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Formal and informal sectors: Interactions between moneylenders and traditional banks in the rural Indian credit market

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FORMAL AND INFORMAL SECTORS: INTERACTIONS BETWEEN MONEYLENDERS AND TRADITIONAL BANKS IN THE RURAL INDIAN CREDIT MARKET*

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ABSTRACT

This paper describes, through a theoretical approach, the interactions between institutional lenders and local moneylenders, and how these affect the rural credit market.

It evaluates the effects produced by the introduction of "spillovers" in a rural credit market with rationing in which banks and moneylenders interact simultaneously while working in distinct segments. Due to the strong and consolidated social ties, it is probable that the spread of knowledge concerning potential debtors comes about in targeted and rapid way with reduced costs for the lenders as well.

INTRODUCTION

The aim of this paper is to examine some of the principal reasons that discourage the formal sector from investing in rural credit markets. Various factors contribute, at different levels, to this situation, causing notable difficulties of access to credit for the poorest individuals. Initially, I follow the approach proposed by Basu (1997), who underlines that in the Indian rural credit market interpersonal ties as well as the interdependence hierarchy that is formed between landlords and tenants are among the major causes that maintain high interest rates and that make it difficult to access to that market segments for traditional credit agencies.

Following this, I analyse interactions between the formal sector and moneylenders in the Indian context, developing the theoretical model of Bell (1990) and highlighting how, through the introduction of the concept of "spillover" (which is tied to the spread of information on the characteristics of potential borrowers in a rural context that is dominated by strong social ties, and supposedly, at low costs) local moneylenders enjoy a comparative advantage with respect to the formal sector.

THE CASE OF THE RURAL INDIAN CREDIT MARKET

We first look at Basu's detailed analysis of the relationships in the rural Indian credit market, trying to understand the reasons that prevent the formal sector from reaching an adequate level of development in this context.

The lenders in this market are essentially the credit institutions, local private moneylenders, wealthy entrepreneurs, wholesale sellers and retail merchants (the last case for small loans for consumption). Interest rates vary not only from region to region and according to the lending source, but also depend on the final use of the credit itself (for instance, for consumption or investment in durable goods.)

There are two main characteristics that distinguish these markets:

1. Default rates tend to be quite low;
2. The level of interest rates applied in these markets is higher than that practiced by government-sponsored credit agencies.

Given the empirical evidence, the question we ask is why, when default rates are relatively low, government credit agencies as well as other lenders such as wealthy entrepreneurs who carry out this activity, appear to be reluctant to extend their banking services to the poorest subjects. Now the point to be addressed is why individuals in precarious economic conditions are often refused credit by all of the lenders operating in the market, except for their own employers.

The asymmetric access to the credit market by different socioeconomic groups is closely connected to different guarantees that these can offer to the bank . The kind of collateral that potential borrowers can offer the credit agency is intrinsically and exclusively characterized by the acceptance of their employers, and not by other institutes of credit or lenders in general.

In rural markets most farmers in difficult economic conditions can only offer their harvest as collateral, which for different reasons can undergo fluctuations (it is uncertain). In such a context it becomes particularly difficult to make lenders recognize collateral of this kind.

What comes up at this point is the question of why the employer (often represented by the landlord) is willing to accept part of the future harvest of the farmer (who becomes, in this context, the creditor as well) as collateral for a future loan, given the risk.

Behaving in such a way the employer adopts a strategy of risk-sharing and motivates the farmer who practises his agricultural activity under the employer to optimize his efforts in order to obtain a good harvest. Between the farmer and the landlord a sort of share-cropping contract is made: the landlord offers lodging and necessary equipment for cultivating the fields; the farmer, on

the other hand, dedicates himself to farming activities and keeps a part of the harvest as retribution for the labour given. A bad harvest depends on multiple factors: events not controlled by man, such as climatic conditions, or circumstances caused by human intervention, for instance the lack of proper care of the fields.

Given that the income of the landlord is directly correlated to the performances of the farmer, by granting loans that are constrained to the collateral of the future harvest, he incentivates the farmer's productivity and returns. This particular interdependence that is created between the two subjects is however asymmetric because the farmer (the weaker part) has no power and is hierarchically subordinated to the landlord, the wealthy owner who receives extra-economic benefits from this type of relationship. Many economists hold that it is the persistence of monopolistic power of private lenders in rural markets that causes high interest rates, but this particular asymmetric interdependence further increases the difficulties for the poor to get credit.

