Do microfinance lenders easily reach an optimal welfare?

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Abstract

Market segmentation characterized by price heterogeneity appears as a failure of classical view of market equilibrium. We suppose that an existence of specific asset pricing determines the wealth level of lenders. In microfinance, we look at the linkages between the welfare of lenders and market segmentation degree. For that, we used a maximization program where a lender utility function is defined. One of the results is that high number of lenders determines their portfolio diversification capacity. In a context of price inelasticity and price discrimination of financial demand for microfinance products, the microfinance market appears as highly segmented but not highly efficient if we consider lenders' returns. Moreover, an increase of average yield and average amount of initial loans positively improve the utility level of lenders. So, the improvement of microfinance lenders welfare is probable, but highly constrained by the behavior of some important financial factors.

Keywords. Market segmentation, microfinance, lender utility function, asset pricing and lender welfare

JEL. G21, L11, L25, M20

1. Introduction

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Broad analysis related to financial performance and outreach, mainly deal with two main questions. On the one hand, is there possible to increase microfinance institutions (MFIs) outreach (depth and breadth) without, or with least increase of financial performance (self-sufficiency and profitability)? And, is there possible to efficiently reach both objectives financial and social performance for MFIs on the other hand? One given answer focus on how finance deals against poverty with an important role gives to small loans. So, MFIs which are financially sustainable have good performance in terms of market interest rates, savings and insurance facilities and repayments, with an increasing positive impact on poverty as well as financial sustainability increase (Mosley and Hulme 1998, P.788).

Another answer considers the existing dilemma between financial performance and outreach highlighting by the "win-win" principle of Morduch, (2000 P. 617) and the yin and yang of microfinance by Rhyne (1998, P.7). Sustainability and profitability of MFIs are complementary approach, and a focus on poor's' welfare enhances in the long term by a sustained good banking activity. Cull et al. (2007, P. F109) analyse the achievement of both objectives and conclude that in some cases it depends on the type of lending strategies, with some MFIs both achieving profitability and meaningful outreach. Nevertheless, some others authors agree that both are negatively correlated (Mersland and Strom, 2008; Hermes, Lensink and Meesters 2011). For some microfinance lenders, there is a highest average of profit levels with at least less social performance.

So, we agree that it is possible to reach profitability and outreach, but it is important to mention that a trade-off could appear during the development process. Some factors could explain a trade-off occurrence: a costly monitoring and control system for informational opaque borrowers (Conning 1999); an increase competition between commercial banks that enter microfinance sector (C. McIntosh and Wydick 2005) ; an increase of SMEs financing opportunities considered as positively impact economic growth (Hermes, Lensink, et Meesters

2009); an increase of better off client's and average loan size (Cull, Demirgüç-Kunt, and Morduch 2010; Mersland and Strøm 2010) and the development level of financial sector (Vanroose and D'Espallier 2013). In addition, an improvement added value to explain trade off occurrence analysis could also be due by taking into account basic motivations of MFIs guiding their market decisions entry and their behaviour as a financial intermediary.

Traditional theory of financial intermediaries identified some market decisions entry determinants which are: liquidity and debt produced by banks (Gurley & Shaw, 1960), Risk management including transaction costs (Pyle, 1971; Bencivenga & Smith, 1991). There is also adversion selection problem, with in fact, banks that are able to select good investment projects (Akerlof, 1970; Stiglitz & Weiss 1981). Institutional growth in the financial sector is therefore linked to growth of the national income, but the financial sector is pro-cyclical and reproduces competition for development. However, if poor households that beneficiate from growth externalities are able to increase the level of their wealth, this is a good signal of worthiness for financial intermediaries specifically MFIs.

The behavior of MFIs as financial intermediaries is thus constrained by some driven forces as risk management (credit risk and liquidity risk), adverse selection and loan costs based on the endogenous characteristics of households. To maximize their profit, MFIs will act to enhance the satisfaction level of microfinance borrower's determine by their current level of income and their expected project return funded by microfinance lenders. When lenders and borrowers agree, there is an observed differential loan cost paid by borrowers constrained by their income level. So, market decision entry of MFIs will also be constrained by the potential demand level defined by the current level of income of excluded clients and better-off clients, expected project return and loan cost diversification. According to this, when micro-financial intermediation enters the market, how do they balanced financial and social objectives? If we consider the *win-win* proposition of microfinance (Morduch, 2000) is high financial

intermediation in the microfinance sector is linked to excessive profit making behavior or responsible profit making behavior?

