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Productivity and vulnerability of microcredit borrowers in microfinance: an approach using non-separability models

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Abstract. The aim of this paper is to find a better match between the supply of and demand for solidarity microcredit with a view to reducing the level of precariousness and vulnerability of micro-entrepreneurs. If microcredit can constitute a necessary production factor for the activity of micro-entrepreneurs, then the deployment of MFIs in developing countries to facilitate access to microfinance services for low-income agents is desirable. However, the effectiveness of such a factor requires a good analysis of the cash flow needs of micro-entrepreneurs (households) in precarious situations, which would enable financial products to be adapted. Two main lessons can be drawn from a theoretical model: (1) demand for microcredit depends not only on the cost of the service, but also on the price of the micro-entrepreneur's output, the price of labour input and the size of the business. And, although they have this labour input, micro-entrepreneurs suffer from a lack of financial means to exploit it in order to benefit from it and improve their living conditions. (2) solidarity microcredit can have a positive impact on household cash flow, improve the smoothing of their consumption and, to a certain extent, strengthen their resistance to economic shocks.

Keywords. Micro-entrepreneur; Productivity; Microcredit; Precariousness

Introduction

In reference to the neo-classical perspective of the neutrality of financial intermediaries (Modigliani and Miller's 1959 Theorem), there is no need to worry about information because financial intermediaries are neutral. This mechanism has led credit theorists to demonstrate that the raison d'être of banks is based on their information function. The existence of hidden actions performed at the inception of the contract that cannot be observed by one of the parties. The agency theory described by Jensen and Meckling (1976) inspires a large part of the models of optimal credit contracts. For example, the management shareholders of a company do not have the same interests as the creditors and have more precise information about the quality of their project. Agency theory studies how informational asymmetries and the difficulty of observing the principal can be overcome by setting up contractual benchmarks that encourage the agent to act in the principal's interest. Diamond (1984) proposes a non-contingent contract where repayments are made on a lump sum basis and the principles of coordination are reduced to the extreme, in order to minimise the costs of control. It is important to know in an individual or group credit whether the quality of the credit members can have a positive or, with a few

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exceptions, a negative impact. The level of effort required by the MFI can encourage bad clients to reveal their type and this in turn will reduce the repayment risk and help the MFI to improve its contract bases according to the type of client. This same level of effort will help to eject bad credit managers among the members making up a group. On the one hand, there is a risk that customers who make little effort will be excluded from future loans. The pressure will be strong within the group, which would mean excluding those most vulnerable to credit. On the other hand, with the effort premium, the MFI creates an incentive within the group and minimises the risk of credit default. We assume that with the introduction of the effort premium, the MFI creates an incentive mechanism, but it remains indifferent to the type of credit; the search for information revolves around the level of effort and the type of clients (efficient or inefficient). Matching supply and demand for microfinance products and services requires, among other things, a broad understanding of reactions and changes in demand-related behaviour. The analysis of the behaviour of vulnerable and precarious people is generally approached within the framework of household models (Chayanov, 1920; Becker, 1965), on the one hand, and neoclassical production models, on the other. In the case of household models, the specificity of this type of modelling lies in the integration within a single structure of a number of behaviours which, until now, have been treated separately in economic literature (Abdelkhalek, 1999). Inspired by classical microeconomic theory and the maximisation of several objectives under constraints, models of households in precarious situations attempt to describe the production, consumption and labour supply behaviour of households with a productive activity. The household is then approached both as a microenterprise and as a family, refusing to take into account only the productive aspects that have dominated previous analyses. This being the case, it becomes possible to take into account the multiple objectives pursued by the household, the interactions between these objectives and the impact of these interactions on the household's ability to react. The literature on models of households in precarious situations distinguishes between so-called separable and non-separable models (Barnum and Squire, 1979; Singh *et al.*, 1986). The principle of separable models is based on the behaviour of households in the context of a perfect market for all products and factors of production (Jorgenson and Lau, 1975). In such a framework, prices are exogenous to the household and all products and factors are marketable without incurring a transaction cost (Sadoulet and De Janvry, 1995). This model makes it possible to solve production, consumption and labour supply problems sequentially. As for non-separable models, it is the presence of market imperfections that leads to the principle of non-separability (Nakajima, 1970). In fact, the household model is called non-separable when the production decisions of the household (microentrepreneur) are influenced by its consumption characteristics. This assumes the existence of potential interdependence between production and consumption decisions within the household. Non-separable household models ultimately raise the question of the weakness of wealth accumulation or access. Indeed, the welfare of these households naturally depends on their level of access to the ownership of certain factors of production, to other durable goods or to other assets (Abdelkhalek, 1999), and it is this accessibility that fundamentally determines their behaviour or their decisions on the various markets. Next, progressive lending models present disadvantaged households solely as producers, using a given set of resources to produce certain goods according to a pre-defined technology. They are deployed when there is no market failure and only the production aspect is privileged. From this point of view, the problem is to find the exploitation plan that maximises an objective without violating any constraints.