The absence of a particular relationship between the farmer and credit agencies is one of the major obstacles preventing the bank's recognition of acceptable collateral. One possible solution is the proposal of using the landlord as "cosigner" on behalf of the farmer with credit agencies, but this idea still keeps the farmer dependent on the employer and incapable of independent economic evolution. In fact the landlord would continue to benefit from economic privileges coming from such a hierarchical relationship. This would not allow poorer subjects to achieve a real increase of well-being[1].

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[1] In Basu (1997).

INTERACTIONS BETWEEN THE FORMAL SECTOR AND THE INFORMAL SECTOR IN THE RURAL INDIAN CREDIT MARKET

We give here a sketchy outline of the basic assumptions that describe the interactions between the formal sector and local moneylenders in the rural Indian credit market, based on Bell's model (1990). Initially, we assume that:

(1) The informal sector operates alone on the market;

(2) The moneylender is risk-neutral;

(3) The moneylender's goal is the maximization of his expected profits, $E\pi$.

The iso-expected profit curves will be U-shaped (as drawn in figure 1), due to the influence of fixed costs (for example investments of the lender in acquiring knowledge about his potential borrowers), and the fact that in the presence of moral hazard, the probability of default, at some point, will rise with the size of the loan.

We notice from figure 1 that there are two different cases of particular interest: First, we assume that there is free entry into moneylending activities, and lenders will make zero expected profits. In a similar context, on the basis of his information regarding the client's characteristics, the lender will offer the potential debtor a menu of contracts described by the iso-expected profit curve $E\pi(L,r)=0$. The borrower will choose the contract (that is a combination of the variables "L" and "r") that maximizes his expected net income, defined by Ey.

Figure 1: The loan contract and the preference map when only the informal sector exists*
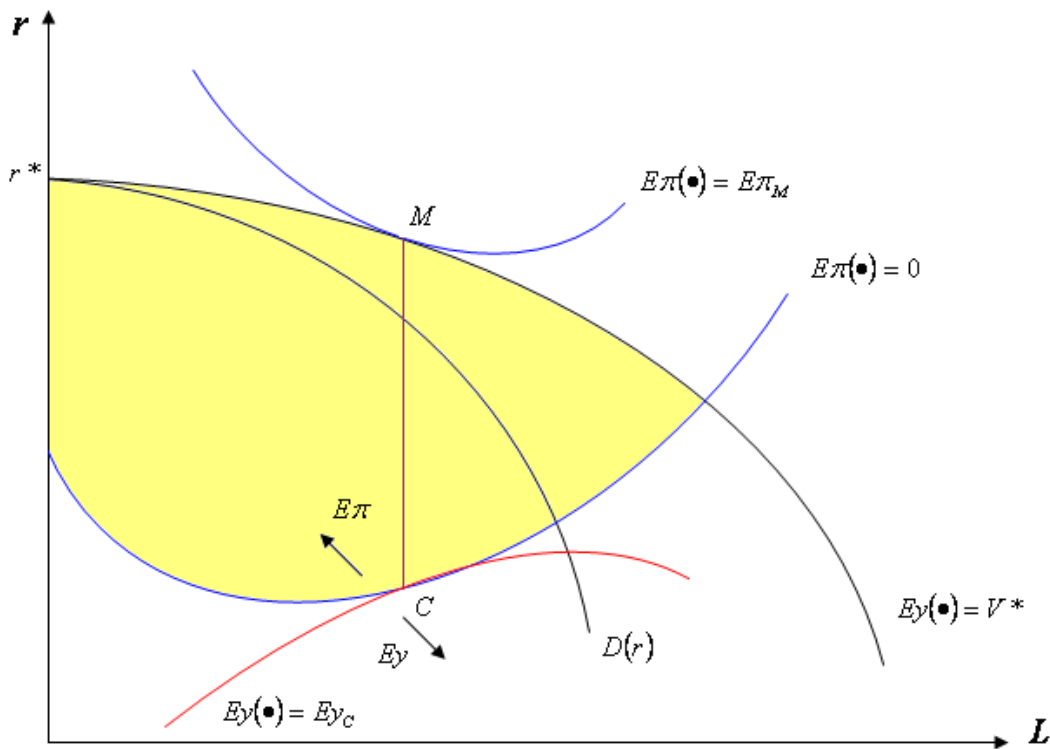
. **taken from: "Interactions between institutional and informal credit agencies in rural India", Bell (1990).*

The variable r, on the vertical axis, represents the rate of interest applied, while the variable L measures the size of loans available on the market.