Our main interest in this paper is to evaluate welfare in terms of gains and losses for microfinance lenders, of entry into a highly segmented financial market such as microfinance market. To evaluate lenders' welfare, we defined their utility function by considering an approach adapted from the Pagano model developed in 1989. The specificity of this model is based on the study of dealer trading models, based on the analysis of the relationship between market absorption capacity and trading volume. It deals with the identification of the dealer equity determinant based on the volume of trade and the degree of liquidity assets. These two factors influence the market trading concentration; determine the choice of the dealer, and the behavior of market speculators. This approach was carried out using a utility function with the aim of analyzing the demand for equity. The main variable used in the utility function is the wealth of the microfinance lenders.

As results, in a context of price inelasticity and price discrimination of financial demand for microfinance products, the microfinance market appears as highly segmented but not highly efficient if we consider lenders' returns. This reverse and negative effect on the product portfolio of microfinance lenders results in an analysis of the segmentation on the microfinance market that can help to improve the performance of micro-financial intermediation in developing economies. Moreover, an increase of average yield and average amount of initial loans positively improve the utility level of lenders. So, the improvement of microfinance lenders welfare is probable, but highly constrained by the behavior of some important financial factors.

The rest of paper proceeds as follows. Section 2 presents a microfinance lenders' model that highlights lenders' behavior and solve the maximizing program of lenders' utility function.

In section 3, we present results that show an impact on the variance of the initial loan supply, on the demand capacity and on the loan portfolio. Based on this, we discuss in section 4 the results and conclude in section 5 with several points that highlight the importance of performing micro-financial segmentation under certain conditions in order to ensure financial development and stability.

2. Model

2.1 Hypothesis

In 1989, Marco Pagano developed a theoretical model showing the segmentation of the financial market by highlighting the link between the volume of trade and asset liquidity. He considered the absorption capacity of the financial market and trade volume. He considered that the portfolio assets of a trader have two types of goods: risky assets and non-risky assets. By considering the degree of market liquidity, the trader seeks equity to finance and increase his wealth and utility level, which in turn influences the volume of trade. The Pagano's model makes the following assumptions:

(i) Hypothesis 1: the absorption capacity of financial markets determines the activity development of traders. (ii) Hypothesis 2: financial marketplace transactions are carried out over two periods (1 and 2) with the presence of risk adverse investors. (iii) Hypothesis 3: each trader chooses his equity function by taking into consideration that of other (*N-1*) traders present on the market. (iv) Hypothesis 4: the other (*N-1*) traders' demand function is a linear and negative function of price. (v) Hypothesis 5: A trader's demand for equity, expressed on the market allows him to maximize his level of final wealth. The Pagano (1989) basic model has five main equations marked (1) to (5):

$$\begin{cases} K_{0i} = K_0 + e_i \qquad avec\ i = 1, \dots\dots\dots\dots, N & (1) \\ W_{1i} = \tilde{d}K_i + R[w_{0i} + P(K_{0i} - K_i)] & (2) \\ E(U_i(W_{1i})) = E(W_{1i}) - (b/2)Var(W_{1i}) & (3) \\ \sum_{\substack{h=1 \\ h\neq i}}^{N} K_h = A - BP + \tilde{\eta} & (4) \\ \sum_{h=1}^{N} K_h = A - BP + K_i + \tilde{\eta} = NK_0 + \sum_{h=1}^{N} e_h & (5) \end{cases}$$

The initial allocation level of equity for agent (i) (Equation 1) is determined by the unconditional mean of stock allocations and its associated variance illustrates portfolio volatility. The trader's budget constraint (Equation2) is made up of the returns on risky assets ($\tilde{d}K_i$) and the return on non-risky assets $R[w_{0i} + P(K_{0i} - K_i)]$. The trader's expected (Equation 3) depends essentially on his budget constraint that also represents his wealth level. (Equation 4) is trader's (*N-1*) demand function and (equation 5) is the equilibrium condition existing between supply and demand of (*N*) traders present on the financial market.

