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Learning Curve Spillovers and Transactions Cost in the Microfinance Industry of the Philippines

Jovi Dacanay C*

School of Economics, University of Asia, The Pacific Pearl Drive Corner St. Josemaria Escriva Drive Ortigas Center (1605), Pasig City, Philippines

Abstract

Microfinance institutions (MFIs) in the Philippines have gained a reputation for operating as a for-profit institution reaching the poor through micro-lending. The problem or issue which the study addresses is to determine how MFIs in the Philippines are able to attain operational self-sufficiency, the established indicator for financial viability among microfinance institutions, in spite of high transactions cost. The phenomenon may be verified by the following research question: does the behavior of operational and transactions costs among group and individual microfinance lenders manifest experience or learning curve spillovers and a U-shaped supply curve? The study has two objectives. First, using appropriate measures of financial and social performance, the study shall empirically verify the phenomenon of experience or learning curve spillovers among MFIs. Second is to estimate the supply curve for loans to the unbanked poor and verify that it is U-shaped.

The results of the pooled least squares with cross-section random effects regression estimation show that both NGOs and rural banks are attaining both objectives of operational self-sufficiency and moderate to good social performance, through the spillover effects of learning, that is, fast learning for rural banks and moderate learning for NGOs. Operational and transactions costs are high but decreasing for both rural banks and NGOs. Older, more mature NGOs and rural banks are able to set transactions cost at the prescribed level of 11%-25%. Such costs ensure that the MFIs operate in order to both financial performance and outreach.

Keywords: Transactions cost; Operational self-sufficiency; Social performanc; Experience curve; Spillovers

Introduction

The Philippines maintains its standing as No. 1 in the world in microfinance regulatory environment. For four years in a row (2009-2012), the Economist Intelligence Unit's global survey has ranked the Philippines as number one in the world in terms of policy and regulatory framework for microfinance. The Philippines is also consistently ranked at the top ten for having a good microfinance business environment. The survey noted that the Philippines recorded material gains in transparency in pricing given the BSP's issuance of improved rules on transparency and disclosure. However, the microfinance industry in the Philippines suffers from the incidence of over-borrowing and the high cost of transactions.

Statement of the research problem

The study investigates the relationship between transactions cost and operational self-sufficiency in the microfinance industry of the Philippines. When micro-lenders target the entrepreneurial poor, monitoring regularity of payments of borrowers may be costly. This leads to the main problem of the paper: In spite of the presence of transactions cost, can the microfinance industry achieve operational efficiency? The study has two objectives. First, using appropriate measures of financial and social performance, the study shall empirically verify a downward sloping experience curve. Second is to estimate the supply curve for loans to the unbanked poor and verify that it is U-shaped. Both objectives shall lead the study to a verification of decreasing operations cost and transactions cost, thereby allowing MFIs to operate more efficiently.

Significance of the research question

The Philippines has a favorable regulatory environment which allows rural banks to operate in a financially viable manner in spite of allotting a certain percent of credit made accessible to the unbanked, allows rural banks to financially include them. Why? There has been a significant increase in the number of active borrowers in the Philippines since 1994. Microfinance activities have been existing previous to the 1997 establishment the regulatory body called National Credit Council. Through microfinance, the unbanked, that is, micro entrepreneurs who do not have access to the lending activities and practices of commercial banks, had access to loans. Now, financial services to the poor are provided by NGOs, cooperative and rural banks [1,2]. Previous regulation by the Central Bank of the Philippines had

that is, micro entrepreneurs. Reason is that the regulatory environment

Previous regulation by the Central Bank of the Philippines had directed credit, also called subsidized credit which did not work. Reason: micro entrepreneurs have to be trained and assisted in order to finance and operate a business viably. There was a need for human capital development [3].

In spite of the Philippines scoring high internationally in terms of creating a policy environment that enhances financial inclusion and effective financial access to the unbanked, it scores low on financial education and monitoring. Payments system, transparency in lending and data collection for existing NGOs can be improved so as to closely monitor and evaluate the financial and social outreach performance of these MFIs. The Philippines scored low on a supporting institutional framework which would incentivize MFIs to achieve accounting

*Corresponding author: Jovi Dacanay C, Economist, School of Economics, University of Asia, The Pacific Pearl Drive Corner St. Josemaria Escriva Drive Ortigas Center (1605), Pasig City, Philippines, Tel: 6326370912; E-mail: jovi.dacanay@uap.asia

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transparency, adherence to international standards of accounting, dispute settlements for unfair and time-consuming loan processes, an integrated credit bureau and policy and practice of financial transactions through agents [1]. Even if the microfinance industry has allowed e-commerce, with the cooperation of telecommunications services such as Smart Communications and Globe Telecom, to be made available for the payment of loans, loan officers are crucial in order to monitor and ensure the regular payment of loans. All these seem to denote high transactions cost.

Such high transactions costs may hinder the further expansion of financial access to the unbanked, as there is still 2.9 million families which are unserved by microfinance institutions [4]. There is a large, about 67%, unmet demand for micro loans to the entrepreneurial poor, henceforth denoted as the unbanked.

Scope and Limitations

The study focuses on the occurrence of transactions cost as human asset specificity to explain the reason for high operating costs among MFIs. However, such types of costs also imply experience and learning. The theoretical formulation of experience, learning and transactions costs proper to the microfinance industry is non-existent to date.

Due to a lack of access to actual data per firm over the amount of loans and interest charged to each borrower, the study focused on annual data per MFI made accessible in the Microfinance Information. Exchange Portal (MIX). Borrowing and payment behavior of creditors would be important in order to detect the occurrence of mission drift in an MFI. Indicators used in the regressions are based on the accepted accounting variables which are accessible through the MIX website. As a consequence, relevant variables in the study are interest rates charged to micro-borrowers, human asset specificity and social performance. The indicators used in the global industry are operating expense ratio (also known as operating cost per dollar of loan), personnel expense ratio and the social efficiency index.

The social performance indicators used in the study are number of borrowers, depth of outreach (Average loan size over GDP per capita also termed as national loan size), and the social efficiency index (Operating Expense Ratio x cost per borrower) Outreach is only one aspect of social performance for MFIs.

The phenomenon of multiple loans across various MFIs cannot be observed from the data used, as this phenomenon would involve detailed MFI data. Anecdotal information claims that some MFIs apply for a loan to other MFIs so as to repay their loans, leading to overindebtedness. Previous to 2011, MFIs were allowed to lend only up to US\$3,500. However, a BSP circular issued in 2011 has allowed rural banks to lend up to US\$7,000.

Methodology

Using appropriate financial data provided by the Microfinance Information Exchange Portal, the likelihood of a U-shaped supply curve for loans to the unbanked poor, due to the high unit cost of transactions, shall be discussed. Then, an analysis of the factors explaining transactions cost, through an estimation of the appropriate/ proper measure of operational self-sufficiency, an evaluation of selected social performance measures for the microfinance industry, and, indicators for cumulated output shall be done. Operational self-sufficiency is the measurement used to denote financial viability among MFIs, whereas, the social performance index and the number of women borrowers and outreach is the variables used to indicate social performance. The regression estimation procedure, using unbalanced panel data, with cross-section random effects shall be performed in order to evaluate whether or not the chosen MFIs for the study are either: (a) decreasing their transactions cost but at a constant or level of operational self-sufficiency, or, (b) improving their operational selfsufficiency and lowering their transactions cost at the same time.

Definition of Terms

The following terms are used based on the stated definitions. The conceptualization and definition of these terms are followed [5,6].

Operating expenses include the costs of implementing the loan activities personnel compensation, supplies, travel, depreciation of fixed assets, etc. Operating expenses consume the majority of the income of most micro lenders' loan portfolios, so this component is the largest determinant of the rate the borrowers end up paying.

Financial viability refers to the operational and financial sustainability of MFIs. Operational and financial sustainability refers to the achievement of cost effective strategies in order to reach the unbanked and entrepreneurial poor. Financial outcomes would indicate a lowering of portfolio at risk (90 days), constant or sustained returns to assets and cost of operations over total assets.

In a broad perspective, the social performance of MFIs is associated with their social objective, which is extending credit by targeting the poor and the excluded, the adaptation of services and products to target customers, and improvement in the equity capital of beneficiaries through the creation and strengthening of community relations. Specifically, the social performance of MFIs refers to their mission: the alleviation of poverty by extending credit to the unbanked poor, while at the same time operating cost effectively, that is, achieving operational and financial sustainability or viability.

Financial inclusion, as an objective of MFIs, refers to their capacity to extend credit to the unbanked entrepreneurial poor in a financially viable way. It is used synonymously with the social and financial performance of MFIs.

Transaction costs in credit markets therefore are indirect financial costs generated by various processes, including the cost of searching and collecting relevant information. They are indirect costs caused by frictions in the flow of credit funds, preventing credit markets from reaching efficient market equilibrium. Consequently transaction costs of lending consist of the costs of administering credit, coordination costs and the costs of the risk of default. It is further highlighted that administrative costs are those which are directly attributable to the processing, delivering and administering of loans while coordination costs are those resources a financial institution dedicates to ensuring that clients adhere to terms stipulated in loan contracts.

Literature Review

Historical development

Past government initiatives for poverty alleviation in the 60s to 80s were focused on direct credit and guarantee programs, which provided massive credit subsidies to bring down the cost of borrowing for target sectors. These programs resulted in very limited effectivity and outreach, and at a great cost to the government's budget. These programs were met with massive repayment problems, capture of funds by large-scale borrowers, neglect of deposit mobilization and huge fiscal costs for the government [7].

Learning from these experiences, the government policies of the

last decade have shaped reforms to develop a market oriented financial and credit policy environment that promotes and supports private institutions to broaden and deepen their services; while government will instead focus not on the actual provision of credit but on creating the enabling policy environment. It is during this period that the National Strategy for Microfinance was created imbibing the following principles: 1) Greater role of the private microfinance institutions in the provision of financial services, 2) Existence of an enabling policy environment that facilitates the increased participation of the private sector in microfinance, 3) Adherence to market oriented financial and credit policies, 4) Non-participation of government line agencies in the implementation of credit and guarantee programs. Several laws were enacted in support of this strategy namely; Social Reform and Poverty Alleviation Act, Agriculture and Fisheries Modernization Act, Barangay Micro-Business Enterprises Act, Executive Order 138 and the General Banking Act of 2000. With the National Strategy for Microfinance and the subsequent policy issuances and laws that were passed, the microfinance market has been driven by the private sector with the government only providing the enabling policy and regulatory environment. The strategy also laid the groundwork for the establishment of a regulatory framework for microfinance as well as the uniform set of performance standards for all types of microfinance institutions [7].