Point C in figure 1 depicts the optimal contract, where an iso-expected net income curve[2] (for the borrower) is tangent to the zero expected profits curve, $E\pi(L,r) = 0$.

We can observe that C is to the left of the demand schedule for loans, $D(r)$[3], so that the client is rationed because, at the level of interest rate which corresponds to his optimum contract, he would like more funds than those foreseen in the contract. If the informal sector increases the amount of credit available on the market, moneylenders would obtain negative expected profits.[4]

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[2] See the appendix.
[3] See the appendix.
[4] As results the graph, an increase of L,(starting from point C, at the same rate of interest), would produce a move towards a lower iso-expected profits curve compared to the one that defines expected net profits equal to zero, implying negative income for the lender.

A polar case implies that the lender is a monopolist. If there is no competition, the only constraint for the lender must be that the contract he offers is at least as attractive as the borrower's reservation alternative (that consists in self financing his activities), described by the curve $V*$.

If the lender is a monopolist, the contract which maximizes his expected profits is at point M, where the curve defined by $Ey(L,r) = V^*$ is tangent to the iso-expected profits curve $E\pi_M$. At point M ("take it or leave it" offer), which lies to the right of the demand curve $D(r)$, the level of interest rate applied induces the individual to decrease the size of loan requested, while the lender would prefer to increase the amount of the loan.

Between these two extremes, both sides would have some contractual power and the end result would depend on the personal bargaining strengths . It is likely that the outcome would be Pareto-efficient, which means it will lie somewhere on the contract curve CM [5].

We now examine how the entry of the institutional agencies into the rural market affects the welfare of borrowers and local moneylenders. We focus our attention only on the formal sector, and we also suppose that the traditional banks can offer loans up to a certain ceiling, defined by $\overline{L_1}$, at a given rate of interest r_1. The ceiling's size can depend on the use to be made of the loan, the type and extent of the client's activities, and the form of collateral offered to obtain the funds.

Given these initial assumptions, the boundary of the borrower's opportunity set is represented by $\psi(L,r) = 0$ (figure 2).

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[5] This vertical line CM is the contract curve (or Pareto set) that describes all the combinations of the variables L and r which produce a Pareto-efficient outcome. In this context, CM is a vertical line, as shown by Milde and Riley (1988) in a similar model, on the basis of the previous model of Jaffee (1972); for a demonstration, see the appendix.

Figure 2.a: Credit demand satisfied at the interest rate r_1 ^
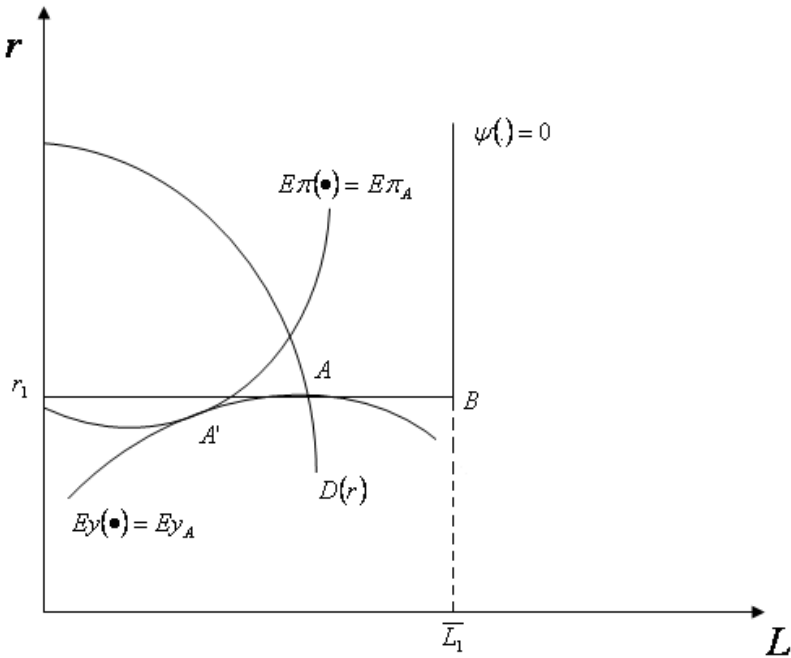
Figure 2.b: Excess demand at the rate of interest r_1 ^
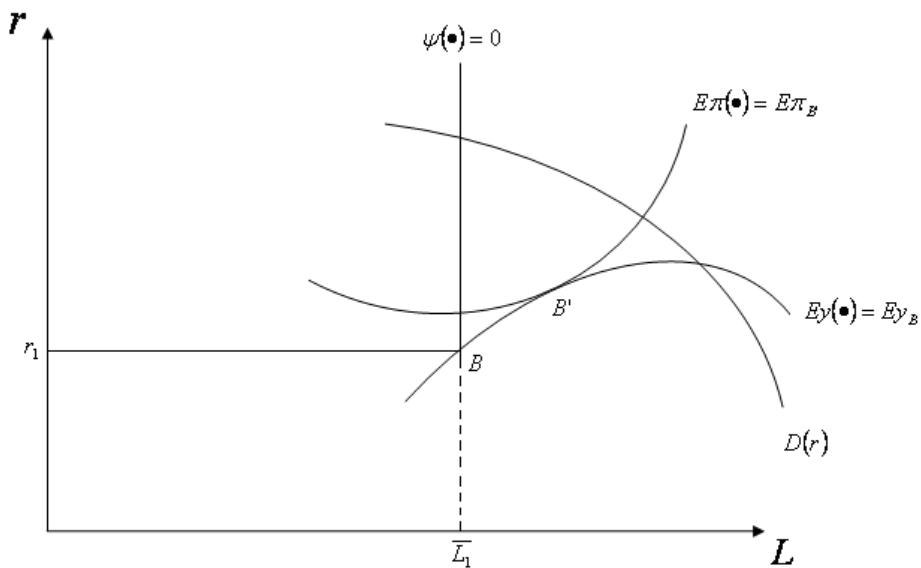
If an individual's credit demand, defined by $D(r)$, is less than $\overline{L}_1$, the amount of funds distributed will also be less; when the borrower's credit demand exceeds or is equal to the ceiling, the sum of funds will be equal to $\overline{L}_1$.