The final goal here is to maximize the expected utility of the economic agent (the investor) by considering his wealth level and the demand of other economic agents present on the market. This helps to obtain an optimal demand for equity associated to an optimal level of utility. From the Pagano model defined in 1989, we adapted the assumptions and equations to our study related to the micro-financial segmentation of supply, and we make the following assumptions:

(vi) Hypothesis 6: market absorption capacity (all borrowers) determines the entry of a lender into the microfinance market. A low absorption capacity leads microfinance providers to leave the market, and results in a possible reduction of trade volume. (vii) Hypothesis 7: microfinance market transactions are made over two periods (1 and 2) with an identification of two types of client groups: good clients and risky clients. (viii) Hypothesis 8: each supplier partly chooses his credit grant function based on those of the other *(N-1)* microfinance

institutions present on the market. (ix) Hypothesis 9: the credit supply of other *(N-1)* microfinance institutions is a positive and linear function of price. (x) Hypothesis 10: the equity demand function of a microfinance lender allows him to maximize his level of final wealth.

We considered a market supply of microfinance products and services with two types of agents, namely households that are sometimes considered as net savers and one-person-firms that need funding for their projects and are grouped together in the category of borrowers. Microfinance institutions are lending agents with liquidity that can be transformed into loans. Households and individuals have projects to finance that initially require two types of inputs, capital (physical, human and financial) and labor. The financial capital is financed by compulsory savings made by borrowers considered as a financial condition to get access to loans offered by microfinance institutions. Savings can be made in financial form i.e., banknotes, coins, current accounts, passbooks or life insurance, and in non-financial form, i.e., real estate such as housing, land or farm plots, and movable property such as furniture, equipment or means of transport (car/motorcycle).

The arbitrage factors a saver considers when choosing a saving form are liquidity, safety and profitability. The lender will benefit from those savings if the borrower's needs to expand his income-generating activity rise. The structure model of the segmentation of microfinance lenders is defined according to six equations (6) to (11):

$$\begin{cases} Cr_i = Cr_{0i} + Cr_{IMF} \qquad avec\ i = 1, \dots\dots\dots\dots, N & (6) \\ Cr_i = \overline{Cr} + e_i & (7) \\ W_{1i} = \tilde{d}Cr_{0i} + R(e,\theta) * P * Cr_{IMF} & (8) \\ E(U_i(W_{1i})) = E(W_{1i}) - (b/2)Var(W_{1i}) & (9) \\ \sum_{\substack{h=1 \\ h\neq i}}^{N} Cr_{0h} = A + BP + \tilde{\eta} & (10) \\ \sum_{h=1}^{N} Cr_{0h} = A + BP + Cr_{0i} + \tilde{\eta} = NCr_0 + \sum_{h=1}^{N} e_h & (11) \end{cases}$$

Equation (6) defines the loan supply of a lender (i) as Cr_i during the first period (t_1) that depends on the initial loan offering Cr_{0i}financed by the deposits collected, and additional funds from microfinance institutions Cr_{IMF} funded by donations, grants and bank loans. Borrowers' initial contribution is collected from deposits and in some cases from non-financial savings.

The value of the loan presented in equation (7) is determined by the average of loans $\overline{Cr}$ and an associated random term e_i which is identically distributed with a mean μ_e and variance σ_e^2, that represent the degree of average loan diversity.

Equation (8) shows the level of microfinance lender wealth that depends on the yield of initial supply $\tilde{d}Cr_{0i}$, with $\tilde{d}$a random variable that has a mean μ and a variance σ^2. The yield of additional financial fund is $R(e,\theta)PCr_{IMF} = R(e,\theta)[P(Cr_i - Cr_{0i})]$, with Cr_{IMF} the lender's cash endowment (i), (P) the loan price identified as the loan interest rate, and $\big(R(e,\theta)\big)$ the yield of the project which depends on the borrower's effort (e) and adverse risks (θ).

The utility function is a negative exponential function, i.e, $U_i(W) = -\exp(aW)$ (Roger 1991). Coefficient "a" represents an absolute aversion coefficient to risk common to all agents (Gresse, 2001). Taking into account this form of utility function maximizes expected utility which is the differential between expectancy wealth level of agent (i) at the first period and its variance.

