05, * p<0.1

Table A2. Estimation of the Share Equations (3) for Labor and Capital

	(1)		(2)		(3)		(4)	
	Credit-only MFIs				**Credit-plus-Deposit MFIs**			
	Unsubsidized		**Subsidized**		**Unsubsidized**		**Subsidized**	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Labor Share								
ln(number of active borrowers)	0.047***	(0.006)	0.056***	(0.004)	0.051***	(0.006)	0.046***	(0.008)
ln(loans in USD)	-0.053***	(0.007)	-0.081***	(0.004)	-0.037***	(0.008)	-0.043***	(0.010)
ln(number of voluntary depositors)					-0.006	(0.004)	0.005	(0.004)
ln(deposits in USD)					-0.023***	(0.006)	-0.018***	(0.006)
ln(PLabor)	0.083***	(0.008)	0.078***	(0.004)	0.083***	(0.008)	0.052***	(0.008)
ln(PFinCapital)	-0.067***	(0.007)	-0.063***	(0.003)	-0.091***	(0.007)	-0.046***	(0.006)
Constant	0.417***	(0.014)	0.372***	(0.005)	0.300***	(0.010)	0.315***	(0.012)
Mill's ratio	-0.061***		-0.079***		0.007		-0.005	
Financial Capital Share								
ln(number of active borrowers)	-0.032***	(0.007)	-0.046***	(0.004)	-0.051***	(0.009)	-0.036***	(0.010)
ln(loans in USD)	0.052***	(0.008)	0.081***	(0.004)	0.009	(0.005)	-0.011**	(0.006)
ln(number of voluntary depositors)					0.019*	(0.011)	0.058***	(0.012)
ln(deposits in USD)					0.034***	(0.009)	0.012	(0.008)
ln(PLabor)	-0.067***	(0.007)	-0.063***	(0.003)	-0.091***	(0.007)	-0.046***	(0.006)
ln(PFinCapital)	0.080***	(0.008)	0.088***	(0.004)	0.178***	(0.009)	0.133***	(0.008)
Constant	0.310***	(0.018)	0.337***	(0.006)	0.379***	(0.012)	0.329***	(0.015)
Mill's ratio	0.041		0.036***		0.018		0.022*	
Observations	573		1,173		552		1,031	
Uncensored observations	301		998		285		205	

Standard errors in parentheses. Significance: *** p<0.01, ** p<0.05, * p<0.1