Given this backdrop, there are now three types of institutions that provide microfinance services: the nongovernmental organizations (NGOs), cooperatives and rural banks. The success factor in developing a range of microfinance institutions is that the policy environment encourages the development of these different types of institutions recognizing the strength of each type in delivering microfinance services. The current players include eight microfinance oriented banks and 187 thrift and rural banks with some level of microfinance operations, approximately 300 NGOs where around 30 will have sizeable and significant microfinance portfolios, and 50 cooperatives engaged in pure microfinance activities. Together, these institutions are providing microfinance services to approximately 1.3 to 1.5 million families [7]. This number amounts to close to a third of the entrepreneurial poor [8].

Internationally, women, usually, are the clientele, low level of credit available to the poor in spite of the possibility of high returns [3,5]. The mission of the MFI is to alleviate poverty by extending credit to the unbanked poor. There are two factors which prompts an MFI to increase its average loan size over time, thereby lowering depth of outreach. First, progressive lending, which, in the microfinance jargon, pertains to the idea that existing clients can reach up to higher credit ceilings after observing a "clean" repayment record at the end of each credit cycle. Second, cross-subsidization, which entails reaching out to unbanked wealthier clients in order to finance a larger number of poor clients whose average loan size is relatively small. These two explanations are in line with the MFI social objective [5].

Policy issues

The Bangko Sentral ng Pilipinas (BSP) remains at the forefront of establishing a policy and regulatory environment conducive to financial inclusion. This stems from the recognition that financial inclusion is a worthy policy objective that could and should be pursued alongside the promotion of stability and efficiency in the financial system. It is also believed that financial inclusion is a key component of inclusive growth. The BSP is actively implementing policy and program initiatives to realize the Philippine government's vision for the financial sector: "an inclusive financial system which provides for

In spite of the absence of a regulatory body for NGOs, the BSP regulates NGOs through circulars and ordinances. The BSP aims at promoting transparency and good governance among MFIs through the Issuance of Rules Regarding the Relationship Between Banks and their Related Microfinance Non-Governmental Organizations (Circular 725, 16 June 2011). This issuance recognizes the possible synergy between a bank with microfinance operations and a related microfinance NGO/Foundation. While this has become a successful model for some, the issuance aims to ensure that the banks with related microfinance NGOs are able to safely and viably coexist by mitigating possible operational, governance and reputational risks. The salient features of the issuance includes a) requiring clear contractual agreements between the two entities, b) prohibiting bank personnel from holding any concurrent, full time positions that may cause them to be involved in the daily operations of related NGOs/foundations and c) issuing general principle sand standards that will govern the business relationships between banks and their related NGOs/foundations. (BSP Financial Inclusion Initiatives Year-End Report December 2011).

Traditionally, the central bank defined microfinance loans to be below P150,000 (US\$3,500). In December 2011, BSP issued Circular 744 that allows banks to offer the option of "Microfinance Plus" loans of up to P300,000 (US\$7,000). This is intended to lessen the occurrence of over-indebtedness among MFIs as small borrowers seem to resort to borrowing from other MFIs so as to pay the outstanding balance from a loan.

There is still, however, a need for an integrated credit bureau. Under the Republic Act 9510 (also known as the Credit Information Act (CISA)), signed into law in 2008, all regulated entities would be required to submit positive and negative information to a credit bureau under the Securities and Exchange Commission (SEC). A crucial component of the legislated is the creation of the Central Credit Information Corporation (CCIC) to receive and consolidate the credit data and to act as a central registry of credit information which will provide access to standardized information in order to overcome and replace the existing system of fragmented credit bureaus. Although the law's implementing rules and regulation were approved in May 2009, the establishment of the Central Credit Information Corporation (CICC) has not yet resulted in the operation of a functioning, active credit bureau. Under the CISA implementing rules and regulations, the proposed corporation will have a seed capital of Php 75 million. But so far, CCIC only received Php 17.5 million. The future central depositary of credit history is also still looking for an office, still forming the organization chart, and outlining plans for the rest of the year.

Meanwhile, the private sector is pursuing its own initiative. The Banker's Association of the Philippines (BAP) has its own credit bureau, which the Rural Bankers Association of the Philippines, the association of rural banks, is also using. BAP's credit information database contains approximately 3.8 million accounts and information pertaining to unpaid loans, loans under litigation, bounced checks and credit card debt. To encourage rural banks to subscribe to the database BAP-CB lowered the fee for each inquiry from Php 11 (US\$ 0.25) to Php 5.6 (US\$ 0.13) and removed the upfront subscription fee. As of January 2011, twenty rural banks have joined the bureau. Access to credit information can help rural banks identify whether loan applicants already have outstanding loans and avoid the problem of over-indebtedness, which can be harmful to the borrowers, the banks and the sector as a whole. BAP's credit bureau is almost exclusively for non-microfinance clients, however as a result, the system of fragmented credit bureaus remains intact. For example, cooperatives based in Mindanao have formed their own credit bureau called CCBOL. Perhaps the most promising initiative was taken by the leading MFIs. In early 2013, the seven largest microfinance providers (Taytay sa Kauswagan Inc. (TSKI), OK Bank, CARD Bank, CARD NGO, Negros Women, Ahon sa Hirap and ASA Philippines), which together serve about 70 percent of the estimated one million micro-borrowers in the country, signed a memorandum of agreement on the creation of the credit bureau called the "Microfinance Data Sharing System (MiDAS)". Initially, MiDAS is meant to focus on negative information, i.e. delinquent borrowers, with the view later on of establishing and implementing programs aimed at client rehabilitation. The business requirements of MiDAS are unique to its users, the microfinance institutions, with a special feature that allows for Barangay (town or village) level search for delinquent borrowers. It is the intention of the founders to expand the coverage of the credit bureau to other MFIs as well in the future [1].

New rules issued by the BSP and effective July 1, 2012 outlaw the use of flat interest rate calculation methods for regulated institutions. Unregulated NGO-MFIs and cooperatives are encouraged to follow suit but the BSP lacks the authority to require them to do so. This makes the calculation of an effective interest rate difficult. Through the flat balance calculation method, the interest rate is applied to the initial loan amount throughout the entire loan term. Through this method the borrower pays interest on the full loan amount even though the amount they have over the loan term is less and less as they repay the loan. Interest rates calculated using the flat balance appear much cheaper than declining balance rates, but are in fact nearly twice as expensive. For example, an annual interest rate of 15% charged on a flat balance results in almost the same amount in interest payments as an annual interest rate of 30% charged on a declining balance. This can make comparison between the prices of loans difficult, posing a serious obstacle to MFIs in terms of their ability to make informed pricesetting decisions and to clients in terms of comparing the prices of the loan products available to them. Through the declining, or reducing, balance interest rate calculation method, the lender charges interest on the loan balance that the borrower has not yet repaid. This amount declines over time as the borrower repays the loan, so that interest is only charged on money that the borrower is in possession of.

Theoretical issues

When one observes the behavior of commercial lenders, there seems to be a causal link as to why there is low level of credit supplied to the poor in spite of high demand. There is a high demand for credit among the entrepreneurial poor, but these borrowers have high transactions cost, and commercial lenders would incur low profit. The transactions cost come about as more effort is needed among commercial lenders, that is, monitoring costs to ensure frequent and constant payment of loans has to be done. As a result, there is a discontinuous marginal revenue curve for borrowers among the micro-borrowers or the entrepreneurial poor vis-à-vis borrowers from small and medium enterprises. This phenomenon partly explains the existence for a U-shaped supply curve, a downward sloping steep supply curve for low levels of borrowings, after which it reaches a minimum point, then the supply curve slopes upwards for higher levels of borrowings [3].

The microfinance industry has addressed or mitigated the occurrence of high transactions cost either by individual lending

(rural banks) or group lending but with individual liability (NGOS). NGOs tend to have high information cost, thus, they seek other sources of funding, i.e. donors or investors [3], with transactions cost operationalized as governance cost, one can explain the institutional organization of MFIs, i.e. vertically integrated firm has to be the structure due to asset specific transactions [9], Skilled loan officers invest time and effort in order to understand the difficulties faced by micro-borrowers in achieving their weekly repayment of loans. This investment of time and effort may be viewed as a sunk cost for both NGOs and rural banks. Through time, there is an observed decrease in operational costs per borrower, reflecting the possibility of a downward sloping experience curve for the industry [2].

Frictions in the smooth flow of contractual arrangement in transactions give way to transactions cost. The economic counterpart of friction is transaction cost: for that subset of transactions where it is important to elicit cooperation, do the parties to the exchange operate harmoniously, or are there frequent misunderstandings and conflicts that lead to delays, breakdowns, and other malfunctions? Transaction cost analysis entails an examination of the comparative costs of planning, adapting, and monitoring task completion under alternative governance structures [10].

An application of the theory on governance costs on the microfinance industry shall now be discussed. The discussion centers on the reasons why credit does not reach the poor. First, it has been observed that there is a lack of available complementary inputs when lending to micro-entrepreneurs. For example, there is a lack of financial and accounting education, there is insufficient financial capital to invest and acquire human capital, land or entrepreneurial ability in order to improve the productivity of land or any foregoing business activity. Second, investment is not based on the marginal productivity of capital or the returns on capital, but on the risk-adjusted returns. The poor may promise higher returns but they also represent much higher risk [11,12]. An adverse selection problem usually happens. These problems have been reduced by monitoring but such activity lead to high cost due to the small scale of the loan made available to many borrowers. This aspect characterizes the asset specificity of negotiations for loans and the monitoring of loan payments. Third, is the transactions cost of loans. Partly, these are the costs of monitoring and of creating legal liens on whatever collateral the poor may have to offer. But besides these, the time the banker spent in helping an illiterate man fill out an application form (to have his particulars available), the time spent to process the loan and to take back cash in small installments and keep records, all have to be costed [13].

Empirical issues

Empirical findings based on various data sources show that there is a difference in performance when more years are covered per MFI. This may imply that the number of years of existence of an MFI is directly proportional to operational self-sufficiency (financial revenue over the sum of financial expense, impairment loss and operating expense), and, the capacity to sustain outreach targets with commercial funding and internally sourced equity [2,5], studied empirical outcomes first before any theoretical explanation is given; i.e. social performance, financial performance and the current phenomenon of mission drift [13], focused on the empirical assessment of microfinance performance in India, using indicators of transactions cost, especially with group lending, making use of [14], computation of information cost [13] stresses the importance of commercially operated MFIs, which allows the recognition of the role of transactions cost when examining the interest rates charged by MFIs. The results highlight the mistakes committed by the government of India in handling the MFIs in Andhra Pradesh. Microfinance activity was governed by state sponsored loans crowding-out private sector initiative and the needed financial discipline which arises through commercial or market-led operations in microfinance. Rural officials use microcredit as a way to increase patronage within the region of Andhra Pradesh. The government of India decided to stop microfinance activity in this state leading to client drop-out, access to funding froze, many MFIs in the area defaulted [1].

Transactions Cost for Microfinance Institutions

Hypotheses

The research hypothesis to be tested in the study is: higher experience or learning curve spillover effects lessens operating and transactions cost.