Equation (9) represents the lender's expected utility that depends on the expected wealth $E\ (W_{1i})$ and its variance (W_{1i}) . Equation (10) depends on price (P), on strictly positive constants A and B, and on the random term $\tilde{\eta}$. Considering a microfinance market with (N) lenders, the loans offered by lenders (N-1) is a positive linear function of the price of credit (P). Equation (11) represents the market equilibrium between supply and demand for loans that is:

$$\sum_{h=1}^{N} Cr_{0h} = A + BPr + Cr_{0i} + \tilde{\eta} = \sum_{\substack{h=1 \\ h \neq i}}^{N} Cr_{0h} + Cr_{0i}$$

According to the definition of the structure model of micro-financial segmentation, we develop the maximization program based on the expected utility function of lenders.

2.2 Microfinancial lender maximization program

Wealth level W_{1i} allows the lender to maximize the expected utility function (equation 9) according to Von Neuman and Morgestern approach, under a budget constraint (Equations System 12):

$$\begin{cases} MaxE(U_i) = E(W_{1i}) - \left(\frac{b}{2}\right) Var(W_{1i}) \\ S/C \\ W_{1i} = \tilde{d} Cr_{0i} + R(e,\theta) * P(Cr_i - Cr_{0i}) \end{cases} \quad (12)$$

The expected utility can still be written as follows:

$$E(U_i(W_{1i})) = \mu Cr_{0i} + R(e,\theta)P * (Cr_i - Cr_{0i}) - \left(\frac{b}{2}\right) * \sigma^2 Cr_{0i}^2 \quad (13)$$

The microfinance institution expected utility takes into account the central tendency characteristics (mean and variance - volatility of the initial offer) of the initial offer performance. There is also the project yield financed partly by the additional funds provided by the microfinance institution. The microfinance institution budget constraint is a positive linear function of initial equity yield and additional funds.

By identifying the form of expected utility function of microfinance institution, the optimal level of the initial offer determined by the formation of market segments associated to microfinance products and services can be found. The resolution of the utility maximization program of the microfinance supplier implies defining the first order condition to deduce the initial level of credits at the optimum level, that is:

$$\frac{\partial E(U_i(W_{1i}))}{\partial Cr_{0i}} = \mu + R(e,\theta) * \frac{\partial Pr}{\partial Cr_i}(Cr_i - Cr_{0i}) - R(e,\theta)P - b\sigma^2 Cr_{0i}$$

$\frac{\partial P}{\partial Y_i}$ corresponds to price variation compared to equity demand, and is obtained by using the equations (10) and (11) and the ratio *1/B*. Therefore, the lender's demand for equity is equal to:

$$Cr_{0i} = \frac{1}{\frac{R(e,\theta)}{B} + b\sigma^2}\left[\mu + \frac{R(e,\theta)}{B} * Cr_i - R(e,\theta) * P\right] \qquad (14)$$

With an average value of loans defined by equation (7) as follows:

$$Cr_i = \overline{Cr} + \varepsilon_i$$

By substituting the average value of loans in equation (14), we obtained the optimal initial amount of credit granted by a lender:

$$Cr_{0i} = \frac{1}{\frac{R(e,\theta)}{B} + b\sigma^2}\left[\frac{R(e,\theta)}{B} * (\overline{Cr} + e_i) + R(e,\theta) * P - \mu\right]$$

The initial credit supply is a linear function of loan price (P) , yield of the project granted $R(e,\theta)$and average amount of loan ($\overline{Cr}$). The initial credit supply increases with the loan price increase and vice versa. Similarly, if the average amount of credit or the yield of project increases, then the level of initial credit grant increases too, and vice versa**.**

For other credit providers, the equation (10) can be rewritten as follows:

$$\sum_{\substack{h=1 \\ h\neq i}}^{N} Cr_{0h} = \frac{1}{\frac{R(e,\theta)}{B} - b\sigma^2}\left[(N-1)\left[\frac{R(e,\theta)}{B} * \overline{Cr} + R(e,\theta) * P - \mu\right] + \frac{R(e,\theta)}{B} * \sum_{\substack{h=1 \\ h\neq i}}^{N} \varepsilon_h\right] \quad (15)$$

Comparing equation (15) and the supposed credit supply of other lenders presented in equation (10), the corresponding values of constants A and B and$\tilde{\eta}$ can be deduced:

$$A = \frac{N-2}{b\sigma^2}\mu + \overline{Cr} \;;\; B = \frac{R(e,\theta)(N-2)}{b\sigma^2} \quad ; \quad \tilde{\eta} = \frac{1}{N-1}\sum_{\substack{h=1 \\ h\neq i}}^{N} \varepsilon_h$$