Microfinance institutions (MFIs) generally grant microloans to projects that are likely to generate income for the beneficiaries. Under these conditions, the progressive loan model

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approach seems best suited to analysing the behaviour of microfinance clients. It is this type of model that is used here to study the behaviour of microfinance clients (Eboue et al., 2021). Despite the labour force available to them, the underprivileged have difficulty in improving their living conditions. All these factors undoubtedly militate in favour of the need to turn to microcredit. It is also recognised that microcredit programmes bring the dynamism of the market economy to the world's disadvantaged groups. They make it possible to grant small loans to households so that they can engage in an independent activity that provides them with an income and enables them to meet their needs and those of their families. **What then will be the production behaviour of vulnerable people once they benefit from this additional production factor? The** aim of this study is to contribute to a better match between the supply of and demand for microfinance with a view to reducing the level of precariousness among households by analysing the reactions and behaviour of low-income households, the presumed target of microfinance. This amounts to studying the production behaviour of a low-income individual who benefits from a microcredit based on the progressive loan model approach. This work is organised into four points: The first section defines the contextual analysis framework; the second section is devoted to the theoretical modelling; the third section concerns the recommendations and the fourth section constitutes the conclusion.

2. Literature review

The individual behaviour of low-income populations is generally assessed using household models. The literature distinguishes between theoretical analyses and applications in both developed and developing economies. Turning first to theoretical modelling, four major contributions generally attract attention. The first is that of Chayanov (1923), taken up by Nakajima (1957). Based on a marginalist approach to rural economics, this pioneering contribution draws on the historical context of debates on agriculture in the Union of Soviet Socialist Republics (USSR) to present the internal equilibrium of the household as an optimisation of a production-consumption equilibrium. The second contribution places the principle of separability at the centre of rural household models (Singh *et al.*, 1986). This results in two types of model. The first type concerns separable or recursive models. These are constructs which assume that production, consumption and labour decisions within a household are made separately. The central assumption is that markets are perfect for all factors of production and for the good produced. Prices are then exogenous to the household. It should be emphasised that perfect markets are a sufficient but not necessary condition for separability (De Janvry and Sadoulet, 1995). Indeed, separability implies that household production decisions are not affected by consumption and labour resource decisions. However, labour resources and consumption decisions are not independent of production decisions. It is assumed that production decisions are made to optimise the first phase, allowing for the solution of factor demands, output supplies and optimal profit. Given the optimal level of profit determined in the first stage, the second-stage consumption problem is solved. The leisure demands of all household members and the demands for other products are determined by the results of the first stage. The second type are non-separable or non-recursive models. The idea is that, in most cases, markets are imperfect, which implies the non-marketing of goods produced or of non-marketable factors of production (Sadoulet *et al*., 1998; Sadoulet, 2000). The failure or absence of a market makes the production, consumption and consumption decisions of a rural household inseparable. These decisions must therefore be jointly determined and simultaneously estimated. Failure to take simultaneity into account leads to contradictory statistical evaluations (Singh *et al*., 1986). The third contribution is that of Ellis's "peasant economics" models (1993).

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This is a typology of rural household models based on trade-offs between external and internal activities (work/leisure or internal work and salaried employment). These models explain the atypical behaviour of agricultural supply in a context of structural adjustment. The fourth, more recent contribution, focuses on the importance of non-agricultural activities in rural areas and household income (Rugalema, 2001). The integration of this new context has given rise to models known as sustainable rural livelihoods (SRL). SRLs also incorporate the dimension of risk and household vulnerability to shocks. With regard to microfinance, studies (Lakwo, 2006; Basher, 2010; Bhuiyan, 2013) have explicitly explored the link between microfinance and SRL. In terms of applications, two groups of studies stand out. The first group concerns studies in developing countries (e.g. Lau *et al*., 1978; Barnum and Squire, 1978; Strauss, 1984; De Janvry *et al.*, 1992; Skoufias, 1994). The second group includes work carried out in developed and transition economies (e.g. Huffman and Lange, 1989; Tokle and Huffman, 1991). These studies use cross-sectional data, on the one hand, and panel data, on the other, to analyse household behaviour. It has to be said that many applied studies continue to use the unitary model, even though theoretical models have gradually evolved to reflect the appropriate behaviour of microfinance client households.