In figure 2, two different graphs are shown. First, the individual's credit demand at the rate of interest r_1 is less than the ceiling; he selects point A, where the demand curve for credit intersects the horizontal section of $\psi(\bullet) = 0$, and the indifference curve $Ey(\bullet) = Ey_A$ (which defines all the combinations of L and r that yield the same expected net income for the borrower) is tangent to $\psi(\bullet) = 0$. In the second part of figure 2, the individual's credit demand exceeds the ration imposed, so that the borrower must make to with this ration, which places him at point B, the "elbow" of $\psi(\bullet) = 0$.

We now introduce the informal lender to the model, and analyse the case in which he is a monopolist, before the establishment of the formal sector.

If both the moneylender and the traditional bank want to improve their performance and enforce their contracts, they must be able to offer a menu of contracts that are at least as attractive as those depicted at points A and B of figure 2.

The moneylender's optimum, because of the particular form of the borrower's indifference curves, will be the point of tangency between the iso-expected profits curve and the debtor's indifference curve corresponding to the reservation alternative which is to obtain capital from formal credit agencies. At point A' we notice that the interest rate offered by the moneylenders is less than r_1 (the rate of interest applied by the formal sector). In section "b" of figure 2, the moneylender's optimum is represented by point B', in which both the interest rate and the size of the loan exceed those offered by the traditional banks.

We can go back to the case in which the moneylender is a monopolist, and suppose that the potential client does not enjoy the alternative opportunities offered by the institutional sector; in this context, the expected net income he could obtain corresponds to $V*$, and the interest rate would rise to $r*$, which exceeds r_1 by a reasonable margin.

At this point the arrival of the formal sector would trigger an increase of the borrower's expected net income but a reduction of the expected profits for the lender; the debtor could obtain an advantageous loan by going to the institutional agencies.

In figure 2.b it is evident that the traditional banks don't hinder the operations and the activities of the informal sector, if the moneylender had monopoly power in his segment of credit market; in this case, the private lenders make loans in order to assure the tangency condition between the iso-expected profits and the iso-expected net income for the borrower.

We now describe the opposite case in which there is free entry into moneylending activity, and the borrower does not suffer any rationing in the institutional market. If the expected net income associated to the indifference curve Ey_A is higher than the one associated to Ey_C (figure 1), moneylenders will leave the market, because borrowers will only go to traditional banks; in the opposite case (if Ey_C exceeds Ey_A) the formal sector will find no clients.