Replacing the value of B in the equation (7), we obtained the following expression:

$$Cr_{0i} = \frac{N-2}{N-1} * \frac{\mu - R(e,\theta) * P}{b\sigma^2} + \frac{\overline{Cr} + \varepsilon_i}{N-1} \quad (16)$$

The NASH equilibrium condition considering the differentiated strategies of loan providers on the markets N is as follows:

$$\frac{\mu - R(e,\theta) * P}{b\sigma^2} = \overline{Cr} + \varepsilon \quad with \quad \varepsilon = \sum_{\substack{h=1 \\ h\neq i}}^{N} \frac{\varepsilon_h}{N} \quad (17)$$

This NASH equilibrium condition helps to rewrite the credit demand handled by the supplier (i) at the optimum, and equation (9) has the new form below:

$$Cr_{0i}^{*} = \frac{N-2}{N-1} * (\overline{Cr} + \varepsilon) + \frac{\overline{Cr} + \varepsilon_i}{N-1} \quad (18)$$

Using this initial offer estimate, we derived the initial allocation variance and the deviation that may exist between the credit supply and the average credit available.

To do this, from the NASH equilibrium (equation 17) we determined the equilibrium price $P = \frac{\mu - b\sigma^2(\overline{Cr}+\varepsilon)}{R}$. Equation (18) determines the initial offer at the optimal position, so we ended up with the following utility function:

$$U(\varepsilon, \varepsilon_i) = \frac{b\sigma^2}{2}[(\overline{Cr} + \varepsilon)^2 + (\frac{\varepsilon - \varepsilon_i}{N-1})^2] + [\mu - b\sigma^2(\overline{Cr} + \varepsilon)](\overline{Cr} + \varepsilon_i) \quad (19)$$

Considering the different variables of behavior that are expectancy, variance and covariance, we have the associated statistical definitions below.

The expected value defined by $E(\varepsilon|\varepsilon_i) = \frac{\varepsilon_i}{N}$ is the average error of initial allocations of credit offered by lender (i).

The variance of loans donation is $E(\varepsilon^2|\varepsilon_i) = \frac{N-1}{N^2}\sigma_\varepsilon^2 + \frac{\varepsilon_i^2}{N^2}$ assessing the volatility of average initial loan allocation granted by a lender (i) on the microfinance market.

The covariance of loan allocations $E\ (\varepsilon\varepsilon_i|\varepsilon_i) = \frac{\varepsilon_i^2}{N}$ measures the deviation of the average initial credits allocation granted by lender (i), whose correction requires a proportional adjustment of the credit portfolio that can influence loan interest rates and gains.

From these error term behavior characteristics of the utility credit function of the microfinance lender, one can determine the expectancy of the initial loan supply function of an emerging micro-financial institution follows:

$$E(U(\varepsilon, \varepsilon_i) = \frac{b\sigma^2}{2}\left(\overline{Cr}^2 + \frac{N-2}{N-1} * \frac{\sigma_\varepsilon^2}{N} - \frac{2\varepsilon_i^2}{N}\right) + (\mu - b\sigma^2\overline{Cr})(\overline{Cr} + \varepsilon_i) \quad (20)$$

By considering this expected utility function, we can conclude that there are three main factors that influence the utility level of microfinance lenders and determine their position on

the market. These are the number of microfinance providers, the average amount of credit, and the average yield of initial loans. These results are discussed below.

3. Results

According to our theoretical analysis applied to microfinance lenders, the results induced by the maximization of the utility function defined by equation (20) for a microfinance lender result in identifying four criteria that determine their utility level.

- the number of microfinance lenders (N),
- the variance of initial credit supply that explains the credit portfolio diversification ($\frac{\sigma_{\varepsilon}^2}{N_E}$) that is correlated to the first criteria,
- the average amount of loans ($\overline{\boldsymbol{Cr}}$), and
- the average return for initial credit supply (μ).