3. Analysis framework

Microcredit is no longer an experiment, but is proving to be one of the most effective development tools (Eboue et al., 2021). The clientele of these MFIs consists mainly of micro and small entrepreneurs (MPEs) and promoters of income-generating activities (IGAs) (Navajas et *al*., 2000)**.** Two forms are considered to be the "ancestors" of microfinance projects: usury and tontines (Hofmann and Kamala, 2001, 10). The speed, simplicity and reliability of the procedures explain the growing success of this system. Its expansion can be explained by the crisis in the banking system, urbanisation and increasing monetarisation (Jacquier, 1999). So, to strengthen the informal sector, increase economic efficiency and reduce inequity, new categories of financial institutions have emerged with the sole aim of facilitating access to finance for these economic units. These are known as microfinance institutions (MFIs), and they advocate offering financial services to poor people who generally have no access to the operations of banks and financial institutions (de Briey, 2005). In low-income countries such as Cameroon, they have also largely focused microfinance loan financing on microenterprise activities. The compatibility of the nature of their activities with MFI financing mechanisms, their growing demand, their ability to reinvest loan proceeds, etc. are all factors that justify, among other things, the orientation of these financial institutions towards microentrepreneurs (Espallier et *al.*, 2011; Aggarwal et *al.*, 2015). Labie (2004) refers to the real difficulties and obvious social pressures that can arise from loans granted especially to precarious and vulnerable people and which, according to Guérin et al. (2006), result in "great disillusionment" for the latter. Some authors believe that microfinance, far from encouraging the development of beneficiary clients, actually generates new forms of social pressure. The legitimacy of support from public authorities (national or international) for the development of microfinance is therefore contested. These failures seem to stem from a mismatch between supply and demand for microfinance products and services. This is all the more true given that microfinance should practically target vulnerable and precarious people. In the context of the economy of developing countries, an analysis of the profile of vulnerable and precarious people could better indicate the right target for MFIs. This will make it possible to characterise the type of individual who should benefit from microfinance products and services. The concept of vulnerability and/or precariousness, and its measurement, has evolved and expanded in recent

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years. However, depending on the definition used, vulnerability and/or insecurity is a complex concept and it is always difficult to define the status of an insecure or vulnerable person (Ndione, 2021). It is often recognised that within any social group, the disadvantaged are those whose living conditions are well below average (PenaCasa and Pochet, 2001; Coudouel *et al*., 2002; Duclos and Gregoire, 2002; Duclos, 2002). Approaches to precariousness reveal two essential dimensions: the monetary dimension, measured by income, and the human dimension, which focuses on certain material conditions of life such as access to drinking water, housing and sanitation**.**

4. Theoretical modelling

We present the model, its resolution and the interpretation of the results.

4.1 The model

The purpose of our model is to analyse the production behaviour of the microfinance borrower. We formulate the hypothesis that the microfinance borrower is an individual in a precarious situation. Their main activity is agriculture or small-scale trade, which they carry out with great difficulty due to a lack of financial resources. In addition, we consider that the microcredit they may receive is used solely as a production factor. To this end, we adopt the model established by Egli, which aims to explain the system of progressive loans in microfinance. This system is based on the fact that a borrower obtains a loan which at the beginning is small, then, as he behaves well, the size of the loan increases. As a result, intermediation takes place through the reward of a larger loan size as repayments are made. This model is based on the idea that the borrower's project needs to be broken down to start financing. This is less efficient in order to maintain pressure on the borrower to repay. Here we return to Stiglitz's conclusion on the size of the loan, which can be used to reduce the risk of the credit granted by the MFI to its client. This model assumes different attitudes to repayment. Hence the existence of two types of loan applicant: the exploiter and the good debtor. The investor does not know the type of applicant, but he does know the proportion of good debtors in the population.

The author will show that the system of repeated loans makes it possible to reduce the risk, but this comes at a cost because the applicant may be obliged to divide his project into sub-projects which will be carried out sequentially. The incentive to repay may consist in the fact that the operators will fulfil their contractual obligation to obtain financing for the more profitable sub-projects. Here we find the bank's promise to refinance the borrower if he repays. The value of the implicit contract is all the greater if the most profitable sub-project is completed at the end. The author will verify the realisation of the incentive on three scenarios of progressive loans where the project is divided into two sub-projects:

- Small projects with a given order: the two sub-projects are carried out in a specific order;
- Small projects in no particular order: the sub-projects are carried out one after the other in a random fashion. In this case, it is shown that the investor will only make the loan if the most profitable project is postponed;
- Large-scale divisible projects: in this case, the borrower is immediately efficient in any project and may not even divide the overall project.

The author then shows that the investor will still want the borrower to divide up his project.