For the microfinance industry, regulation by the Bangko Sentral ng Pilipinas (BSP) plays an important role in monitoring operating costs and operational self-sufficiency. But only rural banks are regulated by the BSP. Thus, the study shall proceed with an analysis for rural banks and another analysis for NGOs.

Operating costs for rural banks may manifest higher experience or learning curve spillover effects and lesser transactions cost than NGOs. This phenomenon may be due to their longer commercial lending experience, their strict observance of industry standards for operational self-sufficiency, and the larger average loan portfolios, comparison to MFIs, handled by loan officers.

Operating costs for NGOs may manifest lower experience or learning curve spillover effects and may have higher transactions cost than rural banks. This phenomenon may be due to their shorter commercial lending experience, the non-regulated nature of their operations, and, smaller average loan portfolios in comparison to that handled by loan officers in rural banks.

Theoretical and conceptual framework

The theoretical approach to the study of the efficiency and productivity of MFIs focuses on the manner in which transactions between the micro-borrower and the loan officer are done. For grouplending MFIs, loans per borrower are radically of a smaller size than that of commercial banks, henceforth referred to as the traditional banking sector, with loans averaging to at most a tenth of loans given by the traditional banking sector to their borrowers. Also, borrowers of MFIs may operate their business in remote areas, far from the nearest MFI. As a consequence, loan officers of MFIs usually have to travel to these areas weekly so as to collect loan payments from a group of borrowers, usually numbering to 30-40 in the Philippines. Some loan officers of group lending borrowers collect more often than once a week. This process involves time and effort for loan officers as problems of repayment of loans have to be immediately resolved per collection period, i.e. 52 collection periods annually, so as to ensure that borrowers repay their loans.

Transactions of rural banks involved in MFI operations, henceforth referred to as simply rural banks, do not have to go to the area where their individual borrowers operate their business. The borrowers go to the most accessible rural bank in order to turn-in their weekly repayment. Given this background the theoretical approach most appropriate to the study of the efficiency and productivity of MFIs in the Philippines would be transactions cost economics.

These specific characteristics of microcredit can now be applied

to the standard theory of average and marginal revenues. With asymmetric information explanation, marginal costs are much higher for the poorer people than for richer people. The economies of scale effect of the transactions cost explanation remains, as well as the ultimate increase in risks with over-indebtedness, and the supply curve becomes downward sloping as loan size increases for richer people. The final curve is U-shaped as in the standard literature because after some point over-borrowing by rich people increases their risks [3].

All the above reasons imply that even if there are no usury laws in a country, lending to the poor is not possible for the commercial sector, as illustrated in figures, which puts together the Marginal Revenue curve (MR) and supply curve for loans (based on the marginal cost curve). Although the simplistic model that is proposed suffers from many limitations as enumerated above, it is good for explaining the fundamentals. Although other authors may have said the same thing, the representation is new and may therefore lead to additional insights [3].

Figure 1 shows that the first portion of the MR curve does not have any equilibrium with the supply curve. As a result, the organized sector did not lend to the poor. The associated average revenue (AR) curve is consequently of little relevance to any monopolistic banker who decides to enter the market. The final equilibrium is at low rates of interest (r_o) but is available only to wealthy borrowers. Since this end of the market is more likely to be subject to (perfect) competition, interest rates are not going to be much higher than marginal cost, but we can associate a demand curve if for institutional reasons there is monopoly power. In this case, the demand curve would start at the same level as this portion of the discontinuous supply curve and (in the simple linear case) would slope downward at half the speed (the AR_{rich} curve would take twice as long as the MR_{rich} curve to reach the X-axis). Interest rates would then be higher at r_m [3].

The MR of capital curve is discontinuous at a point owing to effect of human capital available only to not so poor borrowers. The supply curve is U shaped owing to asymmetric information and transaction costs. As a result, poor people do not receive loans but wealthier people do, at a fairly low interest rate, r_o if there is competition and r_m if there is not solution [3],Why do money lenders lend at high interest rates? Figure 1 illustrates this graphically, using the discontinuous marginal revenue curve and U-shaped supply curve analysis developed above. The lower asymmetric information costs of moneylenders lower the supply curve of credit facing poorer borrowers. As a result, they also get loans, but at higher interest rates of r_{MLm} , much higher than the



rates charged by the organized sector of r_{o} to richer borrowers. Since moneylenders are monopolistic, they charge rates on the associated Average Revenue curve. The supply curve of moneylenders cannot fall lower because their costs are high for various reasons: no access to cheap deposits, little access to debt from the organized sector (they may get personal loans by pledging personal assets), making them reliant only on their own equity capital. This equity capital may also suffer from seasonal variations in demand, indicating that the moneylender may have to recover higher interest rates in the busy season [3].

Moneylenders have lower transaction costs and lower information asymmetry. As a result, they push down the supply curve for poorer borrowers to the dashed line shown in the diagram. They charge high interest rates r_{ML} , much higher than the interest rates r_{o} charged by the competitive organized sector to the wealthier borrowers [3].

Why do banks refuse to enter the market for microcredit? If moneylending is profitable, why don't new entrants like banks increase competition and drive down interest rates and profits? At the very least, they should drive these down to r_{MLc} . The suggested answers are several and are similar to reasons why banks don't come in reference [3].

The first is based on transaction cost or barriers to entry. A new entrant has high start-up costs: if he is not from the locality, he does not know the customers and does not have the case histories. These are developed by experience. Also, it is difficult, time consuming and expensive to market and monitor in isolated villages, driving up costs especially for small transaction sizes. As a result, a new entrant faces higher risks and higher costs than the local established moneylender (Figure 2) [3].

Also, the existence of more than one moneylender (competition as opposed to monopoly) breaks down the business model of the established moneylender. The borrower could shift from one moneylender to another. Greater competition will increase default rates to the first institution, drive down interest rates and reduce the total number of customers. As a result, moneylending would become a lossmaking proposition, driving out competition. Therefore, increasing the number of moneylenders is not a solution [3].

Finally, more important, the market equilibrium in this segment would remain at OD in Figure 2 and interest rates would not fall below the MR curve. Thus, moneylending and other business would be competing only for lowering profits to the segment as a whole. This means that the market of DC for loans in this segment is still not



being served and, in the face of excess labor available to people in the same segment, productive capacity is underutilized and economic development is suboptimal [3].

How can microcredit overcome information asymmetry and other barriers? One method to overcome problems linked with information asymmetry used by microcredit organizations is group lending. Although there are many different forms of group lending exercised by microfinance institutions (solidarity groups, village banking, branch banking, etc.), the essential method consists in lending to individuals in a group, and using group pressure to ensure repayment by individuals. This group pressure may come, for example, if other members of the group would get loans only if the first borrowers pay back. As a result of this, people would not like to form groups with others who are unlikely to pay back. Thus, the adverse selection problem is avoided without the bank getting information.

The second tool for overcoming asymmetric problems is the provision of incentives: to threaten to stop lending, on the individual level, is incremental loans or progressive lending. Thus, if the borrower's project can be divided into a series of projects, the MFI lends a small amount first for one project and the next loan is given only if the first one is repaid. Thus, the borrower is assured of funding for his project, if he can overcome the moral hazard issues of being capable of managing the project and be willing to repay. Another method used by MFIs is to collect repayments in public. Thus, an agent passes at a fixed time once a week and all the borrowers are present and repay him in front of everybody. This reduces collection costs as well as creates a social pressure to repay on time. In some MFIs, there are also medals given for a series of successful repayments, acting as further reinforcements both for the individual receiving the medal as well as the others watching him receive it.

The third tool mentioned above was frequent repayments. The fourth tool is non-traditional collateral. A fifth method used by MFIs is to focus on women. All of the above methods do not necessarily require information being transferred from the individual borrower to the bank, but they overcome the problems of asymmetric information. However, a sixth method is used to improve the information available to the MFI. This includes contacting neighbors to find out information about a potential borrower. Some MFIs also encourage cross reporting where borrowers are encouraged to be whistle blowers, in the interest of the larger group, if they think that some borrower is not going to repay.

The final result of all these factors is illustrated in Figure 3, For graphic simplicity the average revenue curve of the moneylender is taken off but we can see he is charging the higher monopolistic rate. Since no market is yet saturated, MFIs may also be in the position of monopolies. As a result they would charge interest rates somewhere between $r_{\rm MFIc}$ and $r_{\rm MFIm}$, depending on whether their mission is purely social and purely for-profits.

These developments have led to money flowing from the MFIs to the poor to the extent of DD': with moneylenders, the market obtained OD, with MFIs, it obtains OD'.

If the supply curve only shifts downward in this range and not outward to the right, it would also affect the equilibrium solution for richer markets. As shown in Figure 3, the market of the poor now extends from OA earlier to OA' because these people now demand more loans since their productivity has gone up. The next segment therefore shifts to the right and the MR curve of the rich shifts to $MR'_{RICH'}$.



Microfinance institutions have lower cost of capital and they overcome information asymmetry. As a result, they push down the supply curve for poorer borrowers further to the dotted line shown in the diagram. At the same time, group monitoring and involvement may actually boost the performance on projects and push the MR curve of the poor to MR'. The MFIs charge interest rates $r_{\rm MFIc}$, or $r_{\rm MFIm}$, depending on whether there is competition or monopoly in the local market, in either case much higher than the interest rates $r_{\rm o}$ charged by the organized sector to the wealthier borrowers, but much lower than the interest rates $r_{\rm ML}$ charged by money-lender.

The perfect competition equilibrium interest rate to the rich rises from r_o to r'_o . Some rich borrowers borrow less. Correspondingly, the unserved people in the poor market is D'C' since only those willing to pay interest rates above r'_o will be able to use the capital with their available labor, given the new human capital thanks to MFIs, other Non-Government Organizations and governmental dispositions. Although international flows may not affect the national markets of developing countries immediately, they would affect the relative availability of credit in developed countries and the raising of interest rates may occur [3].

Transactions cost economics can then be applied to the microfinance industry. The occurrence of a lowering of interest rates applied to borrowers with a satisfactory payment history would be possible only with the specialized effort applied by loan officers who have invested time and effort to provide information and education to micro-borrowers who may not have acquired the education necessary to carry-on and manage financial and business negotiations. The type of transactions cost proper to microfinance are relationship-specific assets: site specificity, physical asset specificity, dedicated specificity and human asset specificity [9,15]. Understanding the nature of behavioral characteristics in the monitoring of loan payments is not a question of understanding the statistical risks involved in the transactions, which often require a large number of instances, i.e. renegotiations. The bilateral business agreements are specific to the circumstances of the micro-borrower, and would require specific talents and communication capabilities on the part of the loan officers. These human-asset specific relationships enable the MFI to incur agency costs. The study focuses only on the asset specific causes of transactions cost, and specifically, on those which refer to human assets such as skills and capabilities which allow a longer term duration of negotiations between the microborrower and the loan officer.

As the scale of the transactions increase, the firm's demand for

borrowings increase, and a vertically integrated firm can better exploit economies of scale and scope in production. Vertical integration is more likely to be the preferred mode of organizing the transaction for any given level of asset specificity. This process involves a learning phase for each firm involved in microfinance or micro-credit lending (Figure 4).