An increase in the number of lenders reduces their utility function. The number of lenders also affects the variance of initial loan supply $\frac{\sigma_{\varepsilon}^2}{N}$ and the error term of loan supply $\frac{\varepsilon_i^2}{N}$. An increase in the number of microfinance providers (N) reduces the average variance of initial loans which also reduces the utility level of the lender, and vice versa. In this case, the main result is a utility function of the micro-finance lender that is a linear and positive function of the loan variance. The existence of very few microfinance lenders can easily diversify the initial loan granted. To increase the variance of the initial loan granted, there is a need to reduce the number of lenders on the microfinance market. A high degree of variance for initial credit supply means a high degree of variance for initial credit supply that induce a high degree of product portfolio diversification. If the microfinance lenders can easily diversify their financial

product portfolio, the direct implication will also result in good diversification of clients' structure and credit risk.

A positive boomerang effect is produced by the reduction of the number of lenders on the utility function identified at two levels. The first level is the direct effect of the relationship established between the level of utility function of lenders and the number of lenders. The second level is the indirect effect produced by improvements in the transmission mechanism. A study developed by Goetzman and Kumar in 2008 focused on equity portfolio diversification. Among other research questions they estimated the level of under diversification and examined whether the level of diversification could be improved over time. They saw that a large percentage of individual investors are under diversified and the level of under diversification is greater among younger, low income, less educated and less sophisticated investors (Goetzmann and Kumar, 2008).

If we consider that a borrower has to choose between two markets E and F, with $\frac{\sigma_{\varepsilon}^2}{N_E}$ and $\frac{\sigma_{\varepsilon}^2}{N_F}$, this result is true if and only if on the two markets with different sizes, i.e, $N_E \neq N_F$, the entry of new lenders favors the increase of the number of suppliers on both markets. If both markets are the same size, i.e, $N_E = N_F$ and if an increased number of lenders in each market takes place in the same proportions, then the variation of initial supply volatility is essentially due to endogenous characteristics of supply for each micro-finance lender. A high variance level of initial supply reflects a high level of financial product diversification for a micro-finance portfolio. The borrower arbitrage is based on the variance of initial supply and he will be able to choose market "E" if and only if the variance of the associated initial financial supply is greater than that observed on market "F", i.e, $\frac{\sigma_{\varepsilon E}^2}{N_E} > \frac{\sigma_{\varepsilon F}^2}{N_F}$, and vice versa. By considering the

initial supply variance, the microfinance borrower's choice is made on the basis of initial offers proposed. The choice of borrowers is also based on their income level.

The increased number of suppliers may also reduce the deviation $\frac{\varepsilon_i^2}{N}$ which exists between the supply of credit and the average amount of credit. A large deviation results in an important portfolio cost adjustment which reduces suppliers' earning margins. In this case, the lender utility function is a decreasing linear function of the number of microfinance providers. A strong deviation is explained by the existence of extreme values for proposed products. The behavior of loan supply is asymmetric, either with distribution characterized by a large number of small loans and a handful of large loans, or a large number of large loans accompanied by a handful of very small loans. Borrowers arbitrate on the basis of the loan cost proposed by the microfinance lender. The loan cost on the microfinance market depends greatly on the volume and the amounts of financial transactions.

The second determinant is the average amount of credit. From relationship (19) we observed that the average loan $(\overline{\boldsymbol{Cr}})$ is a linear function of the utility credit function granted. Increasing the loan amount induces an increase in the utility level of microfinance lenders. The third determinant is the average yield of the initial loan supply.

The (μ) variable is the average for initial credit return that does not depend on the number of suppliers, or on the amount of credit. But it determines the utility level of micro-finance lenders (i) who decide to engage in a specific market. There is a positive linear relationship between the return on initial credit and the utility level of the micro-finance lender (i). A high return on initial credit supply is accompanied by an improvement of the supplier's utility level (i) (equations 19 and 20).

4. Discussion

An important point that appears according to multiple microfinance lenders is the creation of multiple market microstructures established between lenders and borrowers. Price is a determinant that may explain this. According to microeconomic theory, the price equilibrium consists in presenting the adjustment between supply (lenders) and demand (borrowers). On the microfinance market, one of the main characteristics of price equilibrium is the existence of several prices for the same product that results in the formation of specific client segments. The existence of several prices justifies the price discrimination applied by a specific microfinance lender to attract some borrowers.

Let distinguish three types of price discrimination. The first is “first-degree price discrimination” or “perfect discrimination”, where the lender has complete information on individuals or groups targeted (borrowers). The second is “second-degree price discrimination”, where the lender knows the different possible groups (borrowers), but is unable to classify clients according to specific groups. The pricing applied by the lender is carried out according to the quality or the quantity of products offered. The third type of price discrimination is “third-degree price discrimination”, where the lender has no information on borrowers, but is able to classify each client according to a specific group.