If the individual is rationed in the formal credit market, the final result will depend on the sign of expected profits described by curve $E\pi_{B'}$ (figure 2.b). If it is positive, local moneylenders will be motivated to lend on the market because the institutional lenders would not be able to offer a menu of contracts as attractive as those described at point B'; if it is negative, local moneylenders would be forced to leave the market.

We now examine the case in which there are nonexclusive contracts offered by the formal sector; this scenario is depicted in figure 3, differentiating between the situation in which there is no "spillover"[6] and the case with "spillover".

As shown in the following graph (figure 3.a), the lowest rate the informal lender could charge and still make non negative expected profits (i) exceeds r_1. The shape and the location of the expected profits curve depends on different factors: the moneylender's knowledge of different relationships that regard traditional banks and borrowers, and the ease of entry into moneylending activities.

The contours of the individual's preference map are steeper than the previous case[7], while those of the local moneylenders are unchanged or become less steep, depending on the quantity and the quality of the information available concerning the borrower's dealings with the formal sector.

The most interesting case to examine is that in which the debtor is rationed in the formal segment of the market. In section "a" of figure 3, the indifference curve $Ey(\bullet) = Ey_B$ is below the zero profit curve $E\pi(\bullet) = 0$, which describes the optimal menu of contracts that the moneylender is able to offer.

If the firm (in this situation, the moneylender) does not make any investment in the search of information concerning the borrower's characteristics, it cannot offer any interesting contracts to potential clients, since there is no contact between the two curves.

In the two different cases depicted in figure 3.b, there is tangency between the expected profits curve and the indifference curve of the borrower. The lender, in this context, invests in knowledge concerning the borrower's features, and incurs the costs of the search of information needed for the screening activity.

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[6] In this particular context, I have considered the "spillovers" connected to the knowledge and information about borrowers, on the basis of the model developed by Romer (1986).
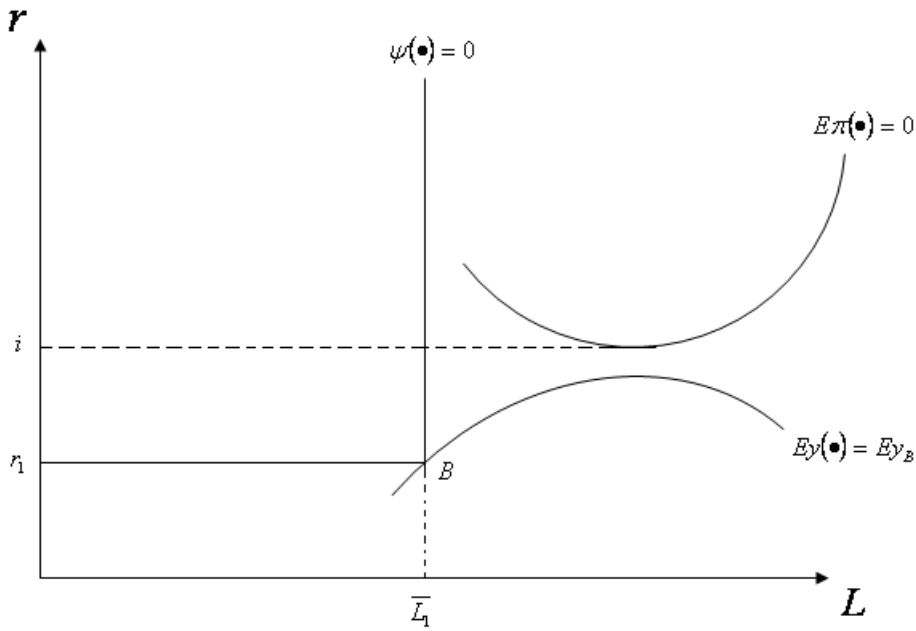[7] In Bell (1990).

This increases $E\pi$ for all levels of L and r, which leads to a downward movement of the expected profits curve (as shown in the passage from part "a" to part "b" in figure 3).

A new equilibrium, that takes on different characteristics based on the kind of market where moneylenders and credit agencies operate, is created. In the case of a monopoly, the equilibrium corresponds to point M ', while in the presence of a competitive market it will be C '(in which there are no profits.)[8]

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[8] The spread of information concerning the characteristics of potential clients to other firms ("lenders") creates a "spillover effect", that represents a positive esternality for the other operators in the market; the firm, which has initially made the investment in information collection, does not receive any form of repayment for this.