The structure of the model is common to all three scenarios. It is a two-period model where in each period the borrower offers a repayment in exchange for a loan to a potential

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investor for his project. The investor either accepts or rejects the offer. If he accepts, then the project is completed and at the end of the period, the loan must be repaid. If he rejects, we move on to the next period.

We assume that a contractor has access to a project divided into two sub-projects: *A* and *B*. The sub-project ($j=A, B$) requires an initial investment of k_j and gives a return of π_j .

The two subprojects are assumed to be of different sizes: $k_A < k_B$ and have a positive net present value of $\pi_j > k_j$. We also introduce the inverse probability of measurement $\Delta_j = \frac{k_j}{\pi_j}$.

Finally, the projects can be carried out during period $t = 1,2$.

There is an investor with a quantity of wealth of $\pi_A + \pi_B$. At the beginning of the period, the borrower proposes a contract specifying project *A* or *B* and the repayment amount.

r t that it offers in exchange for the investment corresponding to the desired project *A* π or *B* π.

We assume two types of entrepreneur: a good one with a probability of $p_0 \in [0,1]$ and a bad one with a probability of $(1 - p_0)$. During the period, the investor only knows the prior probability of p_0, and at the end of the period, he knows whether any bad borrowers have also repaid *r*. We posit $\beta \in [0,1]$ as the probability of a bad borrower repaying 1 *r1*. Therefore the probability that the borrower will be repaid at the end of the period is $q = p_0 + \beta (1 - p_0)$. Furthermore, at the end of the period, the investor can update his probability p_0 : $p_1 = \frac{p_0}{q}$.

Let $\gamma^* \in [0,1]$ be the probability that the investor accepts the repayment proposal *r*. We will have :

$$\gamma^* \begin{cases} = 0 \xrightarrow{if} r < \dfrac{k}{p_0} \\ \in [0,1] \xrightarrow{if} r = \dfrac{k}{p_0} \xrightarrow{and} p_0 = \Delta \\ = 1 \xrightarrow{if} r \geq \dfrac{k}{p_0} \xrightarrow{and} p_0 > \Delta \end{cases}$$

The case of small projects with a given order: the contractor can only carry out one project at a time, and project *B* can only be carried out after project *A*. This case is used to analyse the other scenarios.

First, we look at what happens at the start of the second period. If project *A* has not been completed in the first period, only that project will be feasible in period 2.

Hence, if $p_0 \geq \Delta_A$, the entrepreneur will offer a repayment of $r =^*_2 \frac{k_A}{p_0}$ in exchange for the investment k_A . The investor will accept with probability $\gamma^* \begin{cases} \in [0,1] \\ 1 \end{cases}$. The bad entrepreneur will default with certainty. If $p_0 \geq \Delta_A$, there will be no contract signed.

If project *A* is completed in the first period and repayment r1 has been made, the borrower will be able to claim to complete project *B* in the second period. If $p_0 \geq \Delta_B$, the entrepreneur will offer a repayment $r =^*_2 \frac{k_B}{p_0}$ in exchange for the investment k_B .

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The investor will accept with probability $\gamma^* \begin{cases} \in[0,1] \xrightarrow{if} p_1=\Delta_B \\ 1 \xrightarrow{if} p_1>\Delta_B \end{cases}$. The bad contractor will default with certainty. If $p_1 < \Delta_B$, there will be no contract signed in the second period.

This means that at the end of period 1, the bad entrepreneur knows with what probability γ^* , he will obtain the return on project *B* with present value π_B if he repays r_1 with probability β such that $p_1 \geq \Delta_B$. Naturally, he will default if the cost r_1 which corresponds to the accumulation of reputation exceeds the potential gain π_B from such reputation. In other words, $\beta^* = 0 \Leftrightarrow r_1 > \pi_B$. On the other hand, for $r_1 < \Delta_B$, this bad contractor will choose a β as high as possible in order to maximise his probability of having a surplus on the reputation annuity $\pi_B - r_1$. Therefore, if $p_0 \geq \Delta_B$, he will choose β = 1 so as not to risk losing the contract in the second period. If $p_0 \geq \Delta_B$, he will maximise $\beta^* = \overline{\beta} = \frac{p_0}{1-p_0}\frac{1-\Delta_B}{\Delta_B} < 1$ implying $p_1 = \Delta_B$ hence the realisation of a contract in period 2 with probability $\gamma^* \in [0, 1]$.

So, at equilibrium $\gamma,^* \pi_B - r_1$ must be zero, which means that $\gamma =^* \frac{r_1}{\pi_B}$.