There is financial market segmentation if and only if an application of multiple possible trading and transactions is found for the same asset or financial product outside the market (Biais, Foucault and Hillion, 1997). As are looking at a microeconomic view, the existence of financial market segmentation is proof that the pure regime of perfect competition is bounded. Market segmentation exists when the classical and neoclassical equilibrium mechanisms like supply atomicity, price transparency and free transactions on the market, are no longer sufficient to ensure identical market share conditions for lenders. The concept of market

segmentation also concerns Marketing development where different competitive strategies are applied on markets; we can thus distinguish differentiation from segmentation (Smith, 1956). The market segmentation approach helps to understand why the prices fluctuate on the market (Johnson, Zuber and Gandar 2004). Price fluctuation in the microfinance sector is related to the definition of loan interest rate levels that differ from one institution to another (Johnson, Zuber and Gandar 2004).Financial segmentation has a double impact on the behavior of both lenders and that of borrowers.

Some other factors identified can explain microfinance market segmentation as the geographical location of lenders, the competition and the regulation framework. The placement decision of a new lender in the microfinance market is determined by the characteristics of a location choose (McIntosh, Janvry, and Sadoulet 2005 P. 990) . Microfinance market segment can also been determined by the differential abilities of lenders to collect collateral, and to implement screening and monitoring ((Conning 1999; Navajas, Conning, et Gonzalez-Vega 2003). The microfinance market let appears a supply of credit which is not fixed but that depends on the quality of the projects. There is a huge issue of asymmetric information between borrowers and lenders, and borrowers know exactly what quantity they need. In the microfinance market there is no evidence of a positive externality between the credit volume lent by a microfinance institution and better credit rates, if anything, there could even be a crowding out effect. This point contributes to raise up competition among microfinance institutions and the consequence is that clients may take loans from several lenders simultaneously and will increase by this way the probability of indebtedness.

Another factor explaining the differences between the lenders in the microfinance market is the intrinsic cost of ownership (Mersland 2009, P.469). the cost of ownership differ from one lender to another because some would want to fulfils the short term needs of poor

clients and others will want to stabilize the double objectives at long term as the win-win logic argue ((Morduch 2000; Rhyne 1998).

Financial market segmentation helps to get a better overview of flows on the microfinance market and to control the number of lenders that enter the market (Montgomery, 1991). Segmenting a market is an easy way to evaluate the impact of a new entry lender on market performance and on borrowers' welfare. Financial market segmentation in microfinance shows the coexistence of a high number of small and a small number of large microfinance institutions where there is a strong competition, and a low level of market share and profit margin held by small microfinance organizations (Allen and Jagtiani, 1997).

5. Conclusion

In a context of price inelasticity and price discrimination of financial demand for microfinance products, the microfinance market appears as highly segmented but not highly efficient if we consider lenders' returns. This reverse and negative effect on the product portfolio of microfinance lenders results in an analysis of the segmentation on the microfinance market that can help to improve the performance of micro-financial intermediation in developing economies. After two decades of speedy development of microfinance activity, one of the results is a high number of microfinance lenders, and as we have seen above, this large number has a negative effect on lenders' utility function for it reduces the degree of initial possible supply diversification. An important question arises at this stage of analysis, i.e, "how can we improve entry and institutional development in terms of microfinance lenders' asset size with a possible positive impact on their financial and social performances?" An answer to this question could be to implement a process of financial consolidation (regulation and market

regime). We have also see that lenders easily define the borrowers' preference not only on loan cost, but also according to the degree of initial supply variation of lenders from one to another.

The microfinance consolidation process proposed as a solution to improve the reverse effects of a highly segmented microfinance market can have a positive impact on microfinance performance by helping the increase the assets of microfinance lenders with diverse specialized financial capacities and by reducing the number of micro-financial intermediaries. A direct consequence of this action could be the easier financial capability of consolidated microfinance institutions to offer better diversified initial loans, with an important positive impact on the financial inclusion rate of poor and precarious clients.

References

Akerlof, George A. 1970. « The market for 'lemons': quality uncertainty and the market mechanism ». *Aug* 84 (3): 488-500.

Allen, L., et J. Jagtiani. 1997. « Risk and market segmentation in financial intermediaries' returns ». *Journal of Financial Services Research* 12 (2): 159-73.