Figure 3.a: Equilibrium in presence of non-exclusive contracts of the formal sector, in absence of "spillovers"

taken from: "Interactions between institutional and informal credit agencies in rural India", Bell (1990).

Figure 3.b: Equilibrium in presence of non-exclusive contracts of the formal sector, with "spillovers"
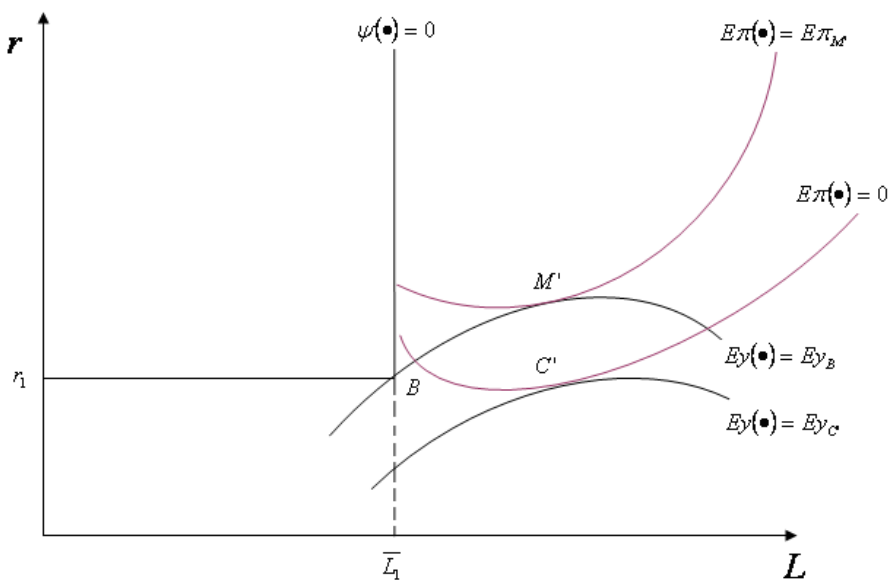
taken from: "Interactions between institutional and informal credit agencies in rural India", Bell (1990).

INTERMEDIATION BETWEEN CREDIT AGENCIES AND MONEYLENDERS

In order to evaluate the effects produced by the intermediation between credit agencies and the informal sector on the loan contracts, initially we assume to be in a context of perfect information. In the absence of uncertainty, the moneylender (who either is a monopolist or operates in a competitive market) will respond to a fall in the cost of loanable funds with a decrease in the level of interest rate.

In the case of monopoly, if the moneylender is not able to apply a perfect discrimination in this market, his clients will enjoy an improving margin; in a perfect competitive market, where the marginal costs are constant, the borrowers will secure the entire welfare gain.

We now examine the scenario with imperfect information. If there is free access to moneylending, the expected profits will be equal to zero, the expected iso-profits curves, depicted in figure 2, will shift downward and the fund costs for the lender will decrease, so that the debtors will earn the total gains.

If the moneylender is a monopolist, and in the presence of exclusive contracts, he will secure all the profits generated by the loan activity, unless the lender confronts credible threats of strategic default from the client. These threats can lead to a sharing of gains between monopolist and borrower. Another important aspect to consider, concerning the relationships between formal and informal sectors, is the possibility for an individual who obtains a loan by an institutional agency to relend this amount to another subject, charging him a higher interest rate.

This possibility is limited by several factors:

- The supply of funds from institutional agencies is restricted.
- The activity of relending implies that the lender has information about the borrower's characteristics, and this type of knowledge is expensive (a part of this costs can be covered by the spread between the interest rate applied on the institutional market and the informal interest rate).
- Alternative activities, such as farming activities, can be more attractive than the "relending" and generate higher returns.

In the case in which there is free entry to the moneylending activity for each potential lender able to acquire knowledge concerning the clients, and if there is a sufficiently large number of lenders willing to offer on the market unlimited funds at the interest rate r_1, then the expected profits in this sector will decrease in the long run and fall to zero.

Finally, if there is an excess demand by potential borrowers at the interest rate r_1, and the institutional agencies are not able to operate exclusively on the market, the equilibrium will be at point C' in figure 3.b.

CONCLUSIONS

In the underdeveloped countries, informal finance assumes relevant dimensions, as most of the population lives in rural zones, in which economic conditions are difficult. It meets the needs of entrepreneurs who have no access to the formal credit market, and can be considered the principal indicator of the demand for microfinance services. The institutions and the organizations that operate in the market for microcredit represent the missing link which ties the formal sector to the informal one within the underdeveloped economies.