The probability of repayment in the first period becomes :

$$q^* = \begin{cases} 1 \xrightarrow{if} r_1 \leq \pi_B \xrightarrow{and} p_0 \geq \Delta_B \\ \frac{p_0}{\Delta_B} \xrightarrow{if} r_1 \leq \pi_B \xrightarrow{and} p_0 = \Delta_B \\ p_0 \xrightarrow{if} r_1 > \pi_B \end{cases}$$

The updated probability of repayment will therefore be :

$$P_1^* = \begin{cases} P_0 \xrightarrow{if} r_1 \leq \pi_B \xrightarrow{and} p_0 \geq \Delta_B \\ \Delta_B \xrightarrow{if} r_1 \leq \pi_B \xrightarrow{and} p_0 = \Delta_B \\ 1 \xrightarrow{if} r_1 > \pi_B \end{cases}$$

Now, let's look at what happens at the beginning of period 1. The investor will anticipate *q** he therefore knows that he can expect a repayment of $q\, r^*_1$. He will agree to commit to lending funds if his investment k_A earns him $r_1 \geq \frac{k_A}{q^*}$. Moreover, he knows that $r_1 \leq \pi_A$ because the borrower has no individual wealth. Moreover, a probability of repayment that is positive or less than 1 implies that $\beta^* = \overline{\beta}$, which is possible if and only if the reputational annuity is non-negative: $r_1 \leq$. Therefore the choice of β^* subject to $p_0 < \Delta_B$ will only be possible if $\min\{\pi_A, \pi_B\} \geq r_1 \frac{k_A}{p_0}\Delta_B$ This implies that: $p_0 \geq \max\left\{\Delta_A \Delta_B, \frac{k_A}{\pi_B}\Delta_B\right\}$. Thus, a good borrower will choose to offer a repayment r_1 that satisfies this last inequality. This repayment will therefore be as low as possible in order to maximise his income. He will therefore propose :

$$r_1^* = \frac{k_A}{p_0}\Delta_B$$

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It should be noted that a bad entrepreneur will be forced to imitate the good entrepreneur because any other proposal than the one above would reveal that he is not of the right type. From this, the author defines three types of equilibrium at the end of the first period:

- "*Reputation equilibrium.* For $\Delta_B \geq p_0 \geq \max\left\{\Delta_A\Delta_B, \frac{k_A}{p_0}\Delta_B\right\}$, there is a unique reputational equilibrium in which the entrepreneur, good or bad, offers a contract promising a payback $r_1^* = \frac{k_A}{p_0}\Delta_B$ in exchange for the investment k_A in the first period, and the investor accepts it. At the end of period 1, the bad entrepreneur repays with probability $\beta^* = \overline{\beta} \in [0,1]$;

- "*Pool equilibrium"* ($\beta^* = 1$). Assume $p_0 \geq \Delta_B$, there will be a unique pool equilibrium in which the entrepreneur, good or bad, offers a contract promising a repayment $r_1^* = k_A$ in exchange for k_A in the first period, and the investor accepts. At the end of the period, the bad entrepreneur repays with certainty" ;

- *"The separating equilibrium* ($\beta^* = 0$). Suppose $\max\left\{\Delta_A\Delta_B, \frac{k_A}{\pi_B}\Delta_B\right\} > p_0 \geq \Delta_A$, there will be a unique separating equilibrium in which the entrepreneur, good or bad, offers a contract promising a refund $r_1^* = \frac{k_A}{p_0}$ in exchange for the investment k_A in the first period, the investor accepts. At the end of period 1, the bad entrepreneur defaults with certainty".

However, we should also mention the case where no contract has been signed:

$$p_0 < \min\left\{\max\left\{\Delta_A\Delta_B, \frac{k_A}{\pi_B}\right\}, \Delta_A\right\}$$

The case of small projects with no given order. Now the project sequence is endogenous. There are therefore two possible sequence orders *{A, B}* and *{B,* A}. The intuition behind this scenario is quite simple. The low probability of project *A* makes it less attractive than *B*. Consequently, the incentive for a bad entrepreneur will be higher if project *B* is financed in the second period. So for the project sequence *{B, A}* there will be no investment. On the other hand, the sequence *{A, B}* leads to a reputational equilibrium.

The case of the large-scale divisible project. It is assumed that the entrepreneur has a large project at his disposal. If the project is completed in its entirety in the first period, then it costs: $k_A + k_B$ and yields $\pi_A + \pi_B$ or, alternatively, the project is divided into sub-projects. According to the author, the investor will be willing to invest $k_A + k_B$ if and only if $p_0 \geq \frac{(k_A + k_B)}{(\pi_A + \pi_B)} = \Delta_{ND}$. Consequently, each time the project is financed, it is split. For low values of p_0 , project *A* is carried out first. A good entrepreneur will prefer to split his project as this will allow him to reduce the risk of an exploiter in the second period. This will reduce the value of repaying the entire project.