Bencivenga, Valerie R., et Bruce D. Smith. 1991. « Financial intermediation and endogenous growth ». *The Review of Economic Studies* 58 (2): 195-209.

Biais, Bruno, Thierry Foucault, et Pierre Hillion. 1997. *Microstructure des marchés financiers: institutions, modèles et tests empiriques*. Presses universitaires de France.

Conning, Jonathan. 1999. « Outreach, Sustainability and Leverage in Monitored and Peer-Monitored Lending ». *Journal of Development Economics* 60 (1): 51-77.

Cull, Robert, Asli Demirgüç-Kunt, et Jonathan Morduch. 2010. « Microfinance meets the market ». *Contemporary Studies in Economic and Financial Analysis* 92: 1-30.

Cull, Robert, Jonathan Morduch, et others. 2007. « Financial performance and outreach: a global analysis of leading microbanks* ». *The Economic Journal* 117 (517): F107-33.

Goetzmann, William N., et Alok Kumar. 2008. « Equity portfolio diversification* ». *Review of Finance* 12 (3): 433-63.

Gresse, Carole. 2001. « Fragmentation des marchés d'actions et concurrence entre systèmes d'échange ». http://basepub.dauphine.fr/handle/123456789/6666.

Gurley, J. G, et E. S Shaw. 1960. « Money in a Theory of Finance (Washington, DC: Brookings Institution) ». *Money in a Theory of Finance (Washington, DC: Brookings Institution)*.

Hermes, Niels, Robert Lensink, et Aljar Meesters. 2009. « Financial Development and the Efficiency of Microfinance Institutions ». SSRN Scholarly Paper ID 1396202. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=1396202.

Johnson, R. S, R. Zuber, et J. M. Gandar. 2004. *Market segmentation theory: A pedagogical model for explaining the term structure of interest rates*. Finance Education Association, Mystic, CT.

McIntosh, Craig, Alain Janvry, et Elisabeth Sadoulet. 2005. « How Rising Competition Among Microfinance Institutions Affects Incumbent Lenders* ». *The Economic Journal* 115 (506): 987-1004.

McIntosh, C., et B. Wydick. 2005. « Competition and microfinance ». *Journal of Development Economics* 78 (2): 271-98.

Mersland, Roy. 2009. « The cost of ownership in microfinance organizations ». *World Development* 37 (2): 469-78.

Mersland, Roy, et R. Øystein Strøm. 2010. « Microfinance mission drift? » *World Development* 38 (1): 28-36.

Montgomery, John D. 1991. « Market Segmentation and 1992: Toward a Theory of Trade in Financial Services ». In *Financial regulation and monetary arrangements after 1992*, 173-99. North-Holland; distributed in the U.S. and Canada by Elsevier Science, New York.

Morduch, J. 2000. « The microfinance schism ». *World Development* 28 (4): 617-29.

Mosley, Paul, et David Hulme. 1998. « Microenterprise Finance: Is There a Conflict between Growth and Poverty Alleviation? » *World Development* 26 (5): 783-90.

Navajas, S., J. Conning, et C. Gonzalez-Vega. 2003. « Lending technologies, competition and consolidation in the market for microfinance in Bolivia ». *Journal of International Development* 15 (6): 747-70.

Pyle, David H. 1971. « On the theory of financial intermediation ». *The Journal of Finance* 26 (3): 737-47.

Rhyne, E. 1998. « The yin and yang of microfinance: reaching the poor and sustainability ». *MicroBanking Bulletin* 2 (1): 6-8.

Roger, Patrick. 1991. *Les outils de la modélisation financière*. Pr. Univ. de France.

Smith, Wendell R. 1956. « Product Differentiation and Market Segmentation as Alternative Marketing Strategies ». *The Journal of Marketing* 21 (1): 3-8. doi:10.2307/1247695.

Stiglitz, J. E, et A. Weiss. 1981. « Credit rationing in markets with imperfect information ». *The American economic review* 71 (3): 393-410.

Vanroose, Annabel, et Bert D'Espallier. 2013. « Do microfinance institutions accomplish their mission? Evidence from the relationship between traditional financial sector development and microfinance institutions' outreach and performance ». *Applied Economics* 45 (15): 1965-82. doi:10.1080/00036846.2011.641932.