An important role is played by risk, closely connected to farming activities, which turn out to be the most important sector in these countries. However, the opportunities for risk management (for example, through the provision of insurance) are underdeveloped, especially in the rural areas. What is most surprising is the small proportion of financial transactions that are accounted for by the institutional sector, compared to the full scale of market operations, above all in rural economies. The aspect that keeps the various financial forms together and dominates this market is the reliance on personal ties and economic interdependence among the subjects involved. This makes it possible to bypass informational problems that prevent the formal agencies from finding correct information about the debtors, and to effect a screening activity.

The analysis of the rural markets shows that credit demand is generated by three distinct kinds of needs: fixed capital, mostly to start new economic activities, working capital, devoted to buy equipment used to develop production, and consumption credit, generally requested by the poor.

As shown by Basu (1997), the seasonal character of farming production, together with the low level of income that characterizes the rural markets, increases the importance of the working capital and the consumption credit; obviously, a lot of resources are necessary to start a farming activity, that could be reimbursed only later on, from the moment in which the harvest will be sold. The uncertainty that dominates the sector, caused also by outside factors, such as the unforeseeable climate conditions, does not allow for reliable forecasts on future incomes and often creates important variations in earnings .

Some peculiar features of the rural credit markets can be readily identified. Above all, informational constraints are pervasive: they generate uncertainties concerning the destination of the agreed upon loan and the decisions regarding its repayment because of scarce information

about the debtor. Segmentation is another widespread aspect given that credit relations are extremely personalized and require time to be set up with the local moneylender.

Exclusive contracts also play an important role in informal markets (see Bell, 1990) because the lender often does not approve of his client receiving financing from other operators, nurturing and favouring monopolistic power in the hands of local moneylenders. The rationing of the available credit is another important phenomenon in such markets, one which affects both the formal and informal sector .In my opinion, the most intriguing characteristic that marks rural economies is the interlinkage that ties these credit transactions to other types of transactions in different markets, like those of labour or land or farm production, with the aim to increase loan contract enforcement.

One of the main reasons why credit transactions present interlinkage characteristics is to be found in the fact that complex agreements of this type contribute to preventing strategic failure of borrowers, by providing an additional incentive system targeted to loan repayment.
Basu (1997) describes the hierarchical interdependence that is formed between the landlord and tenant, and highlights how this constrains the poor, barring them from free access to credit, tying them exclusively to their landlord for all economic needs.
The same phenomenon of interlinkage is examined through the formal model of Bell (1990), and constitutes the main point of my work; this model analytically describes how moneylenders and institutional credit agencies interact in the rural Indian credit market.

On the basis of the literature I have examined, I believe that a potential solution for the information problems inside these markets is the use of knowledge and information possessed by local moneylenders to the benefit of banks and credit institutions. This is possible if we presume that those lenders may act on behalf of a formal credit institution, becoming its "agents" to all intents and purposes. In such a scenario, agents would operate following the provisions of a traditional bank, for which they act as intermediaries, and would at the same time benefit from a considerable information potential concerning target customers, such as to allow screening at reduced costs, with considerable advantage for the institutional body.

In case such a suggestion were implemented, the problem of defining a system of incentives, to stimulate agents to select the best customers in terms of reliability, would arise; as a possible solution, an agent might be guaranteed a fixed minimum salary making the risk affordable, and then be given a further variable remuneration linked to the effective repayment rates obtained.

APPENDIX

Starting from the assumption that in the presence of the phenomenon of "moral hazard" the probability of project default increases with the size of loan (L) (as shown by Bell, 1990), Smith (1972, discussed in Milde and Riley, 1988) develops the optimal level of credit rationing, on the basis of the contract curve (which describes all the combinations of L and M Pareto-efficient for the lender and the borrower).

Subsequent elaborations of his model are due to Jaffee (1972) and Milde and Riley (1988); the latter, starting from the analysis of a neoclassic model of credit market, propose a vertical contract curve in which a level of fixed L, (L^*), which guarantees the maximization of total surplus, is calculated.

Mathematically, the procedure for the definition of L^* is simple (figure 1). First, we define the feasible set, that is the "constraint", limited by the curve $Ey(\bullet) = V^*$ to the north and by the curve that guarantees expected profits equal to zero for the firm to the south. This turns out to be a compact set. Then we maximize the total surplus (given by the sum of expected net returns of the borrower and expected profits of the lender).