This model shows that splitting borrowers' projects into a number of small sub-projects is a means of financing without collateral. The size of the loan allows the MFI to manage the risk and, consequently, splitting up the project is a way of lending without collateral. In addition,

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it creates incentives for the MFI, as repayment leads to the financing of the rest of the project with a larger loan. This mechanism also allows reputation to work both ways. The MFI will have a reputation for providing larger loans with a repayment and the borrower will gradually acquire a reputation and be able to obtain these larger loans at subsidised interest rates. This ultimately reduces the total cost of the project. Loan splitting is a tool used by the MFI to put pressure on borrowers to repay on time. Under this incentive system, the most profitable sub-project will be carried out last so as to keep this pressure constant.

The disadvantage of the progressive loan is a loss of well-being on the borrower's side, which hampers growth. However, this loss enables the borrower to obtain a better loan condition on the overall project because the acquisition of reputation that he makes as he goes along enables him to obtain a more advantageous interest rate on the capital he applies for. This reduces the overall cost of the project compared with what it would have cost if it had been financed all at once.

In the *sequential* lending model, one or more people receive credit while one or more others wait their turn. Like mutual tontines, the sequential model seems to defy the rationality of *homoeconomicus* for anyone who does not take the first turn. However, the basic mutual tontine model is simpler than the deferred group loan model in that it does not incorporate a cost of credit, but more sophisticated formulas have emerged and have been the subject of extensive study. The terms of the sequential loan contract can be illustrated as follows. At date *t=0*, a group is freely formed by two people *A* and *B* who agree on the first credit beneficiary, for example *A*. On date *t=1*, the group must repay the loan granted to *A*. If the group fails to repay, it goes bankrupt and the lender (MFI) sues *A* and *B* jointly and severally. Joint liability and the fact that *B*'s access to credit is conditional on *A*'s repayment, encourages *B* to monitor and assist *A*, and to contribute if necessary at date t=1. If A is repaid at date t=1, *B* obtains credit in turn. At date *t=2*, the group must repay *B*'s loan. If the group fails to repay, it goes bankrupt and the MFI sues *A* and *B* jointly and severally. Similarly, joint and several liability, and the fact that the renewal of the group's loan cycle is conditional on *B*'s repayment, encourages *A* to assist *and* monitor *B*, and possibly contribute at date *t=2*. We are interested here in the *rank of passage from* the perspective of a one-shot game. Why would *B* accept such a game, which is a *priori* unequal from two points of view: rank and joint responsibility at date t=1? There are a number of possible reasons for *B*'s attitude, including the concept of project *timing* and the *convention* approach. *B is* seeking liquidity for a project that could only start at *t=1*. Common examples are periodic liquidity shocks, seasonal activities and fixed-date projects. Anticipating this need for liquidity, *B* commits to the group (or to a tontine mechanism). Before date *t=1*, any borrowing is useless and even harmful. Unnecessary, because the resulting liquidity cannot be invested in the project, which is not yet ready for initialisation; harmful, because if *B* takes on debt at date *t=0*, even if it is invested at the risk-free rate, it will not be enough to pay the interest at date *t=1*. Worse still, the whole point of taking part in the game would be missed: at date *t=1* he would have to pay back the money when it was the right time for him to invest in his project. Given that only one person benefits from the first round, *A* and *B* can agree to draw lots to determine who goes first. For this *agreement* to be effective as a coordination mechanism, the players must not question the result of the draw. Without this agreement, the *payoffs* for *A* and *B* are zero, or even negative, because they will not be able to undertake their respective projects. At the very least, *B* can withdraw voluntarily (without a draw) for optimisation reasons that are specific to the project/or simply out of confidence. With a view to repeating the game, *A* and *B* can then agree that in the next cycle, it would be *B* who would go

first, and so on. The two players thus put in place a dual mechanism of reputation and micro-assurance.