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The experience of a firm at any given age may be measured in a number of ways including, inter alia, the age of the firm, the cumulative prior output of the firm, which for microfinance would mean average loan balance per borrower, and, number of active borrowers, the average tenure of its employees, or the average length of related work experience of its employees. The most popular implementation assumes that the current unit cost of a firm of age v, c(v), is a decreasing function of its cumulative prior output, $\gamma(v) = \int x(s) ds$, where x(s) is the firm's output given its market share at age v. In most research, most especially in empirical and macroeconomic applications, a power rule, a functional form for cost, c(v), using constant elasticity to scale, of the following form:

$$c(\nu) = c(0)\gamma(\nu)^{-\beta} = m + c_o e^{-\overline{y}}$$
⁽¹⁾

is assumed [16,17] For Equation (1), *c* refers to cost, *m* refers to fixed costs, \bar{Y} is the cumulated industry output at the end of the period and λ refers to industry spillovers, i.e. organizational structures so as to improve repayment and other relevant experiences in dealing with micro-borrowers is made known to the entire industry. Note that the equation used to estimate the experience curve uses firm figures but the result will refer to the total industry as market shares per firm in the MFI industry are not significantly different from each other, i.e. the Hirshman-Herfindahl index is <0.15, indicating that market shares per firm in terms of number of borrowers and gross loan portfolio have a close to a perfectly competitive market structure[18,19]. This specification of the learning curve assumes that with a close to competitive market structure, cost structures are not significantly different and spillovers occur. Proprietary experience per firm due to the existence of patents is almost nil.

The differences in the cost curves will depend on the spillover parameter, λ , the mean of the assumed exponential function, which is also interpreted as a rate or speed of cost decrease. Lower levels of λ would indicate a faster learning time since the intercept at time = 0 would also be higher. Thus, from Figure 4, $|\lambda_3| < |\lambda_2| < |\lambda_1|$. Note that the spillover rate is the reciprocal of the coefficient of the variables indicating cumulative output, when a regression estimation is done on unit cost as dependent variable and a cumulative output indicator as repressor, it [18,19] would refer to experience or learning curve spillovers in order to incorporate the seminal concept of learning-by-doing [16].

Scale economies may be present for the commercial banking sector. However, such may not be the case for banks dealing with microentrepreneurs. The decrease in the cost of transactions within a specific level of borrowings among micro-entrepreneurs may not necessarily denote scale economies but may just be an indication that more experience in transacting with the unbanked poor enables microfinance institutions to acquire a higher level of learning, thereby, lessening the costs of monitoring. This phenomenon may be summarized by a downward sloping experience curve, which flattens rightwards. Passive learning, a phenomenon which gives rise to learning from experience, refers to the conventional economic characterization of organizational learning by doing as an incidental and costless byproduct of a firm's production activities [17]. A firm that increases productivity through



passive learning will be said to move along an experience curve [17].

The experience curve, also synonymously termed as the learning curve, is the curve that relates unit costs to accumulated volume [18,19]. The learning curve is believed to characterize the costs in some industrial markets, and can be an important determinant of competitive behavior in those markets (Spence, 1981). When there is a learning curve, the short-run output decision is a type of investment decision. It affects the cumulated output, a stock, and through it, future costs and market position [19]. When additions to output lower future costs, it is appropriate for the firm to go beyond the short-run profit maximizing level of output.

The occurrence of an experience curve or a learning curve spillover, that is, a decrease in operational and transactions cost in the case of the microfinance industry, with cumulated output, differs from economies of scale. Economies of scale refer to the ability to perform activities at a lower unit cost when those activities are performed on a larger scale at a given point in time. The behavior of the experience or learning curve spillover refers to reductions in unit costs due to cumulated experience over time. Economies of scale may be substantial even when learning or experience is minimal. This is likely to be the case in mature, capital-intensive production processes. Likewise, experience may be substantial even when economies of scale are minimal, as in such complex labor-intensive activities as the production of handmade watches [15]. In industries wherein asset specificity occurs due to the diversity of transactions handled by loan officers, initially high costs may happen in transactions and negotiations carried out even by skilled personnel. Through time, learning occurs on the part of bank personnel monitoring loan payments as well as micro-creditors, resulting to experience or learning curve spillovers.

Methodology

To be able to test the stated hypotheses, the empirical methodology shall proceed with two steps, which also pertain to the objectives of study. The study therefore attempts to empirically verify (1) a decreasing cost over cumulative output indicated by age, also called a learning or experience curve spillover, and (2) a U-shaped supply function, for the microfinance industry. Pooled least squares regression with cross-section random effects shall be performed for (1) and (2).

The coefficient of age upon establishment and average loan balance per borrower shall be the indicator for experience or learning curve spillovers. The greater the spill-over effects, the greater the capacity of the MFI to decrease transactions cost, assuming that the data covers a time period from zero output up to a planning period. The reciprocal of the coefficient of the cumulative output shall be the indicator for the spillover rate as the regression model to be performed will not be a logarithmic function. Experience in negotiations and transactions with micro-borrowers communicated within each MFI and to the whole MFI industry is likely to result to a trend towards lowering transactions cost.

Due to the unique nature of MFI operations, wherein, the human capital specificity of each transaction with borrowers is also a function of the average loan per borrower, a regression shall be performed for both rural banks and NGOs with human capital specificity as dependent variable. Human capital specificity, as indicated by personnel expense per average loan portfolio per borrower, accounts for more than 50% of operating expenses. Thus, the study would verify if MFIs undergo a learning curve as regards transactions with micro-borrowers. The data only extends to aggregates per firm and not by loan officer or employee per firm. Thus, the study shall use average loan per borrower and age upon establishment as the indicator for cumulative output, the operating expense ratio or cost per dollar of loan as the indicator for unit cost, and, personnel expense ratio or the personnel cost per dollar of loan as the indicator for human asset specificity, or the transactions cost indicator.

The functional form used for the learning or experience curve assumes spillovers, that is, rivals learn from each other's experience, i.e. organizational structures are made known to all in the industry, due to the presence of a regulatory body monitoring the financial viability of the players. If learning is neither too slow nor too rapid, no significant entry barriers arise.

Using the operating expense ratio as the cost indicator of MFI operations and dependent variable, a regression using operational self-sufficiency, average loan balance per borrower, number of active borrowers, capitalization, size, actual age (upon establishment), square of actual age, and, outreach as explanatory variables, can be done, answering objective 1. The regression model used is adapted from [20], who used the same independent variables to explain financial performance. In their empirical model, labor and capital costs were included as regressors. For the study, the operating expense ratio was been used, indicator for unit cost, as a dependent variable and cumulated output would be indicated by age upon establishment, and, average loan balance per borrower for objective 1. The estimated regression for Equations (2) and (3) shall be plotted with age upon establishment and operating expense ratio (unit cost indicator) and personnel expense ratio (asset specificity indicator).

The reciprocal of the coefficient of average loan balance per borrower and age upon establishment shall be the indicators for the experience or learning curve spillover rate. Through time, it has been observed, microfinance firms increase their average loan balance per borrower as they are more capable, with greater experience, to monitor and manage increasing amounts of credit made available to borrowers. To achieve an asymptotic curve, the square of age shall be included in the regression equation. The experience curve can be estimated using the following equation, with the operating expense ratio used as the indicator for unit cost:

 $\begin{array}{l} \mbox{Establishment Squared}_{ijt} \ \beta_8 \ Scale_{ijt} + \ \beta_9 \ Outreach_{ijt} + \ \beta_{10} \ Number \ of \\ \mbox{Women Borrowers}_{ijt} + \ \beta_{10} \ Social \ Efficiency \ Index_{ijt} + \ \epsilon_{it} \ \ (2) \end{array}$

Note that performance indicators have been used as regressors in the empirical model. This specification was used due to the need for MFIs to achieve the regulated or standard levels for operational self-sufficiency, which should be greater than 100%. This level of operational self-sufficiency has to be reached even while achieving its social outreach motives. The meaning of the above-mentioned explanatory variables and the expected signs from the regression are indicated in Table 1.

The downward sloping learning or experience curve happens as a result of a decreasing operating cost per dollar of loan across time, i.e. more years of experience by the micro-borrower in transacting with the MFIs and its personnel. As mentioned by Shankar [13], transactions costs do seem to decrease with time for the Philippines. In fact, there is much hope for interest rates charged to micro-borrowers due to an expectation that as micro-lenders acquire more experience they learn to lend more efficiently [2], thus, what is expected to be observed for operating costs must also be observed for transactions cost, the main cost driver for MFIs. This observation will be verified through the following regression, with the personnel expense ratio used as the indicator for transactions cost:

Personnel Cost per dollar of Loan_{ijt} (Personnel Expense Ratio) = $\alpha_{ij} + \beta_1 OSS_{ijt} + \beta_2$ Average Loan Balance per Borrower_{ijt} + β_3 Number of Active Borrowers_{ijt} + β_4 Capital Cost_{ijt} + β_5 Gross Loan Portfolio per Asset_{ijt} + β_6 Age upon Establishment_{ijt} + β_7 Age upon Establishment Squared_{ijt} β_8 Scale_{ijt} + β_9 Outreach_{ijt} + β_{10} Number of Women Borrowers_{ijt} + β_{10} Social Efficiency Index_{ijt} + ϵ_{it} (3)

Neo-classical economic theory on competitive market structures points out that cost improvements happen as firms (or the whole industry in a given market) acquire more experience. Eventually, efficiency lessons are learned, and the experience curve flattens out. At this point efficiency improves slowly even in the absence of technological breakthroughs [2], In addition to the learning curve, there is hope that the pressure of competition will force lenders to find more efficient delivery systems. There seems to be, therefore, a global evidence for a flattening operating cost curve for the microfinance industry, as micro-lenders such as MFIs, gain more lending experience to micro-borrowers with time or age.

The study shall use high quality data reported in the Microfinance Information Exchange Portal (MIX). Profitability patterns can be observed across the two main institutional types, also denoted as lending types in the study, identified in the MIX are as follows:

1. Individual-based Rural Bank lenders: institutions that use standard bilateral lending contracts between a lender and a single borrower. Liability for repaying the loan rests with the individual borrower only, although in some cases another individual might serve as a guarantor;

2. NGO group lenders: institutions that employ contracts based on a group with either joint or individual liability implemented with solidarity groups (in the spirit of contracts used initially at the Grameen Bank in Bangladesh and at BancoSol in Bolivia). Loans are made to individuals within the group, which has between 30 to 40 members depending on the institution and location.

In a study by Morduch [20], it has been observed that village banks have the highest portfolio yields (indicator of financial self-sufficiency) and expense ratios (indicator of operating cost self-sufficiency), but at the same time has the lowest return on assets (indicator of profitability). The individual based lenders are observed to have the most financial and cost efficient mode of operations and are also the most profitable.