In order to simplify the analysis, we define such a function in the following way:

$$W = Ey(L,r) + E\pi(L,r) \qquad (a)$$

The total surplus (W) is maximized with the selection of level L that satisfies the first order condition $\dfrac{\partial W}{\partial L} = 0$.

We suppose that the expected profit function is the following:

$$E\pi = P(L)(1+r)L - (1 - P(L))L \qquad (b)$$

Where P represents the probability of success of the project, with $P'(L) < 0$. If the project succeeds, the return for the lender is the repayment of loan with interests; in the other case, the return is equal to zero. Costs are represented by the loan's loss in the bad case.

The slope of the iso-expected profit curve is:

$$\frac{dr}{dL} = -\frac{\partial E\pi / \partial L}{\partial E\pi / \partial r} = -\frac{P(L)(1+r) + P'(L)(1+r)L - (1 - P(L)) + P'(L)L}{P(L)L} \qquad (c)$$

The sign of (c) depends on

$$L \lessgtr \frac{1 - P(L)(2+r)}{P'(L)(2+r)} \qquad (d)$$

If (c) =0 and (d) is satisfied as strict equality, we have an extreme point of the iso-profit curve. We now use (c) in order to calculate the second derivative, with $P''(L)=0$:

$$\frac{d^2r}{dL^2} = -\frac{[2P'(L)(1+r)+2P'(L)]P(L)L - [P(L)(1+r)+P'(L)(1+r)L - (1-P(L))+P'(L)L][P'(L)L+P(L)]}{(P(L)L)^2} \quad \text{(e)}$$

The second quadratic bracket is identical to the numerator of (c), so that its value is zero in the neighbourhood of the extreme point (*envelope theorem*).

In this neighbourhood, (e)>0, then the extreme point is a minimum of the iso-profit curve. We note that the value of L which defines this minimum is an inverse function of (r) (see (d)).

Furthermore, we assume that the expected net income curve is:

$$Ey = P(L)[y(L)-rL] \quad \text{(f)}$$

Where y is the gross return of the project, with $y'>0$ and $y''<0$. If the project succeeds, the borrower obtains this amount of money, in the case of default, the returns and the costs are both equal to zero[9] (because the borrower does not repay the loan).

The slope of the indifference curve is:

$$\frac{dr}{dL} = -\frac{\partial Ey / \partial L}{\partial Ey / \partial r} = -\frac{P'(L)[y(L)-rL]+P(L)[y'(L)-r]}{P(L)L} \quad \text{(g)}$$

The sign of (g) depends on

$$L \lessgtr \frac{P(L)[y'(L)-r]+P'(L)y(L)}{P'(L)r} \quad \text{(h)}$$

If (g)=0 and (h) is satisfied as strict equality, we have an extreme point; from (g), with $P''(L)=0$:

$$\frac{d^2r}{dL^2} = \frac{[2P'(L)[y'(L)-r]+P(L)y''(L)]P(L)L - [P'(L)L+P(L)][P'(L)[y(L)-rL]+P(L)[y'(L)-r]]}{(P(L)L)^2} \quad \text{(i)}$$

The last quadratic bracket is identical to the numerator of (g), and it is equal to zero for the *envelope theorem*.

If (g)=0, the two quadratic brackets of (g) must assume the same sign and, in order to have (f)>0, this sign must be positive. We now apply this condition at the first quadratic bracket of (i), and we obtain that (i)<0 in the neighbourhood of the extreme point; this point is a maximum of the indifference curve. From (h), the value of L that defines this maximum is an inverse function of (r).

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[9] We suppose the absence of *strategic bankruptcy*.

From (c) and (g) we obtain the equation that defines the contract curve; if we solve for L, we have:

$$L = \frac{1 - 2P(L) - P'(L)y(L) - P(L)y'(L)}{2P'(L)} \qquad \text{(l)}$$

Given that y, y', P, P' are only functions of L, the Pareto-efficient level of L is independent of r, therefore the contract curve is vertical.

In addition to this, we can note that the value of equation (l) is ≥ 0, only if

$$P(L) \geq \frac{1 - P'(L)y(L)}{2 + y'(L)} \qquad \text{(m)}$$

From (m) it follows that P must be greater than a certain strictly positive level (not just greater than zero).

If we set (g) equal to zero and solve for L, we obtain the demand function for parametric values of r, so $D(r)$ (figure 1) connects all the maximum points of the indifference curves.

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