4.2 Interpreting the results

This theoretical modelling of the production behaviour of microfinance clients provides two main lessons. In addition to the cost of the microcredit, demand for the microcredit production factor depends on the price of the output of the microfinance client's activity, the price of labour input and the size of the farm. Microcredit can be a factor of production for a microfinance client engaged in a production or commercial activity. With regard to the first lesson, the fact that demand for microcredit is determined by factors other than the interest rate means that the existence of MFIs is not enough to ensure that supply and demand for microfinance products and services match. The cost of microcredit must be at an attractive level. Also, the decision to acquire a microcredit must take into account the costs of other inputs in the production process and the price of the products. The cost of labour in the case of vulnerable and precarious people is derisory, if not zero. In fact, labour power is generally provided by the individual himself. Such behaviour makes it difficult to interpret the remuneration of labour in terms of wages. In fact, it is rather the profit from the operation after the sale and especially after the repayment of the microcredit that constitutes the main gain. From then on, the problem of remuneration for work is more a question of product prices and the sharing of margins (CERISE, 2002). From this point of view, a variation in the price of labour may not have a significant influence on the demand for microcredit from the underprivileged in certain countries. The price of products is undoubtedly a major factor in the demand for microcredit among the underprivileged. Indeed, when it is competitive, it leads to profit maximisation. Generally speaking, producers/merchants will focus on growing products that command high profit margins on the market. As a result, they will be quick to take out micro-loans for their production. The characteristics of the farm, particularly its size and profitability, are also reasons for applying for microcredit. In fact, when people have land or spaces that are fertile or well placed, this can be an additional motivation to look for a way to develop them. In the case of several underdeveloped countries, the so-called disadvantaged populations generally possess this natural production factor. However, the lack of financial resources does not allow them to make better use of it in order to benefit from it and thus improve their living conditions. In this respect, microcredit is an additional factor likely to reduce the level of vulnerability and precariousness. With regard to the second, microcredit, as a production factor, contributes to maximising the profit of the agricultural and/or commercial operation. This corroborates the assertion that microfinance can have a positive impact on the cash flow of vulnerable and precarious people, improve the smoothing of their consumption and, to a certain extent, strengthen their resistance to economic shocks. In this respect, by turning vulnerable and precarious people into a solvent demand, it could be a means of reducing poverty. In the absence of other financial operators, microfinance becomes a solid alternative for financing development. In fact, it is a fully-fledged business whose objective, in accordance with economic theory, is economic and financial profitability. One might therefore think that MFIs do not carry out their activity in the way advocated by Professor Yunus, who insists on the social objective of microfinance in each of his interventions. If microfinance is to help reduce precariousness, the question arises as to how effective MFIs are in relation to this objective in terms of internalising the "vulnerability and precariousness" externality. In other words, MFIs should integrate the poverty reduction objective when they postulate their production function.

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5. Conclusion

All this analysis of microfinance lending models has made it possible to specify the nature of the financial intermediation that is carried out. This includes all the traditional financial intermediation presented in our introduction. The innovation is that it incorporates a new aspect to this intermediation, which is more informal. The results of the study show firstly that microfinance clients are confined to agricultural production and retail trade. Secondly, when they benefit from microcredit, they can increase their income and thus improve their living conditions. In this way, microcredit is a necessary production factor for the agricultural and/or commercial activity of these individuals. This argues in favour of deploying MFIs in developing countries to facilitate access to microcredit for the inhabitants of these countries. But the effectiveness of such a factor requires a good understanding of the cash flow needs of microentrepreneurs, which would enable financial products to be adapted. The fact remains that analysis of the financial needs of microentrepreneurs necessarily requires direct surveys of farms. However, it should be noted that the problem with such a method is to obtain a general overview. In fact, it may be suitable for an MFI's area of intervention, but requires a heavy survey system to be able to offer a macroeconomic view.

References

[1] Abdelkhalek, T. (1999), 'Modèles de comportement des ménages: présentation et revue de la littérature', *Cahier de recherche de l'équipe MIMAP-Maroc, INSEA*, Rabat.

[2] Barnum, H. N. & L. Squire (1979), 'An Econometric Application of the Theory of the Household', *Journal of Development Economics* 6:79-102.

[3] Basher, M. (2010), Promotional role of microcredit: Evidence from the Grameen Bank of Bangladesh. *Journal of International Development* 22:521-529.

[4] Becker, G. S (1965), 'A Theory of the Allocation of Time', *Economic Journal* 75(299):493-517.

[5] Bhuiyan, A. B. (2013), 'Microcredit and Sustainable Development: An Empirical Study of Islamic and Conventional Credit on the Development of Human Capital of the Borrowers in Bangladesh', *Journal of Economic Cooperation and Development* 34(3):101-128.

[6] CERISE, (2002), 'L'évolution des enjeux et outils de l'analyse d'impact en Microfinance'. In *Techniques Financières et Développement*, Epargne Sans Frontière, n°70.

[7] Chayanov, A. (1923), 'Die Lehre von der Bauerlichen Wirthschaft', Versuch einer Theorie der Familienwirtschaft in Landau. Berlin: Parey.

[8] Coudouel, A., J. S. Hentschel & Q. T. Wodon (2002), 'Poverty Measurement and Analysis', PRSP Source Book, The World Bank, Washington, D.C.

[9] De Janvry, A. & E. Sadoulet, (1995), *Quantitative Development Policy Analysis*, Baltimore and London: The John Hopkins University Press.

[10] De Janvry, A., E. Sadoulet & M. Raki (1992), 'Structural Adjustment and the Peasantry in Morocco: A Computable Household Model', *European Review of Agricultural Economics* 19:427-53.