For RP, the MIX data can only specify the type of market, i.e. poor vis-à-vis better-off clients. Rural banks usually lend individually. Grameen type rural banks loan to groups, but liability is rendered to each individual member of the group. NGOs lend to groups but liability for loans can either be individual or by group. But accounting for liability cannot be observed from the MIX data. From Figure 5, it can be observed that rural banks have financial and cost efficient mode of operations and are also the most profitable [21-24].

This observation shows that the analysis of the operational efficiency by lending type *i*, referring to either individual-based lenders such as rural banks, or, group lenders or NGOs, across *j* firms and *t* years, from 2003 to 2011, would be affected by the level of operating and transactions cost, and vice versa. When costs per loan transaction are placed as dependent variable, the equation may be interpreted as a supply for loans function, obtaining the regression procedure to account for Objective 2 of the study. The basic regression model to be used, with the personnel expense ratio used an the indicator for human asset specificity, is as follows:

 $\begin{array}{l} \mbox{Transactions Cost}_{ijt} \mbox{(Personnel Expense Ratio)} &= \alpha_{ij} + \beta_1 \mbox{OSS}_{ijt} + \\ \beta_2 \mbox{Average Loan Balance per Borrower}_{ijt} + \beta_3 \mbox{Average Loan Balance per Borrower} \mbox{Squared}_{ijt} + \beta_4 \mbox{Number of Active Borrowers}_{ijt} + \beta_5 \\ \mbox{Capital Cost}_{ijt} + \beta_6 \mbox{Gross} \mbox{Loan Portfolio per Asset}_{ijt} + \beta_7 \mbox{Age upon Establishment}_{ijt} + \beta_8 \mbox{Scale}_{ijt} + \beta_9 \mbox{Outreach}_{ijt} + \beta_{10} \mbox{Number of Women Borrowers}_{ijt} + \beta_{11} \mbox{Social Efficiency Index}_{ijt} + \epsilon_{it} \end{array}$

Due to the large percentage share of personnel expense per dollar of loan to operating expense per dollar of loan, the same set of explanatory variables in Equation (5) shall also be done with operating expense per dollar of loan, the indicator for unit cost for the supply curve equation, as dependent variable:

Operating Costs_{ijt} (Operating Cost per Dollar of loan) = $\alpha_{ij} + \beta_1 \text{OSS}_{ijt}$ + $\beta_2 \text{Average Loan Balance per Borrower}_{iit} + \beta_3 \text{Average Loan Balance}$

Transactions Cost	Transactions Cost (Personnel Expense per US\$100 of Loan) of Rural Banks (RB) and NGOs from 2000 to 2011 by Age								
Annual Transactions Cost (Personnel			А	ge			Remarks on Outreach		
Expense per US\$100 of Loan)	Yo	ung	Ма	ture	T	otal			
	RB	NGOs	RB	NGOs	RB	NGOs			
Low: Less than \$26	0	4	46	10	46	14	Narrow to moderate		
Moderate: \$26-\$50	1	2	2	10	3	12			
High: \$51-\$100	0	0	0	3	0	3	Moderate to broad with several network affiliations		
Total	1	6	48	23	49	29			

Note: Commercial sources of funds is the usual source of funding for all MFIs.

Table 1: Transactions Cost (Personnel Expense per US\$100 of Loan) of Rural Banks (RB) and NGOs from 2000 to 2011 by Age.

Squared_{ijt} + β_4 Number of Active Borrowers_{iit} + per Borrower β_5 Capital Cost_{ijt} + β_6 Gross Loan Portfolio per Asset_{ijt} + β_7 Age upon establishment_{ijt} + β_8 Scale_{ijt} + β_9 Outreach_{ijt} + β_{10} Number of Women Borrowers_{iit} + β_{11} Social Efficiency Index_{iit} + ε_{it} (5)

The dependent variable is transactions cost, indicated by personnel expense per average loan balance per borrower, the indicator used for human asset specificity. Transactions cost also signifies the personnel cost per dollar of loan. It shall be regressed on OSS (operational selfsufficiency by MFI institution, i.e. rural bank or NGO), average loan balance per borrower, the square of the average loan balance per borrower (to capture either an asymptotic behavior or a U-shaped curve, number of active borrowers). MFI History would refer to age and scale of the MFI, and, orientation would refer to the target market or outreach and type of outreach such as the number of women borrowers. The capital structure indicator shall not use the debt-to-equity ratio but shall use the gross loan portfolio over assets, as the debt-to-equity ratio for MFIs would need more information on funding sources. Note that the expected signs for Equations (4) and (5) are the same as the expected signs for Equations (2) and (3), and the explanatory variables are the same except for an additional variable which the square of the average loan balance per borrower which serves as the indicator for the behavior of costs.

If the supply curve is expected to be U-shaped, then the curve reaches a minimum level of costs then starts to increase as the amount of loans by micro-entrepreneurs increases. More loan officers and personnel have to be employed in order to process and assess the viability of bigger loan amounts, as well as assess the credit history and capacity to pay of the borrower. When the supply curve of MFIs starts to slope upwards, then one can say that the behavior of the loan officers and personnel would compare and follow the usual behavior of personnel employed in commercial banks. Note that Equations (4) and (5) incorporate the experience or learning curve spillover indicators. These regressors aim to capture the existence of a supply curve in the microfinance industry that is primarily denoting a downward-sloping experience or learning curve. When the learning curve spillovers are large enough as to influence players in the industry to achieve better monitoring of clients, then an industry-wide decrease in operating and transactions cost is expected to occur, prolonged, verified by an asymptotic marginal cost curve that flattens at a minimum point. It may start increasing as cumulated output increases, that is, when micro-borrowers are more capable of handling and managing larger loans for their micro-businesses.

MFIs listed in the Microfinance Information Exchange Portal (MIX), opt to be transparent with their data, and thus, their financial and operational viability. This attempt would imply that they observe the rules on the financial and operational self-sufficiency indicators imposed on all MFIs. However, the two main types of lenders studied: rural banks (mostly individual lenders) and NGOs (combination of individual and group lenders), would competitively behave differently, i.e. outreach vis-à-vis profitability. Thus, the NGOs will have to be analyzed separately from the rural banks. Some types of lenders try to attract the better-off borrowers (high profitability ratios) and/or sustainable borrowers (low operational costs). This may be true for rural banks. Other lenders, such as NGOs, target poorer borrowers.

Data Sources

Data for the study was obtained from the Microfinance Information Exchange Portal (MIX), which accounts for close to 60% of the total number of active borrowers around the world. MIX is the premier source, open access, incorporated since 2002, for relevant microfinance performance data and analysis. MIX provides performance information on microfinance institutions (MFIs), funders, networks and service providers dedicated to serving the financial sector needs for lowincome clients. MIX fulfills its mission through a variety of platforms.

The MIX Market provides instant access to financial and social performance information covering approximately 2,000 MFIs around the world. MIX is a non-profit organization headquartered in Washington, DC with regional offices in Azerbaijan, India, Morocco, and Peru.

The current study uses the MIX portal for financial and social performance data for 104 MFIs, i.e. rural banks, NGOs and credit cooperatives. A total of only 50 MFIs: 18 Rural Banks and 32 NGOs, with historical data from 1998 to 2011, are included in the dataset. Not all MFIs have a complete set of financial and social performance indicator for all the years specified.

Analysis of Results

Descriptive analysis of the operational efficiency and social performance for MFIs

From the above-stated objective 1, that is, an evaluation of MFI performance based on financial viability and outreach, show the following results. A comparison of operational self-sufficiency, and outreach was done with rural banks and NGOs based on the MIX Portal database from 2000-2011 with a total of 50 rural banks and 32 NGO. It can be seen that more mature MFIs are able to achieve lower levels of personnel expense per dollar of loan, i.e. less than US\$ 26.00. Due to the strict regulatory nature of the commercial banking system, most rural banks are able to control their transactions to less than US\$ 26.00.

Not only are rural banks able to control their transactions cost, they are also able to strictly observe low risk and financially sustainable operations. NGOs, most of whom are not regulated, operate to sustain profits, decrease risk but increase outreach. Most rural banks are mature, whose client size mostly have a medium to large asset size. Also, rural banks have a market clientele or target market ranging from micro firms (better-off micro firms) to small and high end businesses. NGOs vary from young and new to mature firms. Client outreach is composed of small to large firms (by asset size). But NGOs primarily target low end (or poor) businesses as clients, indicated by a narrow to moderate level of outreach (Tables 1 and 2).

Rural banks are primarily focused on profitability as seen in the average profit margin, OSS and ROA's of the 50 listed rural banks in the MIX Portal. Cost per borrower is close to double that of NGOs but NGOs have more than double the number of active borrowers. Loans extended by rural banks are more than double that of NGOs (Table 3), for the specific MFIs).

Very little improvements in operational efficiency can be observed from 2000-2005 and 2006 to 2012. One can observe an increase in the average loan balance per borrower as the well an increase in the number of active borrowers for both rural banks and NGOs (Table 4).

Slight improvements in operational efficiency through the operational self-sufficiency indicator, can be observed with NGOs. However, their social efficiency index falls within poor levels, with

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Transactions Cost (Personnel Expense					Age a	nd Ope	rationa	l Self-S	ufficien	cy (OS	S)				Remarks on	
per US\$100 of Loan)			Yo	oung					Ма	ture			Т	otal	Outreach	
		RB			NGOs	6		RB			NGOs		anks	S	-	
	0SS < 1	0SS 1 1	Total	0SS <1	oss - 1	Total	0SS < 1	0SS 1 1	Total	oss <1	oss 1 1	Total	Rural Ba	NGO		
Low: Less than \$26			0		4	4	2	44	46	2	8	10	46	14	Narrow to moderate	
Moderate: \$26-\$50			1	1		2	2 2	2		2	2 2	8	10	3	12	
High:\$ 51-\$100			0			0			0	3		3	0	3	Moderate to broad with several network affiliations	
Total	0	1	1	0	6	6	4	44	48	7	16	23	49	29		

Note: The lowest level of operational self-sufficiency achieved by a bank from 2000 to 2011 is 0.48, and, 0.18 for NGOs for all samples. Commercial sources of funds is the usual source of funding for all MFIs.

Table 2: Transactions Cost (Personnel Expense per US\$100 of Loan) of Rural Banks (RB) and NGOs (2000 to 2011) by Age and Operational Self-Sufficiency (OSS).