[11] De Janvry, A., M. Fafchamps & E. Sadoulet (1991), 'Peasant Household Behavior with Missing Markets: Some Paradoxes Explained', *Economic Journal* 101:1400-17.

[12] Duclos, Jean-Yves & P. Grégoire (2002), 'Absolute and Relative Deprivation and the Measurement of Poverty', Review of Income and Wealth, *International Association for Research in Income and Wealth*, 48(4):471-92.

[13] Duclos, Jean-Yves (2002), 'Vulnerability and poverty measurement issues for public policy,' *Social Protection Discussion Papers* 25534, The World Bank, Washington, D.C.

[14] Eboue, C., Mbondo, G., Ntieche, A., & Mukoko, B. (2021). CHAPITRE 24–Le Renouveau de la Théorie de la Défaillance bancaire in Artus, P., Holzmann, R., & Colmant, M. B. *Finance, banque, microfinance: où va la richesse créée?*. Éditions Larcier.

[15] Ellis, F. (1993), 'Peasant Economics: Farm Households and Agrarian Development', New York and Melbourne: Cambridge University Press.

[16] Huffman, W. & M. Lange (1989), 'Off-Farm Work Decisions of Husbands and Wives: Joint Decision Making', *The Review of Economics and Statistics* 71:471-80.

[17] Jorgenson, Dale, and L. J. Lau (1975), 'The Structure of Consumer Preferences'. *Annals of Social and Economic Measurement* 4(1):49-101.

[18] Lakwo, A. (2006), 'Microfinance, rural livelihoods, and women's empowerment in Uganda', African Studies Centre Research Report 85/2006, African Studies Centre: Leiden, Holland.

[19] Lau, L.J, W. L. Lin & P. A. Yotopolous (1978), 'The Linear Logarithmic Expenditure System: An application to consumption leisure', *Econometrica* 46:843-868.

[20] Mduma, J. K & P. Wobst (2005), Determinants of rural labor market participation in Tanzania. *African Studies Quarterly* 8(2):32-47.

[21] Nakajima, Chihiro (1957), 'Economic Theory of the Farm Household' (in Japanese), *The Economic Review of Osaka University* 7(2).

[22] Nakajima, Chikiro (1970), 'Subsistence and Commercial Family Farms: Some Theoretical Models of Subjective Equilibrum' in C.R. Wharton (ed), *Subsistence Agriculture and Economic Development*, Chicago Aldine Publishing Co.

[23] Ndione, M. (2021). Création de valeur au sein des institutions de microfinance de l'UEMOA: l'impact des parties prenantes. *RECMA*, (1), 111-126.

[24] Peña-Casas, Ramon & Phillipe Pochet (2001), 'Les indicateurs monétaires et non monétaires de pauvreté et d'exclusion sociale dans une perspective européenne' Ministère des Affaires sociales, de la santé publique et de l'environnement, Paris, France.

[25] Roe, T. & T. Graham-Tomasi (1986), Yield risk in a dynamic model of the agricultural household. In *Agricultural household models: Extensions, applications, and policy*, ed. I. Singh, L. Squire, and J. Strauss. Baltimore: Johns Hopkins University Press.

[26] Rugalema, G. (2001), 'Coping or Struggling? A Journey into the Impact of HIV/AIDS on Rural Livelihoods in Southern Africa', Paper presented for the expert meeting on Mitigating the Impact of HIV/AIDS on Food Security and Rural Poverty: A Framework for the Agricultural Sector. Rome: Food and Agricultural Organization of the United Nations.

[27] Sadoulet, E. (2000), 'Marchés imparfaits et modélisation des comportements des ménages paysans: où en sommes-nous?' *Actualité Economique*, 76 (4):459-489.

[28] Sadoulet, E., A. De Janvry & C. Benjamin (1998), 'Household Behavior with Imperfect Markets', *Industrial Relations* 37(1):85-108.

[29] Several Outputs: Responses to Prices, Production Technology, and Demographic Characteristics,' *American Journal of Agricultural Economics* 66:321-331.

[30] Singh, I., L. Squire & J. Strauss (1986), *Agricultural Household Models*, Baltimore: Johns Hopkins University Press.

[31] Skoufias, E. (1994), 'Using Shadow Wages to Estimate Labor Supply of Agricultural Households', *American Journal of Agricultural Economics* 76(2):215-27.
[32] Strauss, John (1984), 'Market Surpluses of Agricultural Households Producing
[33] Tokle, J. & W. Huffman (1991), 'Local Economic Conditions and Wage Labor Decisions of Farm and Nonfarm Couples', *American Journal of Agricultural Economics* 73:652-70.