Relevant Information on Chosen Rural Banks and NGOs (2000-2011)									
Cost per Borrower (US\$)	Number of Active Borrowers	Average Loan Balance per Borrower (US\$)	Average Loan Balance per Borrower per capita Gross National Income (in %)	Total Operating Expenses over Total Loans (in %)					
			Rural Banks						
102	17,436	668	46	22					
79	9,683	454	33	19					
528	267,282	7,139	521	92					
20	208	46	4	2					
194	256	256	255	229					
· · ·		NGOs	·						
44	52,380	118	8	45					
38	18,603	93	6	41					
165	606,488	1,414	69	124					
11	837	30	3	20					
183	226	226	223	189					

Table 3: Relevant Information on Chosen Rural Banks and NGOs (2000-2011).

a slight improvement to moderate level in 2006 to 2012. One can compare this with rural banks, whose social efficiency index improved in 2006-2012. The social efficiency index is computed as the cost per dollar of loan (or operating expense ratio) over cost per borrower and allows one to compare MFIs with different credit methodologies. NGOs seem to face several factors which make the cost of per dollar of loan more expensive. For example, MFIs in the Philippines provide complementary services such as health or training which will increase operating expenses but are not directly related to the cost of providing the loan. For NGOs, however, these complementary services allow them to fulfill their outreach mission.

Learning curve spillover and U-shaped supply curve analysis

All the regression results made use of a pooled least squares with cross-section random effects model. The estimation obtained a strong correlation between fixed and random effects, as the heterogeneity among rural banks and NGOs takes into account the varying intercepts, the indicator of fixed costs, of the regressions obtained per firm. The random effects model gave the correct signs for the explanatory variables, thereby giving sound theoretical results. The Durbin-Watson statistic obtained in all the regressions was less than 1.4, indicating problems of serial correlation. Problems of endogeneity among the explanatory variables are expected in the regression, as the other explanatory variables were meant to explain operational self-sufficiency, which was used as a regressor in the estimation procedure

(Figure 6).

In spite of all the limitations of the regression model used, the study focuses on the level of significance that would be obtained from the coefficients of the cumulated output indicators. The levels of significance obtained from the regression with random effects and the regression without random effects did not differ significantly.

The regression on the learning curve and the U-shaped supply curve shall use the following variables with their corresponding significance and expected sign (Table 5). Specific indicators shall be observed in the regressions: (a) For the experience or learning curve spillover regression, the presence of spillovers among MFIs shall be captured through a learning curve that levels-off as the amount of cumulated output over time increases. These indicators shall be age and the square of age upon establishment, and average loan balance per borrower; (b) For a U-shaped supply curve, also known as the U-shaped marginal cost curve, the presence of a downward-sloping experience or learning curve is expected either to be asymptotic to the cumulated output indicator or that it reaches a minimum then increases as the supply of loans increases. The coefficients of the experience or learning curve spillovers are expected to be significant and negative.

From Table 6 we would observe a lower coefficient level, in absolute terms, for age upon establishment for rural banks than for NGOs, as a lower coefficient for age would refer to a higher experience or learning curve spillover rate, the reciprocal of the coefficient indicates the spillover rate. The square of age is positive and moderately significant for the regression for NGOs and rural banks, stating that the curve flattens as age increases. The slower learning process for NGOs may be due to the high social efficiency index as NGOs face high levels of operational expenses when training loan officers and personnel, following-up and educating micro-borrowers.

When the dependent variable is changed into the asset specificity indicator, which is the personnel expense ratio, it can be observed that the learning curve flattens out with age, but the regression result no longer holds age and the square of age as a significant explanatory variable for rural banks, only for NGOs (Figure 7).

The average loan balance per borrower for rural banks and NGOs continues to be negative and moderately significant with the regression on transactions cost. We can conclude that the experience or learning curve spillover phenomenon among MFIs is explained by increasing average loan balance per borrower and age for NGOs. For rural banks, age of the establishment no longer explains transactions cost (Table 7). Once the operational expense ratio has reached a low level of US\$20, asset specificity no longer plays a significant role as microborrowers increase their average loan size. The goal of continuing efficient operations along with social performance requires a high level of capability among loan officers and personnel when dealing with higher average loan portfolios among micro-entrepreneurs. NGOs, on the other hand, are already on their way to achieving higher spillover effects. Both operating costs and transactions cost are not yet achieving an asymptotic level, but they are decreasing.

The succeeding regressions shall now combine the phenomenon of experience or learning curve spillovers with the presence of a U-shaped supply curve. This time, the other indicator for accumulated output, average loan balance per borrower, shall be used. This is also the indicator for output for the U-shaped supply curve (Figure 8).

When the personnel expense ratio, the indicator used for asset specificity is graphed using average loan balance per borrower on the abscissa, a steep downward sloping experience curve can be observed not only for NGOs but also for rural banks. While the evidence of a flattening experience can be observed with rural banks, the experience curve for NGOs seem to be reaching a low personnel cost per dollar of loan. The average loan balance per borrower, however, has not increased and thus a flattening experience curve cannot be observed (Figure 9).

From the regression results of Table 8, one can see the consistently negative sign of operational self-sufficiency and outreach for both NGOs and rural banks. The extent of outreach through the social efficiency index and the high level of operational self-sufficiency all seem to go hand-in-hand with a steeply downward sloping operating and personnel cost vis-à-vis age upon establishment and the average loan balance per borrower. Only rural banks seem to manifest a slightly increasing marginal cost curve, denoting the well-behaved portion of the supply curve for an individual firm.

Thus, in response to objective 2, the results from Table 9 seem to indicate that only rural banks are starting to manifest a well-behaved supply curve as they are no longer operating at the steep portion of the marginal cost curve (Figures 8 and 9). Operating costs are decreasing as the average amount of loan portfolio increase. The learning curve spillover effects among rural banks is already manifesting a marginal cost curve that has reached a minimum level, and is on its way towards an upward sloping marginal cost curve. On the other hand NGOs, most of whom have a narrow extent of outreach, i.e. only dealing









Source: Author's Regression Results using MIX Market Data **Figure 7:** Experience Curve for Rural Banks and NGOs with Asset Specificity.



with small borrowers, and, with smaller average loan portfolios per borrower than rural banks, do not reflect an upward sloping marginal cost curve. In fact, most NGOs are not yet operating at the minimum level of operating costs, unlike that of rural banks. Average loan balance per borrower hardly reach US\$500 (Figure 9). Transactions costs for NGOs, however, are approaching the minimum level reached by rural banks but over-all operating cost, that is, cost per dollar of loan, are still far from the minimum level of operating costs per dollar of loan achieved by rural banks. International regulatory bodies for MFIs put the standard to be within the range of US\$10-US\$26 per dollar of loan.

The results of the regressions may indicate that NGOs are devoting resources on operations which will enable them to extend loans to micro-borrowers. Efficient operations seem to be compromised by the need to monitor, educate and follow-up repayments done by micro-entrepreneurs. This phenomenon may explain why, in spite of a levelling-off of the cost per dollar of loan as well as transactions cost for rural banks, their social efficiency index is positively related to cost. This observation may be verified by the comparison of operational self-sufficiency and the social efficiency index. This result may suggest that NGOs have to re-think their organization and operations so as to achieve better levels of operational self-sufficiency and social performance efficiency, as their attempt to increase the outreach of their social projects might be comprised with less efficient operations and therefore sacrificing financial sustainability.

The extent of capitalization of the MFI may be indicated by the debtto-equity ratio and the gross loan portfolio over assets. In principle, MFIs should not lend beyond their level of assets. Thus, more efficient operations may be indicated by a negative relationship of this indicator with costs. Both MFIs and rural banks seem to reflect this negative relationship. However, the structure of debt would be indicated by the debt-to-equity ratio. Efficiency would again be reflected by a negative relationship of this indicator with costs. However, this behavior can only be observed with rural banks as the debt-to-equity ratio has a positive relationship with costs for NGOs. This regression result may verify that NGOs have an extensive source of grants that help cover their outreach activities. However, such expenses do not seem to allow a healthy level of operational self-sufficiency and social efficiency index for NGOs (Figure 10).

It can be observed that a social efficiency index which is greater than 100 is likely to have an operational self-sufficiency that is lower than 1.0. This trend is most observed with NGOs. The social efficiency index for some rural banks, though, may fall within the moderate range but would report an operational self-sufficiency level which is lower than 1.0. Most of these rural banks loan more than 10%, the regulated level by the Bangko Sentral ng Pilipinas, of their credit line to MFIs.

The research hypotheses that were tested in the study led to the following results: Hypothesis for rural banks. Operating costs for rural banks have manifested higher experience or learning curve spillovers and lesser transactions cost than NGOs.

This phenomenon is observed to be explained by their longer commercial lending experience, and, their strict observance of industry standards for operational self-sufficiency. With efficiency gains, rural banks are operating at the low marginal cost levels in the supply curve attributed to the individual lending mode of transactions done among rural banks involved with MFI operations which follow the traditional or market-oriented manner of transacting with clients. Lower transactions cost among rural banks enable them to achieve high operational efficiency. Empirically, the presence of lower transactions



Source: Author's Regression Results using MIX Market Data **Figure 8:** Estimated U-shaped Supply curve for Rural Banks and NGOs (2000-2001).





Note: SEI<30 Excellent, 30<SEI<50 Good, 50 <SEI<100 Moderate, SEI >100 Poor

Figure 10: Operational and social outreach Effiency among Rural Banks and NGOs.

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Annual Transaction Cost(in US\$)	Age Young						Mature						Total		Remarks	
	Rural B	anks		NGOs			Rural Bar	Iks		NGOs			Rural	NGOS		
	0SS < 1	0SS > 1	Total	0SS < 1	0SS > 1	Total	0SS < 1	OSS > 1	Total	0SS < 1	0SS > 1	Total	Banks			
Low: Less than \$26	0	0	0	0	JVOFI, JVOFI, HSPFI	m	RB Datu Paglas	Bangko Santiago de Libon, Bangko Kabayan, Bangko Luzon, Bangko Mabuhay, BCB Cantilan Bank, CBMO, FICO, First Macro Bank, GM Bank, Mallig Plains RB, New RB Victorias, Mallig Plains RB, New RB Victorias, RB Camalig, RB Constan, RB Laon, RB Digos, RB Gunobaton, RB Labason, RB Lebak, RB Liloy, RB Loon, RB Digos, RB San Enrique, RB Mabitac, RB Makiling, RB Oroquieta, RB Pagbilao, RB San Enrique, RB Solano, RB Sto. Tomas, RB Talisayan, RB Tangub City, Valiant RB	35	VEF, ASHI, ECLOF- Philippines, MEDF, PMDF, PALFSI	Serviamus	ω	35	1	Funding mainly via commercial sources, outreach is narrow to moderate	-
Moderate: \$26-\$50	0	0	0	0	0	0	0	1st Valley Bank, FAIR Bank, PBC, RB Montevista, Progressive Bank	വ	CEVI	Kasagana-Ka, Kazama Grameen, KCCDFI, MILAMDEC	ى ك	Q	Q		
High:\$51- \$100	0	RB San Jacinto	-	0	DSPI	-	OMB	K Bank, RB Katipunan	ო	0	ABS-CBN, ARDCI, ASKI, DSPI, RSPI	2	4	9	Funding via commercial sources	
Very High:> \$100	0	0	0	PAGASA	ASA Philippines, Life Bank	e	OK Bank	Card Bank, Green Bank	n	0	CARD-NGO, KMBI, NWTF, TSKI, TSPI	ى ب	e	ø	and grants, outreach is moderate to broad, several network affiliations	
Total	0	-	~		Q	2	5	43	45	2	9	23	47	30	High information cost, possible via funding sources, especially for NGOs. Target varies from poor borrowers to SMEs.	
Source: MIX Note: The low red have a neg	Market Da sst level c ative RO	ata of operatic S and RO	nal self- ∃averaç	-sufficiency jed from 2	/ achieved b 2000 to 2011.	y a ban	ık from 200	0 to 2011 is 0.48, and, 0.18 for NGOs for	r all sar	nples. Rura	Banks and NGOs in	green	have a p	ositive F	OS and ROE, those ir	_

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Table 4: Transaction Cost per Borrower of Rural Banks and NGOs (2000 to 2011) by Age, Operational Self-Sufficiency (OSS) and Profitability (Return on Assets (ROS) and Return on Equity (ROE))

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			Selected	I Indicators f	or Operationa	l Efficiency a	nd Social Per	formance			
Descriptiv	e Statistics	Average Lo per Bo	oan Balance prrower	Operat Suff	ional Self- iciency	Social Effic	iency Index ²	Personnel	Productivity	Loan Office	r Productivity
		2000-2005	2006-2012	2000-2005	2006-2012	2000-2005	2006-2012	2000-2005	2006-2012	2000-2005	2006-2012
	Mean	490	769	1.19	1.16	39	27	103	104	72	86
nks	Median	375	495	1.16	1.13	23	19	96	98	60	50
Bar	Maximum 2461 7139		7139	1.95	1.91	219	163	195	1,040	490	871
	Minimum	46	62	0.66	0.48	9	2	41	11	6	1
	Mean	76	129	1.04	1.09	139	97	133	182	137	322
Os	Median	70	109	1.06	1.08	134	95	132	70	132	126
0 Z	Maximum 214 470 1.58 1.85 Minimum 30 44 0.18 0.38		229	229	198	727	284	1,884			
			47	21	44	11	46	8			
5 .	East Asia		>1.0		11-14		110%-120%		200%-280%		
age		Eastern Europe				26-45		60%-90%		155%-190%	
Wer		Latin America				27	' -37	110%	-140%	300%	-310%
٩		World				<1	0-47	High	productivity, e	xcellent asset	quality

Notes: ¹World Average uses 2009 to 2012 data ²Excellent < 30, Good 30-50, Moderate 50-100, Poor > 100 Table 5: Selected Indicators for Operational Efficiency and Social Performance

	Variables Used for the Learning Curve and	U-Shaped Supply Curve Regressions				
Variable Used	Relevance and Expected Sign for all Regressions	Computation and Commercial Bank or Traditional Banking Equivalent				
Operational Expense Ratio also called Cost per Dollar of Loan.	 This ratio provides the best indicator of the overall efficiency of a lending institution. Also referred to as the Efficiency Ratio, measuring the institutional cost of delivering loan services compared to the average loan size of its portfolio. Therefore, a general rule is the lower the Operating Expense Ratio, the higher the efficiency. This variable is used as the dependent variable for the regression in the learning curve, indicator for cost per unit. 	 Operating Expense over Average Loan Portfolio. Goal is lower than 35% for urban MFIs but leading MFIs have 10% or lower. Similar to the Efficiency Ratio or Cost/Income ratio used by the traditional banking sector to determine how efficiently the bank uses its assets and liabilities within internal operations related to the loan portfolio. This ratio measures the amount of non-interest expenses (operating expenses, excluding provisions of loan losses) needed to support operating revenues. 				
Personnel Expense Ratio	 Used as an indicator for asset specificity, or, human asset specificity. Used as the dependent variable for the regression on transaction cost as asset specificity. 	 compensation or salaries over Average Loan Portfolio No equivalent with the traditional banking sector 				
Operational Self- Sufficiency	 Indicator for Financial Self-Sufficiency, and, thus sustainability. Used as an explanatory variable for the learning curve and transactions cost regression. Expected to have a negative sign MFIs operate with the goal of achieving sustainability. Thus, it acts as an explanatory variable for indicating efficiency of operations 	 Financial Revenue over (Financial Expense + Impairment Loss + Operating Expense) Financial revenues are revenues from the loan portfolio and from other financial assets and are broken out separately and by type of income (interest, fee). Equal to or greater than 100% No equivalent with the traditional banking sector 				
Average Loan Portfolio	 Gross loan portfolio over number of active borrowers. Used as an indicator for supply of loans, also indicating corregressions 	umulated output over time and is expected to have a negative sign for all				
Square of Average Loan Portfolio	Indicator for a U-shaped supply curve and is therefore expected to have a positive sign for all regressions					
Number of Active Borrowers	 The number of individuals or entities who currently have a any portion of the Gross Loan Portfolio. Individuals who h Used as an explanatory variable for the regression on the Expected to have a positive sign 	In outstanding loan balance with the MFI or are primarily responsible for repaying have multiple loans with an MFI are counted as a single borrower. learning curve and U-shaped supply curve.				
Debt to Equity Ratio	 The simplest and best-known measure of capital adequacy because it measures the over-all leverage of the institution. Hard to put a standard level as MFIs have various sources of local and international funding It is of particular interest to lenders because it indicates how much of a safety cushion (in the form of equity) there is in the institution to absorb losses. Expected to have either a positive or negative sign 	 Computed as total liability over total equity as in the traditional banking sector Reveals the extent to which the bank funds operations with debt rather than equity, allowing banks to monitor solvency and analyze their capital structure. Varies considerably depending on the type of institution. NGOs typically have lower Debt/Equity (1:1 to 3:1) levels than regulated MFIs, such as rural banks, which even have lower levels than commercial banks. The only way to strengthen an NGO's equity is by reinvesting profits or through grants and donations. 				

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Gross Loan Portfolio over Assets	 Indicator for all outstanding principals due for all outstanding client loans per dollar of assets, includes all outstanding client loans (current, delinquent and renegotiated, except those written-off) and includes interest receivables. Expected to have either a positive or negative sign
Age upon Establishment	 Age upon establishment as a rural bank or as an MFI. Indicator for accumulated output over time Used as explanatory variable for the learning curve regression and U-shaped supply curve regression Expected to have a negative sign
Square of Age upon Establishment	 Indicator for a learning curve that levels-off with a high level of accumulated output, due to the phenomenon of spill-overs. Expected to have a positive sign
Outreach	 Large Number of borrowers > 30,000 Medium Number of borrowers 10,000 to 30,000 Small Number of borrowers < 10,000 Categorical variable: 1 refers to small, 2 refers to medium, 3 refers to large Expected to have either a positive or negative sign
Scale	 Large: Africa, Asia, ECA, MENA: >8 million; LAC: >15 million; Medium: Africa, Asia, ECA, MENA: 2 million–8 million; LAC: 4 million–15 million; Small: Africa, Asia, ECA, MENA: <2 million; LAC: <4 million Categorical variable: 1 refers to small, 2 refers to medium, 3 refers to large Expected to have either a positive or negative sign
Percent of Women Borrowers	 Number of women over total number of active borrowers. An indicator of outreach as some NGOs focus on servicing women. Used as an explanatory variable and may have a positive or negative sign
Social Efficiency Index	 A proxy for how efficiently the institution is providing loans while neutralizing the effects of average loan size on efficiency (both operating expense ratio and cost per borrower are each heavily influenced by the loan size). The Social Efficiency Index allows for a more direct comparison of different types of MFIs with different credit methodologies. Used as an explanatory variable for the regression on the learning curve and transactions cost. Expected to have either a positive or negative sign. Operating Expense Ratio over Cost per Borrower (Operating Expenses over Number of Active Borrowers). This is an index. No equivalent with the traditional banking sector

Note: From Figure 1 it can be observed that rural banks do have higher experience or learning curve spillover rates than NGOs, when we use age upon establishment as the indicator for spillover effects.

 Table 6: Variables Used for the Learning Curve and U-Shaped Supply Curve Regressions

Ехр	erience or Learning Cu Method: Pooled Lea	rve Spillover Regression (For F st Squares with Cross-Section	Rural Banks and NG Random Effects	iOs)	
Explanatory Variables	Expected Sign	Operating Expense per Avera	age Loan Portfolio		
		Rural Banks		NGOs	
C	+	69.52	***	122.69	***
		6.41		12.58	
Operational Self-Sufficiency (OSS)	-	-11.58	***	-22.70	***
		2.81		4.48	
Average Loan Balance per Borrower	-	-0.002	**	-0.04	**
		0.001		0.02	
Number of Active Borrowers	+	8.81E-05	***	1.74E-05	*
		1.72E-05		1.16E-05	
Debt-to-Equity Ratio	+ or -	-0.90	***	0.03	na
		0.29		0.12	
Gross Loan Portfolio over Total Assets	+ or -	-30.91	***	-56.29	***
		4.79		5.89	
Age upon Establishment	-	-0.40	**	-0.71	*
		0.22		0.62	
Age upon Establishment Squared	+	0.005	*	0.03	*
		0.004		0.02	
Scale (1 small, 2 medium, 3 large)	+ or -	-3.56	***	1.57	na
		1.03		1.40	

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Outreach (1 small, 2 medium, 3 large)	+ or -	1.08	na	-0.95	na	
		0.96		1.78		
Women Borrowers as a Percent of Total	+ or -	3.59	**	-7.72	na	
		1.77		6.26		
Social Efficiency Index	+ or -	0.07	***	0.01	na	
		0.02		0.03		
Adjusted R-squared	0.53		0.39			
F-statistic	15.45		10.71			
Durbin-Watson Statistic	1.35		0.82			
Cross-Sections Included		45		29	29	
Total Unbalanced Panel Observations		140		165	165	
Years Covered		2001-2011		2000-2011	2000-2011	

Source: Author's Estimates, MIX Market Data

Note: Italicized numbers refer to the standard deviation. Regression uses White diagonal standard errors and covariance (degrees of freedom corrected). All p-values of the F-statistic are very significant or pless than 0.01. p-values used are: *** p less than 0.01, ** p less than 0.05 and greater than 0.01, * p less than 0.15 and greater than 0.05. Swamy and Arora estimator of component

variances.

Table 7: Experience or Learning Curve Spillover Regression (For Rural Banks and NGOs) Method: Pooled Least Squares with Cross-Section Random Effects

E	xperience or Learning C (Fo Method: Pooled Least	urve Spillover Regr r Rural Banks and N Squares with Cross	ession and Ass IGOs) -Section Rando	et Specificity om Effects	
Explanatory Variables	Expected Sign	·	Personnel Exp	oense per Average Loan Portfolio	
		Rural Bar	iks	NGOs	
С	+	25.93	***	59.15	***
		3.47		8.09	
Operational Self-Sufficiency (OSS)	-	-6.46	***	-17.47	***
		1.69		2.71	
Average Loan Balance per Borrower	-	-0.0005	*	-0.03	**
		0.0004		0.02	
Number of Active Borrowers	+	4.66E-05	***	-3.01E-06	na
		6.71E-06		6.27E-06	
Debt-to-Equity Ratio	+ or -	-0.31	**	-0.04	na
		0.14		0.06	
Gross Loan Portfolio over Total Assets	+ or -	-7.48	***	-15.78	***
		2.29		3.93	
Age upon Establishment	-	0.10	na	-0.55	*
		0.11		0.43	
Age upon Establishment Squared	+	0.001	na	0.03	***
		0.002		0.01	
Scale (1 small, 2 medium, 3 large)	+ or -	-0.86	*	0.48	na
		0.51		0.90	
Outreach (1 small, 2 medium, 3 large)	+ or -	-0.65	*	0.59	na
		0.42		1.11	
Women Borrowers as a Percent of Total Borrowers	+ or -	1.12	*	-2.90	na
		0.77		3.32	
Social Efficiency Index	+ or -	0.08	***	0.04	*
		0.02		0.02	

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Adjusted R-squared	0.58	0.33
F-statistic	13.51	7.07
Durbin-Watson Statistic	1.25	0.91
Cross-Sections Included	43	28
Total Unbalanced Panel Observations	102	136
Years Covered	2003-2010	2003-2011

Source: Author's Estimates, MIX Market Data

Note: Italicized numbers refer to the standard deviation. Regression uses White diagonal standard errors and covariance (degrees of freedom corrected). All p-values of p-values used are: *** p less than 0.01, ** p less than 0.05 and greater than 0.01, * p less than 0.15 and greater than 0.05. Swamy and Arora estimator of component

variances.

Method: Pooled Least Squares with Cross-Section Random Effects

Table 8: Experience or Learning Curve Spillover Regression and Asset Specificity (For Rural Banks and NGOs).

U-Shaped Supply Curve Regression for Rural Banks and NGOs (With Transactions Cost and Experience or Learning Curve Spillovers) Method: Pooled Least
Squares with Cross-Section Random Effects

Explanatory Variables	Expected Sign	Personnel Expense per Average Loan Portfolio				Operating Expense per Average Loan Portfolio			
		Rural Banks		NGOs		Rural Banks		NGOs	
		26.10	***	49.94	***	68.23	***	113.69	***
		3.32		10.96		5.86		15.22	
Operational Self-Sufficiency (OSS)	-	-6.29	***	-17.24	***	-10.80	***	-22.04	***
		1.69		2.90		2.79		4.61	
Average Loan Balance per Borrower	-	-0.002	*	-0.01	na	-0.006	***	-0.03	na
		0.001		0.07		0.002		0.09	
Average Loan Balance per Borrower Squared	+	2.7E-07	*	-3.4E-05	na	9.3E-07	**	-2.3E-05	na
		2.2E-07		0.0001		3.7E-07		0.0002	
Number of Active Borrowers	+	4.7E-05	**	1.3E-06	na	8.0E-05	***	2.3E-05	**
		6.7E-06		6.3E-06		1.7E-05		1.1E-05	
Debt-to-Equity Ratio	+ or -	-0.32	**	-0.03	na	-1.00	***	-0.02	na
		0.14		0.06		0.28		0.12	
Gross Loan Portfolio over Total Assets	+ or -	-7.78	***	-15.02	***	-32.70	***	-56.01	***
		2.26		4.11		4.72		5.95	
Age upon Establishment	-	-0.04	*	0.42	**	-0.11	*	0.21	na
		0.04		0.22		0.07		0.29	
Scale (1 small, 2 medium, 3 large)	+ or -	-0.73	na	0.39	na	-2.93	***	1.16	na
		0.52		0.93		1.04		1.39	
Outreach (1 small, 2 medium, 3 large)	+ or -	-0.71	*	-0.20	na	0.68	na	-1.01	na
		0.43		1.11		1.00		1.79	
Number of Women Borrowers	+ or -	1.06	na	-2.50	na	3.94	**	-7.26	na
		0.77		3.49		1.75		6.32	
Social Efficiency Index	+ or -	0.06	***	0.05	*	0.06	***	0.02	na
		0.02		0.03		0.02		0.04	
Adjusted R-squared		0.58		0.30		0.55		0.39	
F-statistic		13.75		6.30		16.58		10.62	
Durbin-Watson Statistic		1.19		0.88		1.34		0.84	
Cross-Sections Included		43		28		45		29	
Total Unbalanced Panel Observations		102		136		140		165	

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Years Covered	2003-2010	2003-2011	2001-2011	2000-2011

Source: Author's Estimates, MIX Market Data

Note: Italicized numbers refer to the standard deviation. Regression uses White diagonal standard errors and covariance (degrees of freedom corrected). All p-values of the F-statistic are very significant or p less than 0.01.

p-values used are: *** p less than 0.01, ** p less than 0.05 and greater than 0.01, * p less than 0.15 and greater than 0.05. Swamy and Arora estimator of component variances.

Table 9: U-Shaped Supply Curve Regression for Rural Banks and NGOs (With Transactions Cost and Experience or Learning Curve Spillovers) Method: Pooled Least Squares with Cross-Section Random Effects.

cost denoting high learning or spillover effects have enabled rural banks to operate efficiently thereby allowing them to perform their outreach activities with more productivity and lesser cost. The satisfactory level of their social efficiency index indicates that financial and operational expenses are not compromised with extensive social outreach. All these indicators seem to precede the eventual occurrence of an upward sloping marginal cost curve, and thereby, allowing rural banks serving MFI clients to initiate operating at the well-behaved portion of the supply curve.

Hypothesis for NGOs Operating costs for NGOs have manifested lower experience or learning curve spillovers and have higher transactions cost than rural banks.

This phenomenon may be due to their shorter commercial lending experience, and, the non-regulated nature of their operations. Transactions cost among NGOs are high and are less likely to attain industry standards for operational self-sufficiency. With lesser efficiency gains, some NGOs may be experiencing disincentive effects, that is, being unable to increase their average loans credited to microborrowers, and, NGOs may not yet be operating at low marginal cost levels in the supply curve. This can be explained by the group lending with individual liability lending mode of transactions done among NGOs involved with MFI operations which do not follow the traditional or market-oriented manner of transacting with clients. Loan officers and personnel have to achieve a certain level or manner of negotiating capabilities to effectively deal with micro-borrowers. While still at the high level of transactions and operating costs, NGOs into microfinance are not yet in the capacity to operate at the well-behaved portion of the marginal cost curve, also known as the upward sloping supply curve. More efficient operations will have to be achieved while they attempt to accomplish their social outreach. Their social efficiency index seems to denote that financial resources are sacrificing operations thereby disallowing NGOs to operate more efficiently.

In terms of objectives of the study, the results are denoted (Table 10). The downward trend of cost per dollar of loan and transactions cost through time, indicated by age, establishes the presence of an experience or learning curve spillover for rural banks and NGOs. This is the result when the proxy variable in the scatterplot for cumulated output is time, that is, age upon establishment, per firm included in the data (Figures 6 and 7). When the proxy variable for cumulated output in the scatter plot is average loan balance per borrower, one can observe a very steep downward sloping marginal cost curve for NGOs and a U-shaped marginal cost curve for rural banks when the unit cost used is either cost per dollar of loan or transactions cost (Figures 8 and 9). This result establishes the need for a downward sloping with a levelling-off trend for cost per dollar of loan and transactions cost, before the marginal cost curve starts to increase. This phenomenon is observed only among rural banks, and denotes a U-shaped supply curve.

Efficient levels of operational self-sufficiency seems to coincide

with the downward trend of transactions cost and cost per dollar of loan for both rural banks and NGOs. However, social outreach efficiency, indicated by a low social efficiency index, as of the moment, does not seem to coincide with the trend observed with costs as the social efficiency index has a positive relationship with costs [25-29].

Summary, Conclusion and Recommendation

The results of the study can be summarized by the combination of low operating and transactions costs, due to a fast learning environment due to high experience or learning curve spillovers, all seem to be positively related with a satisfactory or low social efficiency index. This combination of indicators allows the MFI to reach a minimum level of marginal costs, while at the same time allowing MFIs to operate efficiently and achieve an appropriate level of outreach. Higher levels of loans transacted by micro-entrepreneurs entail higher personnel and operational expenses in order to properly monitor larger loan portfolios. Only rural banks manifest this trend. On the other hand NGOs have to improve learning from the operations of other NGOs, thereby eventually achieving a higher level of spill-over effects. As of the moment, with a wide variety of micro-borrowers with very small loans, operational and transactions costs are still high, although showing a downward or decreasing trend through time.

The results lead to the following conclusion: high experience or learning curve spillovers in the microfinance industry allow lenders to learn from the experience of other lenders negotiating with microentrepreneurs. Learning from the experience of other MFIs allows the entire industry to reach a low level of operating and transactions costs. This level of costs, however, enables the MFI to appropriately reach its social outreach mission while at the same time achieve operational self-sufficiency, the indicator for financial viability used in the study [30,31]. This phenomenon, though, is being observed only among rural banks. NGOs are still operating at the steep portion of marginal costs but operating and transactions costs are showing a decreasing trend through time.

It is recommended that the observed relationships between the experience curve, operating costs, transactions costs and social efficiency be verified among a sample of MFIs so as to tract those costs which allow transactions and negotiations among micro-borrowers to be costly. Focusing the study on a few MFIs, who would represent a substantial proportion of active borrowers in the Philippines, would enable researchers to determine those costs, specifically costs related to human asset specificity, which explain why NGOs continue to operate at the steep portion of the marginal cost curve. With this intent, there seems to be a rationale behind the existence of a U-shaped supply curve for the microfinance industry of the Philippines, and for the microfinance industry, in general Verification of the existence of a U-shaped supply curve, through the presence of significant experience or learning curve spillovers before reaching the minimum level of marginal costs, may lead to the necessary conditions by which microlenders are able to reach an efficient level of costs and risks [32-34].

Experience or Learning Curve Spillovers, Transactions Cost and a U-Shaped Supply Curve for Rural Banks and NGOs					
MFIs	Experience or Learning Curves (Objective 1)	Experience or Learning Curve Spillovers, Transactions Cost and a U-Shaped Supply Curve (Objective 2)			
Rural Banks	Higher experience or learning curve spillovers translate to faster learning	 Lower transactions cost, lower cost per dollar of loan, leading to a U-shaped supply curve Excellent level of the social efficiency index but has a positive relationship to operating and transactions costs 			
NGOs	Lower experience or learning curve spillovers translate to slower to moderate learning	 Higher transactions cost and operating expenses. NGOs still operate at the steep portion of the marginal cost curve Poor level of the social efficiency index but has a positive relationship to operating and transactions cost 			

Source: Author's Regression Results.

Table 10: Experience or Learning Curve Spillovers, Transactions Cost and a U-Shaped Supply Curve for Rural Banks and NGOs

This efficient level of operations, which combine financial viability and social outreach, may be the starting point through which the microfinance industry, namely rural banks and NGOs, be included in the financial sector.

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